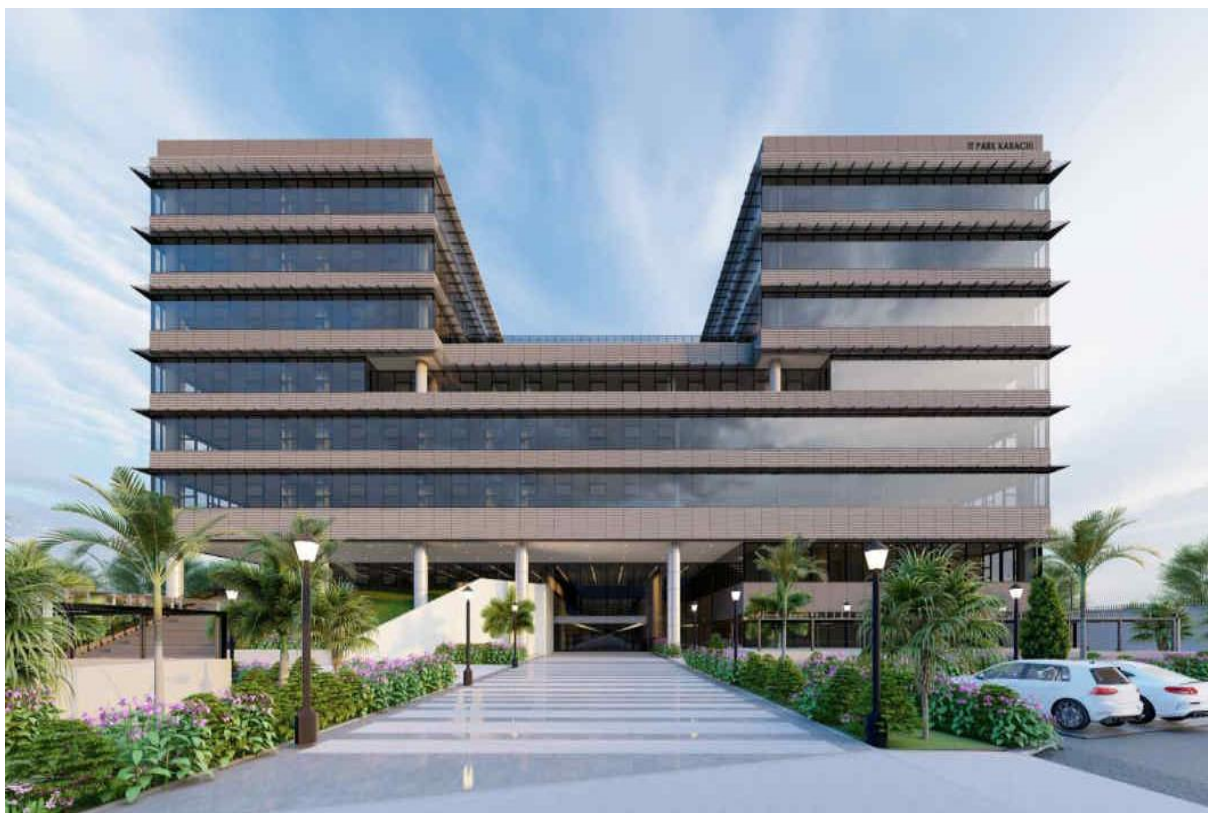


PAKISTAN SOFTWARE EXPORT BOARD (PSEB)

CONSULTANCY SERVICES FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND TRAFFIC IMPACT ASSESSMENT (TIA) FOR ESTABLISHMENT OF IT PARK AT KARACHI



ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

April 2025



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Consultancy Services for Environmental Impact Assessment (EIA) and Traffic Impact Assessment (TIA) for Establishment of IT Park at Karachi

Environmental Impact Assessment (EIA)

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LIST OF ABBREVIATIONS

AIDS:	Acquired Immunodeficiency Syndrome
AOI:	Area of Influence
BCP:	Building Code of Pakistan
BOD:	Biological Oxygen Demand
BoQs:	Bill of Quantities
CAA:	Civil Aviation Authority
CDM:	Clean Development Mechanism
CoC:	Code of Conduct
COP:	Conference of the Parties
COVID-19:	Coronavirus Disease 2019
DCP:	Dry Chemical Powder
DFO:	District Forest Officer
E&S:	Environment and Social
EC:	Environment Checklist
EIA:	Environmental Impact Assessment
EH&S:	Environment, Health, and Safety
EMMP:	Environmental Management and Monitoring Plan
EMP:	Environmental Management Plan
EPA:	Environmental Protection Agency
ECO:	Economic Cooperation Organization
EMMM:	Environmental Mitigation and Management Matrix
GRC:	Grievance Redressal Committee
GRM:	Grievance Redressal Mechanism
GT&GE:	Geo-Technical and Geo-Environmental Engineering
GHG:	Greenhouse Gas
HIV:	Human Immunodeficiency Virus
HSE:	Health, Safety, and Environment
HVAC:	Heating, Ventilation and Air Conditioning
IAQ:	Indoor Air Quality
ICT:	Information and Communication Technology
IEE:	Initial Environmental Examination
IUCN:	International Union for Conservation of Nature
JIAK:	Jinnah International Airport Karachi
K-Electric:	Karachi Electric Supply Company
KMC:	Karachi Metropolitan Corporation
KWSB:	Karachi Water and Sewerage Board
LAA:	Land Acquisition Act
LED:	Light Emitting Diode
LOS:	Level of Service
LPG:	Liquefied Petroleum Gas
MET:	Meteorological
MCC:	Manual Classified Counts
MSDS:	Material Safety Data Sheet

NESPAK:	National Engineering Services Pakistan
NOC:	No Objection Certificate
NS:	Not Specified
O&M:	Operation and Maintenance
OIC:	Organization of Islamic Cooperation
PAF:	Pakistan Air Force
PAA:	Pakistan Aviation Authority
PAPs:	Project Affected Parties
PCC:	Plain Concrete Cement
PCU:	Passenger Car Unit
P&D:	Planning and Development
Pak-EPA:	Pakistan Environmental Protection Agency
PETSAC:	Pakistan Electric and Telecommunication Safety Code
PD:	Project Director
PHA:	Parks and Horticulture Authority
PGA:	Peak Ground Acceleration
PM:	Particulate Matter
PMD:	Pakistan Meteorological Department
PMU:	Project Management Unit
PPE:	Personal Protective Equipment
RCC:	Reinforced Concrete Cement
RNR:	Renewable Natural Resources
SAARC:	South Asian Association for Regional Cooperation
SC:	Supervision Consultant
SDG:	Sustainable Development Goals
SEA:	Sexual Exploitation and Abuse
SEPA:	Sindh Environmental Protection Agency
SEQS:	Sindh Environmental Quality Standards
SIDA:	Sindh Irrigation and Drainage Authority
SLGA:	Sindh Local Government Act
SSSD:	Sindh Strategy for Sustainable Development
SOP:	Standard Operating Procedure
STI:	Sexually Transmitted Infection
STD:	Sexually Transmitted Disease
STP:	Sewage Treatment Plant
SW:	South West
TIA:	Traffic Impact Assessment
TMA:	Tehsil Municipal Administration
UN:	United Nations
UNESCO:	United Nations Educational, Scientific and Cultural Organization
UNFCCC:	United Nations Framework Convention on Climate Change
UNCED:	United Nations Conference on Environment and Development
USD:	United States Dollar
VOC:	Volatile Organic Compound
WHO:	World Health Organization



EXECUTIVE SUMMARY

ES-1 INTRODUCTION

Pakistan Software Export Board (PSEB) has initiated IT Park Karachi Project. The purpose of IT Park is to provide a place where innovative businesses can develop and prosper, to boost a knowledge-based economy; to encourage entrepreneurship; to develop the latest technology in the region; and to attract foreign investment.

ES-2 LEGAL AND ADMINISTRATIVE FRAMEWORK

According to the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021, the proposed project falls under Category J - Urban development and Tourism (2. Residential, Commercial high rise buildings subject to compliance of building bylaws of relevant organization more than 500,000 sq. feet) of Schedule III, which requires EIA study before commencement of construction. Sindh Environmental Protection Act, 2014 is the core legislative requirement to be complied for the proposed project.

ES-3 DESCRIPTION OF THE PROJECT

The project site is situated in Pakistan airport Authority Colony, Faisal Cantonment near Jinnah International Airport Karachi. The project area is accessible through various roads which include Airport road, Shah Faisal Avenue road etc. Total Land area is 24,281 m². The Project site is a barren land covered with shrubs, bushes and couple of trees. Land is already acquired by PSEB from Jinnah International Airport Karachi. The proposed Project is expected to be completed within 30 months. The estimated total cost of the proposed Project is approximately USD 124.39 Million.

ES-4 ANALYSIS OF ALTERNATIVES

Before finalization of the design, various options have been considered during design phase. The analysis has been carried out critically so as to justify the need of the Project and the selected options. Besides the economic viability, environmental sustainability and social soundness has also been considered for analyzing various alternatives for the proposed Project. The details of alternative analysis are provided in Section 4.

ES-5 DESCRIPTION OF THE ENVIRONMENT

The data presented in the forthcoming sections has been collected from the primary and secondary sources. For the primary data acquisition, the NESPAK EIA team conducted the detailed field visits.

PHYSICAL ENVIRONMENT

The proposed project falls under administrative jurisdiction of Karachi. The project area is located in Karachi city, the south of Sindh. The terrain morphology of project area comprise predominantly flat with small sections of ridges and slopes. The physiographic features of the Project Area are divided into two broad categories: Hilly Region (Mountain Highland) and Alluvial Plain (Piedmont Plain). The geology of the proposed Project Area falls under HOLOCENE surficial deposits comprises of unconsolidated deposits of clay, gravel and morains and MIOCENE ROCK Gaj Formation comprises of mainly marine shales and limestone, fossiliferous, topmost sandstone and shales estuarine with abundant molluscan and few vertebrate fauna, early Miocene. The soil in the study area varies from mainly loamy to partly gravelly soils. The Building Code of Pakistan 2021 places project area in Seismic Design Category D. The surface water resources near project area include Malir River and canal.

The climate of Karachi can be characterized by dry, hot and humid conditions and in general terms it is moderate, sunny and humid. There is a minor seasonal intervention of a mild winter from mid-December to mid-February followed by a long hot and humid summer extending from April to September, with monsoon rains from July to mid- September. The level of precipitation is low throughout the year, whereas the humidity levels remain high from March to November, while very low in Winter as the wind direction in winter is north-easterly.

In order to determine the ambient air, background noise levels, water and wastewater quality of the study area different locations were selected in the AOI. Sensitive receptors within 500 m radius of the Proposed Project area were identified during the site visit. Mosques, educational institutes, medical centers were the sensitive receptors present within the Area of Influence (AOI) i.e. 500 m from the Project site.

ECOLOGICAL ENVIRONMENT

Due to gradual degradation of the habitat caused by climatic changes and anthropogenic stresses, the area has lost its original ecological identity and associated status of biodiversity. The area falls in the urban location and the habitat was found modified. There are no endangered species of fauna in the tract. There are no wetlands in the Project Area. There is no game reserve, wild sanctuaries and National Park present in the Project Area.

SOCIO-ECONOMIC ENVIRONMENT

The socioeconomic aspect has been studied with respect to human and economic development and quality of life values of the population in the Project Area. The human and economic development mainly focuses on population and communities, industrial development, infrastructure availability, institutions, transportation network, prevailing land use, power sources and agricultural pattern. Quality of life includes socio-cultural values, public health situation, recreational resources & development and archaeological/historical and cultural sites etc.



Baseline information was gathered from literature, study reports, district census reports and through field surveys comprising interviews and meetings by the Consultants' EIA team, using survey tools. During the field survey interviews and meetings with the different categories of respondents were held and observations were also recorded after giving due consideration during survey. The proposed site exists in Faisal Cantonment and settlements around proposed project site area (CAA Colony, Model Colony and Shah Faisal Colony) falls in the administrative jurisdiction of the Malir District mainly and some falls in the small portion of Korangi District and the socio-economic survey focused on the project area and relevant information related to the district.

ES-6 STAKEHOLDER CONSULTATION

A series of public consultations were required to get the feedback/concerns of the different category of stakeholders including provincial departments, district level departments, potential PAPs, local community and other general public residing in the Study Area. Consultation process includes focus group discussion, village/Town meetings and semi-structured interviews and one to one meeting or interviewed with the government, private and civil society institutions. During the consultation process, the stakeholders were briefed about the project objectives and scope.

ES-7 ANTICIPATED PROJECT IMPACTS AND MITIGATION MEASURES

Significant efforts were made to identify the main environmental (physical, ecological, social, and cultural) issues related to the design, construction and operation of the proposed project. The significant adverse impacts and their mitigations during the construction and operation phases are here under:

- The air & noise pollution will be produced due to the operation of construction machinery and equipment. Noise and vibration are perceived as one of the most undesirable consequences of construction activities. There are a variety of ways by which construction equipment and worksite noise can be controlled that includes use of Quieter Equipment, Modification of Existing Old Equipment, Barrier Protection, change in Work Activity Schedule and Maintenance of vehicle/equipment.
- Wastewater will be generated at the construction camps and from construction activities. If the generated wastewater is not properly treated or disposed of, this may contaminate the surface water sources such as nullahs, drains and water channels. The wastewater generation is estimated to be 19,200 gallons/day; and sewage from construction camps will be disposed of after proper pre-treatment and processes such as septic tank;
- A total of about 135 kg of solid waste will be generated from construction camps on daily basis. All the solid waste from the camps will be properly collected at source by placing containers and disposed of through proper solid waste management system;
- Air quality will be affected by fugitive dust emissions from construction machinery; dust from the unpaved surface and construction vehicles. Emissions from batching / asphalt plants can be controlled efficiently by the appropriate control measures. In addition to that, regular maintenance activities comprising changing of lubricating oil, changing the air and

fuel filter, cleaning the fuel system, draining the water separators and proper tuning may also help in reducing the emissions from diesel generators;

- Due to the construction camps, number of impacts may arise that include waste, soil pollution, groundwater pollution, dust, etc. The construction activities and vehicular movement at construction sites may result in road side accidents particularly inflicting local communities who are not familiar with presence of heavy equipment. Institutions along the route may also suffer during construction period due to air, noise and road accidents. Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources. Contractor will ensure the proper control on construction activities. Contractor will also take due care of the local community and observe sanctity of local customs and traditions by his staff. Contractor will warn the staff strictly not to involve in any unethical activities and to obey the local norms and cultural restrictions.
- Total of 11 plants are found in the project area which might require cutting. In compensation 110 plants will be planted. Additionally, proponent may plant 1,000 trees as an Environmental enhancement measure.

ES-8 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

The Environmental Management and Monitoring Plan (EMMP) of the proposed project mainly comprises institutional requirements; environmental mitigation and management matrix; environmental monitoring plan; plantation plan; Training and Capacity Building; Communication & Documentation; Management Plans; and EMMP Cost. Contractor in coordination with SEPA will be responsible for implementation of EIA of the proposed project during construction phase. The total cost required to effectively implement the mitigation measures is approximately Rs. 40.46 Million, which includes cost of training, environmental monitoring, tree plantation and Health and Safety etc. during construction and operational phases. The EIA including EMMP will be part of the contract document with the Contractor.

ES-9 CONCLUSION AND RECOMMENDATIONS

Results of the EIA Study have shown that the impacts of the Project activities on the physical, ecological and social environment will be low to moderate significant. These impacts could be reduced by proper management and well planned meticulous design of the proposed IT Park Building by implementing an appropriate tree plantation plan. An EIA provides a detailed mitigation matrix that covers impacts, mitigation measures roles and responsibilities and timings to avoid, minimize or mitigate the adverse impacts of the Project. EIA of the project needs to be implemented in true letter and spirit.

1 INTRODUCTION

1.1 GENERAL

This chapter provides an overview of the project's background, explains the rationale for conducting an Environmental Impact Assessment (EIA), defines the EIA's purpose and scope, introduces the EIA team, and outlines the approach and methodology employed in preparing this study.

1.2 PROJECT BACKGROUND

Pakistan is taking a holistic strategy to provide a quality environment for Information Technology (IT) industry by establishing a dedicated IT complex throughout the country. The Government of Pakistan (GoP) envisages its vision to become a top 25 global economy and join the league of upper middle income countries by 2025 with 'Pakistan Vision 2025'. Translating the vision into action, the document sets 7 priority areas including a responsible and accountable government and public sector, entrepreneurial private sector, competitiveness in a knowledge economy, etc. Among the seven pillars of the Vision 2025, the sixth pillar represents knowledge economy, which emphasizes the importance of innovation and IT industry. Information and Communication Technology (ICT) is the key driver of innovation, economic competitiveness, and greater social inclusion. However, the GoP evaluates itself that the country's potential of ICT is not sufficiently leveraged. In response, Pakistan aims to strengthen IT infrastructure, which would include access to broadband internet and computers, improvement of technological readiness, etc.

Pakistan Software Export Board (PSEB) has initiated IT Park Karachi Project. The purpose of IT Park is to provide a place where innovative businesses can develop and prosper, to boost a knowledge-based economy; to encourage entrepreneurship; to develop the latest technology in the region; and to attract foreign investment.

The proposed project is located in Sindh therefore, to comply with the national legal requirements specifically with the Sindh Environmental Protection Act, 2014, PSEB has engaged National Engineering Services Pakistan (Pvt.) Ltd for carrying out Environmental Impact Assessment (EIA) for IT Park, Karachi.

1.3 NEED FOR EIA STUDY OF THE PROPOSED PROJECT

EIA is mandatory according to the Sindh Environmental Protection Act, 2014. Section 17 of the Act states that:

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



According to the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021, the proposed project falls under Category J - Urban development and Tourism (2. Residential, Commercial high rise buildings subject to compliance of building bylaws of relevant organization more than 500,000 sq. feet) of Schedule III. As the total floor area of the proposed IT Park building is 1,201,306 sq. feet, therefore the proposed project requires EIA study before commencement of construction.

1.4 THE PROPONENT AND CONSULTANT

The proponent of the project is Pakistan Software Export Board (PSEB) while the Consultant is National Engineering Services Pakistan (NESPAK). The details are given as under:

a) Proponent Contact Address

Project Director

Pakistan Software Export Board, 2nd floor, Evacuee Trust Complex, F-5/1, Islamabad

Tel: 051-9204074

email: aahmad@pseb.org.pk

b) Consultant Contact Address

National Engineering Services Pakistan Private Limited (NESPAK)

ERSD Section, GT & GE Division, NESPAK House

1-C, Block – N, Model Town Extension, Lahore

Phone: +92 42 99090000

1.5 NATURE, SIZE AND LOCATION OF THE PROJECT

The project site is situated in Pakistan Airport Colony, Faisal Cantonment near Jinnah International Airport Karachi. The total land area of proposed project is 24,281m² and the total floor area is 111,605 m² (1,201,306 sq. feet)¹. The proposed building is comprised of three (03) basement floors, one (01) ground floor and seven (07) floors. The location map of the proposed project is shown in **Figure 1.1**.

¹ Total floor area is calculated by multiplying floor area with the no of floors.

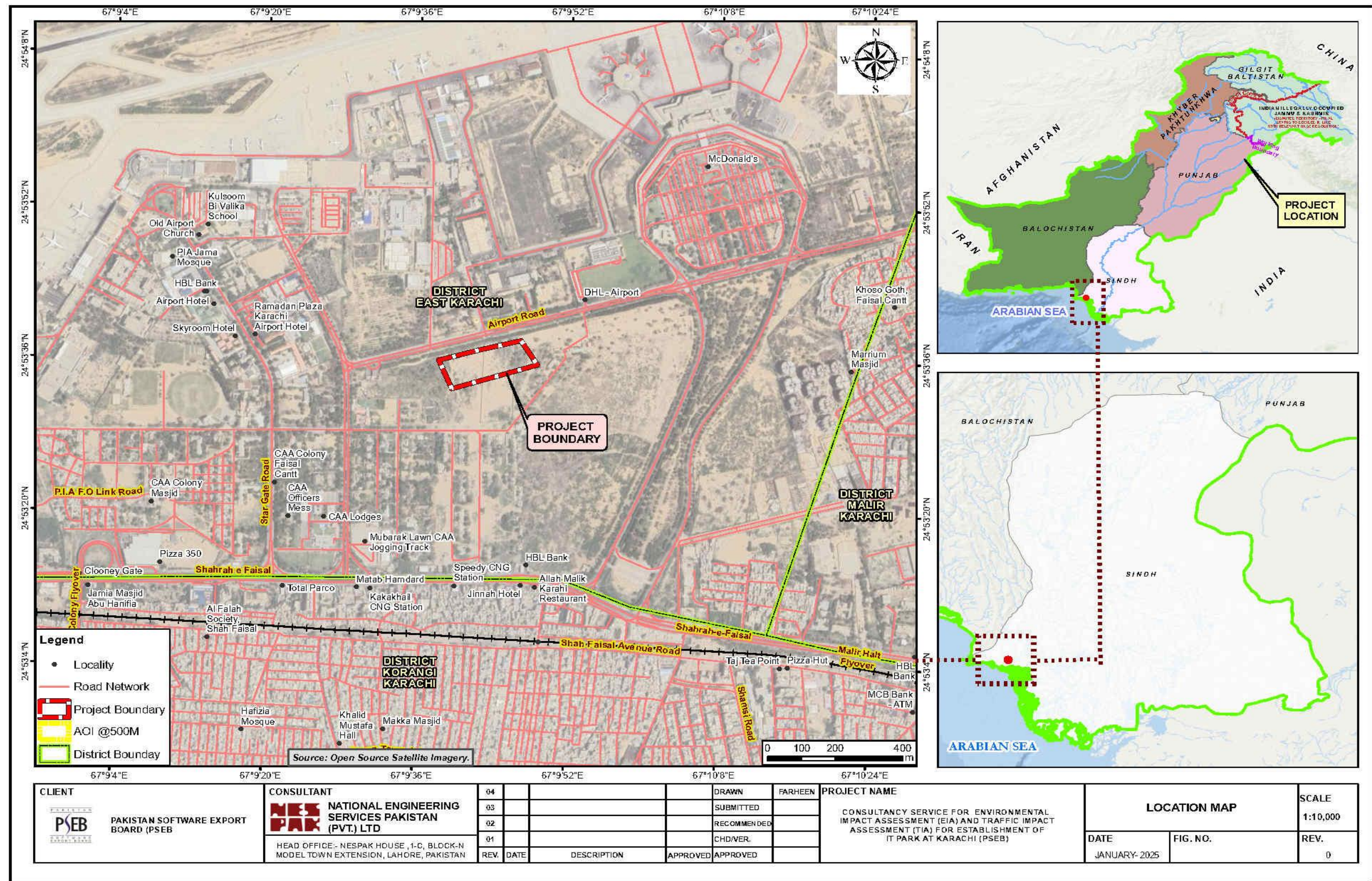


Figure 1.1: Location Map

1.6 SCOPE OF EIA STUDY

The scope of this EIA Study is as follows:

- Review of all relevant existing data, studies, reports and drawings;
- Review of international/national and local guidelines, laws and policies;
- Collection of baseline data related to Physical, Ecological and Social/Cultural environmental aspects;
- Identification, evaluation and categorization of the potential significant bio-physical and socio-economic impacts on the local environment during the construction and operational stages of the proposed project;
- Recommend appropriate mitigation measures for the identified adverse impacts and prepare monitoring plans to address them; and
- Preparation of an Environmental Management and Monitoring Plan (EMMP).

1.7 PURPOSE OF EIA REPORT

The purpose of this EIA Report is to assess whether or not significant adverse environmental impacts are anticipated and to suggest mitigation and remedial measures to make the Project environmental friendly and sustainable during the construction and operational stages of the Project and to initiate the process of obtaining Environmental Approval/No Objection Certificate (NOC) from the Sindh Environmental Protection Agency (SEPA).

1.8 STUDY TEAM

A multidisciplinary team was formulated to conduct the study. The team comprises the following professionals:

Sr. No.	Name	Proposed Position
1.	Mr. Mir Ghazanfar Afzal	Head ERSD/QA Expert
2.	Ms. Uzma Iqbal	Team Leader
3.	Mr. Abdul Basit Sheikh	Traffic Expert
4.	Mr. Hafiz Muhammad Abid Saleem	Sr. Environmental Expert
5.	Mr. Muhammad Sajjad	Sr. Sociologist
6.	Mr. Ibadullah	Sr. Ecologist
7.	Mr. Waleed Farooq	Environmental Engineer

1.9 STUDY APPROACH & METHODOLOGY

1.9.1 Study Approach

The study was conducted in accordance with the requirements of SEPA. The study was based on both primary and secondary data and information. Discussions were held with stakeholders including government officials and community representatives. The main purpose of this approach was to obtain a fair impression on the people's perceptions of the project and its environmental impacts.

1.9.2 Methodology

The following methodology was adopted for carrying out the EIA study of the proposed Project:

a) Orientation

Meetings and discussions were held among the members of the EIA Team of Consultant as well as Client. This activity was aimed to achieve a common ground of understanding of various issues of the study.

b) Planning for Data Collection

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 EIA Team. The plan include; identification of specific data requirements and their sources; determination of time schedules and responsibilities for their collection; and indication of the logistics and other supporting needs for the execution of the data acquisition plan.

c) Data Collection

In this step, primary and secondary data was collected through field observations, environmental monitoring in the field, concerned departments and published materials to establish baseline profile for physical, biological and socio-economic conditions. These activities are as under:

- Analysis of Maps and Plans;
- Literature Review;
- Desk Research;
- Public Consultations;
- Field Observations & Studies; and
- Laboratory Analysis;

Physical Environment

Information was gathered on the existing physical environment, particularly as related to geology, topography, soils, hydrology and drainage, water quality, air quality and noise levels in the Project Area.

Biological Environment

The status of the flora and fauna of the study area were determined by an ecological survey, a review of literature relevant to the study area, and an assessment of terrestrial environments.

Socio-Cultural Environment

The EIA team utilized a combination of desk research, field investigations, census data, structured interviews, maps, reports to generate the data required for description of the existing social environment and assessment of the potential impact of the construction of the proposed project.

d) Stakeholder Consultations

Project stakeholders were identified and meetings and consultations were held during the surveys to receive feedback on the expected environmental issues related to the project and suggested mitigation measures. Meetings were carried out with the locals, relevant departments including Forest, Wildlife, Social Welfare, SEPA, Pakistan Airport Authority etc. to discuss the issues/constraints and get their views and feedback to mitigate the potential environmental impacts associated with the implementation and operation of the project. The proceedings of the consultations/meetings/e-communications along with the photographs and list of participants are documented in Chapter 6.

e) Identification and Evaluation of Environmental Impacts

The impacts of the proposed project on the physical, biological and socio-economic environment prevalent in the Project Area were visualized at the design, construction and operational phases.

f) Mitigation Measures and Implementation Arrangements

The adequate mitigation measures and implementation mechanisms were proposed so that the proponent could incorporate proposed mitigation measures beforehand in the design phase.

1.10 STRUCTURE OF THE REPORT

This report has been structured into following sections;

Section 1 “**Introduction**” briefly presents the project background, purpose, need of EIA study and adopted methodology.



Section 2 “**Policy, Legal and Administrative Framework**” comprises policy guidelines, statutory obligations and roles of institutions concerning EIA study of the proposed Project.

Section 3 “**Project Description**” furnishes information about the location of the proposed project, cost and size of the project and its major components.

Section 4 “**Analysis of Alternatives**” describes no project option, design and site alternatives and the selection of best alternative.

Section 5 “**Description of the Environment**” describes physical, ecological and socio-economic conditions prevalent in the project area.

Section 6 “**Stakeholder Consultations**” provides summary of consultative sessions with the local community as well as with other stakeholders including, local government officials, for their opinions and suggestions on the project

Section 7 “**Anticipated Environmental Impacts and Mitigation Measures**” identifies and evaluates impacts of the project activities during the design, construction and operation stages and provides recommendations to mitigate potential environmental impacts of the proposed project.

Section 8 “**Environmental Management & Monitoring Plan (EMMP)**” outlines environmental mitigation plan, institutional arrangements for the implementation of the proposed mitigation measures, monitoring requirements, environmental cost etc.

Section 9 “**Conclusion and Recommendations**” elaborates the conclusion of subject environmental study and suggests the recommendations to address the issues raised from proposed project activities.

2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

2.1 GENERAL

This chapter provides an overview of the policy framework and legislation that applies to control the environmental consequences as a result of Project implementation and operation. The Project needs to comply with all the applicable environmental policies, laws, guidelines, acts and legislations of Government of Pakistan and the provincial government.

2.2 SUMMARY OF RELEVANT STRATEGIES, POLICIES, ACTS AND LEGISLATION

The summary of major relevant strategies, policies, acts and legislation from environmental perspective are briefly described in **Tables 2.1 & 2.2** below:

Table 2.1: Main Strategies/Policies Related to Environment and Relevance to the Project

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
1.	National Environmental Policy, 2005	In March 2005, Government of Pakistan (GoP) launched its National Environmental Policy, which provides a framework for addressing the environmental issues. Section 5 of the policy commits for integration of environment into development planning as instrument for achieving the objectives of National Environmental Policy. It also provides broad guidelines to the Federal Government, Provincial Governments, Federally Administered Territories and Local Governments to address their environmental concerns and to ensure effective management of their environmental resources.	Clause (b) of sub-section 5.1 states that EIA related provisions in Environmental Protection Act, 1997, will be diligently enforced for all developmental projects.
2.	National Forest Policy, 2015	The goal of this policy is to foster the sustainable development of Renewable Natural Resources (RNR) in Pakistan, through maintenance and rehabilitation of these essential resources and enhancement of sustainable livelihoods of rural masses, particularly women, children and other deserving groups. The various components of the policy include: a) Reducing poverty, powerlessness and unemployment; b) Population planning in critical ecosystems;	Proposed Project involves tree cutting in the Project area so the relevant clauses of preservation of the policy will be applicable.

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		c) Reducing the impact of socio-economic factors; d) Providing substitutes to firewood in the mountain-woods; e) Reducing political interferences in Forestry and Wildlife Departments; f) Renovating and invigorating the institutions of RNR; g) Supporting Local Governments in the sustainable development of their RNR; h) Policies for fragile ecosystems; i) Riverside forests; j) Irrigated plantations; k) Preservation of sensitive and unique forests; l) Wildlife conservation; m) Rangelands and desert ecosystems; and n) Planting trees and fodder on farmlands.	
3.	Pakistan Labor Policy, 2010	The main objective of the Labor Policy, 2010 is the social and economic well-being of the labor of Pakistan. The Labor Policy, 2010 has following 4 parts: • Legal Framework; • Advocacy: rights of workers and employers; • Skill development and employment; and • Manpower export.	The labor will be employed for construction of the proposed Project. The provision of policy will apply to all the labor employed.
4.	National Climate Change Policy, 2021	The National Climate Change Policy provides a framework for addressing the issues that Pakistan faces or will face in future due to the changing climate. In view of Pakistan's high vulnerability to the adverse impacts of climate change, in particular extreme events, adaptation effort is the focus of this policy document. The vulnerabilities of various sectors to climate change have been highlighted and appropriate adaptation measures spelled out. The policy cover measures to address issues in various sectors such as water, agriculture, forestry, coastal areas,	This policy document is a 'living' document and will be reviewed and updated regularly to address emerging concepts and issues in the ever-evolving science of climate change.

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		biodiversity and other vulnerable ecosystems. Notwithstanding the fact that Pakistan's contribution to global Greenhouse Gas (GHG) emissions is very small, its role as a responsible member of the global community in combating climate change has been highlighted by giving due importance to mitigation efforts in sectors such as energy, forestry, agriculture and livestock. Furthermore, appropriate measures relating to disaster preparedness, capacity building, institutional strengthening; technology transfer; introduction of the climate change issue in higher education curricula; ensuring environmental compliance through Initial Environmental Examinations (IEE) and Environmental Impact Assessments (EIA) in the development process; addressing the issue of deforestation and illegal trade in timber; promoting Clean Development Mechanisms (CDM); and raising Pakistan's stance regarding climate change at various international forums, have also been incorporated as important components of the policy. The policy thus provides a comprehensive framework for the development of Action Plans for national efforts on adaptation and mitigation.	
5.	Sindh Strategy for Sustainable Development, 2007	The Sindh Strategy for Sustainable Development (SSSD) proposed a ten-year sustainable development agenda for Sindh. The main focus of SSSD is to promote the sustainable use of natural resources. It targets to reduce poverty and enhance social development through the participation of the people of Sindh. The SSSD recommends that the rehabilitation and extension of water supply and sanitation networks, effective water and wastewater quality monitoring and treatment to comply with SEQS, improved coordination among stakeholders (public agencies, private sector, and residents) for the effective management of air pollution, consultation	This strategy is applicable as the Project involves the construction of building with least environmental burden.

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		based infrastructure planning and development with main focus on minimizing traffic and pollution hazards, and conducting environmental impact assessment of all the major projects. SSSD recommends for the sustainable development and environmentally complying operations of industries: incentive mechanisms for reducing pollution; awareness raising of industrialists and stakeholders; promote cleaner production; enforce pollution charges as per SEPA 2014; prepare baseline of all industrial estates and sites to establish the pollution levels, waste disposal practices, air emissions, generation of hazardous waste for the preparation of environmental management plans for complying SEPA 2014; preparation of EIAs for all industrial development and infrastructure projects.	
6.	Sindh Drinking Water Policy, 2017	This policy is to provide safely managed drinking water whose supply is adequate, well maintained and sustainable; and to enhance public awareness about health, nutrition and hygiene related to safe drinking water. The basic objective of this policy is to introduce legislative measures and regulations to create an enabling framework for safely managed drinking water supply, regulation of water usage, extraction, treatment transportation and distribution.	This policy is applicable for the Project construction phase in terms of regular water quality monitoring, all discharges must comply with environmental quality standards and reuse, recycle and recharge of wastewater for other municipal and productive use will be considered.

Table 2.2: Main Legislation/Acts Related to Environment and Their Relevance to the Project

Sr. No.	Legislation/Act	Brief Coverage	Relevance to the Project
1.	Sindh Environmental Protection Act, 2014	Sindh Environmental Protection Agency as a part of Sindh Act No. VIII of 2014 prepared Sindh Environmental Protection Act (SEPA), 2014 which was passed by the provincial assembly of Sindh on 24 th February, 2014 and asserted by the Governor of Sindh on 19 th March, 2014 and notified on 20 th March, 2014. It is a fairly comprehensive legislation and provides legislative framework for protection, conservation,	This Act has a direct bearing on the proposed Project as the Project requires an Environmental Impact Assessment (EIA). Furthermore, the proposed Project is located mainly in Karachi and so it falls under the jurisdiction of the SEPA that will be the responsible authority for approval of the EIA of the

Sr. No.	Legislation/Act	Brief Coverage	Relevance to the Project
		rehabilitation and improvement of the environment. It contains concrete action plans and programs for the prevention of pollution and promotes sustainable development. Act has 11 parts with 37 Sections followed by sub-sections and clauses. Part VI is related to the environmental examinations and assessments while part X is related to the public participation.	proposed Project falling in Sindh province.
2.	Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021	These regulations set out: • Key policy and procedural requirements for filing an EIA; • The purpose of environmental assessment; • The goals of sustainable development; • The requirement that environmental assessment be integrated with feasibility studies; • The jurisdiction of the Provincial EPA and Planning & Development (P&D) Departments; • The responsibilities of proponents; • Duties of responsible authorities; • Provides schedules of proposals that the Project requires either EC, IEE or an EIA; • The environmental screening process of the projects under schedule I, II and III; and • The procedure for the environmental approval for filing the case with the Sindh EPA for the granting of the NOC.	The provisions of these regulations are applicable for environmental screening of the Project which implies that an EIA study is required for the proposed project.
3.	Sindh Environmental Quality Standards (2016)	SEPA has formulated the Sindh Environmental Quality Standards (SEQS) as per Clause (g) of sub-section (1) of Section 6 of SEPA Act 2014. The SEQS were promulgated in 2016 which includes standards for liquid effluent, industrial gaseous emissions, ambient air, drinking water quality, noise levels and standards for motor vehicle exhaust, diesel vehicle, and petrol vehicles.	All projects to be implemented in Sindh must conform to SEQS during all the phases i.e. construction and operation.
4.	Guidelines for the Preparation and	These guidelines describe the format and content of IEE/EIA reports to be	The guidelines are applicable for the preparation of the EIA.

Sr. No.	Legislation/Act	Brief Coverage	Relevance to the Project
	Review of Environmental Reports, 1997	submitted to SEPA for obtaining NOC/approval. The guidelines present: • The environmental assessment report format; • Assessing impacts; • Mitigation and impact management and preparing an environmental management plan; • Reporting; • Review and decision making; • Monitoring and auditing; and • Project Management.	
5.	Guidelines for Environmental Assessment	Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental management of different types of development Projects. The guidelines that are relevant to the proposed Project are listed below. • Guidelines for the Preparation and Review of Environmental Reports, Pakistan Environmental Protection Agency, 1997; • Guidelines for Public Consultation, Pakistan Environmental Protection Agency, May, 1997; and • Sectoral Guidelines: Pakistan Environmental Assessment Procedures, Pakistan Environmental Protection Agency, October 1997.	The guidelines are applicable for the preparation of the EIA.
6.	Sindh Forest Act, 1927 (amended 2023)	The Forest Act 1927 has been replaced by the provincial Forest Act 2012, after forestry became into the provincial domain under the 18 th amendment to the Constitution of Pakistan. However, the main applicable clauses still hold true in essence. The Act reserve the areas having forest cover, or significant wildlife, to regulate movement and transit of forest produce, and duty livable on timber and other forest produce. It also defines the procedure to be followed for declaring an area to be a Reserved Forest, a Protected Forest or a Village Forest.	This Act will not be triggered as the project area doesn't fall within or near the forest areas.
7.	Sindh Wildlife Protection,	The Sindh Wildlife Protection, Preservation, Conservation &	As the proposed Project does not contain any wildlife

Sr. No.	Legislation/Act	Brief Coverage	Relevance to the Project
	Preservation, Conservation and Management Act, 2020	Management Act was approved in August, 2020. The Act was passed to make provisions for protection, conservation, preservation, and sustainable use of wildlife for establishment, management and maintenance of protected areas in the Province of Sindh. The Act introduces the establishment of a Council for the Conservation of Wildlife, and other measures which guarantee and protect the rights and ensure safety of wildlife in the Province of Sindh.	protected area in its vicinity nor does it fall under the flyway zone of migratory birds, no provision of this law would be applicable to it.
8.	Sindh Cultural Heritage (Preservation) Act, 1994	This provincial act empowers the GoS to preserve and protect any premises or objects of archaeological, architectural, historical, cultural, or national interest in Sindh by declaring them protected.	None of the sites protected under this law has been identified within the Area of Influence (Aol) of the proposed Project. However, chance find procedure will be adopted during construction if any cultural/heritage site is found in the project area.
9.	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.	This act is applicable as Project will generate the solid waste which will be managed and disposed of as per the legislative requirements of this act.
10.	The Sindh Local Government Act 2013 and Sindh Local Government (Amendment) Act, 2019	Under the Sindh Local Government Act 2013 (SLGA), Chapter VI, land use planning; implementation of building by-laws; management of environmental and health hazards; food adulteration; provision and maintenance of water supply schemes and public sources of drinking water; and mobilization of communities for the upgrade of local infrastructure (transportation, landscaping, and removal of encroachments) are the responsibilities of municipal corporations/committees.	This act is applicable for the proposed Project due to its location.
11.	Sindh Factories Act, 2015	The Act deals with regulations related to Project Area workers and workplace EH&S requirements. The Factories Act also provides regulations with provision	This act is applicable for the Project workers working in the construction industry (during construction phase).

Sr. No.	Legislation/Act	Brief Coverage	Relevance to the Project
		for general health and safety of the work force in their work area. Conditions are specified for clean work place, toilets, waste handling, provision of drinking water quality, worker health and hygiene etc. Under the Act, no occupier of a factory shall be allowed to start manufacturing process unless he has obtained factory registration certificate from the Directorate of Labor. The Act does not allow a child below the age of 14 years to work in a factory in any case. The new Law restricts the employment of contractual labor in manufacturing process.	
12.	The Sindh Occupational Safety and Health Act, (2017)	The act makes provisions for occupational safety and health conditions at all workplaces in the province for the protection of workers during work. Under the Act, an Occupational Safety and Health Council will be established in Sindh with secretary of Sindh government's Labor and Human Resources Department as its chairperson. The proposed council lays down penalties in case of death and injury due to violation. In case of death sub-section 01 of section 38 will accord 2 years' imprisonment or a fine of PKR 100,000 or both. Similarly, in case of injury the imprisonment may extend to six months or a fine up to PKR 20,000 or both.	The act applies in any Project situation where worker's rights and protections are enforced. This law is applicable to construction and Project workers and will be complied during construction and operation phases.
13.	The Sindh Transparency and Right to Information Act, 2016	The purpose of this Act to provide transparency and freedom of information to ensure that all citizens have better access to public information, to make the government more accountable to citizens, to enforce the fundamental right to information in all matters of public importance, to ensure transparency in all Government matters. Transparency and access to information are essential principles of democracy which not only enable the citizens to hold the Government and their institutions accountable but also help in improving the system of governance.	This act is applicable as the proposed Project is the public sector Project and shall be transparent for public.

Sr. No.	Legislation/Act	Brief Coverage	Relevance to the Project
14.	Explosives Act, 1884	It provides regulations for handling, transportation and use of explosives.	This Act is not applicable
15.	The Protection against Harassment of Women at the Workplace Act, 2010	The Protection Against Harassment of Women at the Workplace Act (2010) refers to sexual harassment at the workplace.	This Act will be applicable to the Project if women are employed for the construction of the proposed Project.
16.	The Sindh Prohibition of Employment of Children Act, 2017	The Sindh Prohibition of Employment of Children Act, 2017, is a comprehensive piece of legislation aimed at eliminating child labor in Sindh, Pakistan. Under this act, the employment of children under the age of 14 is strictly prohibited in any kind of establishment. For adolescents aged 14 to 18, employment is regulated, particularly prohibiting their involvement in hazardous occupations listed in the Act's schedule.	It will be ensured that no Child Labor is employed for the proposed project.
17.	Labor Laws as part of Constitution of Pakistan 1973	The Constitution of Pakistan contains a range of provisions with regards to labor rights, in particular: • Article 11 of the Constitution prohibits all forms of slavery, forced labor and child labor; • Article 17 provides a fundamental right to exercise the freedom of association and the right to form unions; • Article 25 lays down the right to equality before the law and prohibition of discrimination on the grounds of sex alone; and • Article 37(e) makes provision for securing just and human conditions of work, ensuring that children and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment. Labor law is controlled at both provincial and national levels with compulsory employment agreements containing the terms set out by the labor laws. The labor laws are a comprehensive set of laws in Pakistan dealing with the following aspects: • Contract of Employment; • Termination of Contract; • Working Time and Rest Time;	The labor laws are relevant as it would deal with employment of labor for the construction of proposed Project. Following are the major labor laws which are applicable to the Project: • The Sindh Bonded Labour System (Abolition) Act, 2015 • The Sindh Minimum Wages Act, 2015 • The Sindh Industrial Relations Act, 2013.

Sr. No.	Legislation/Act	Brief Coverage	Relevance to the Project
		• Working hours; • Paid Leave; • Maternity Leave and Maternity Protection; • Other Leave Entitlements; • Minimum Age and Protection of Young Workers; • Equality • Pay Issues; • Workers' Representation in the Enterprise; • Trade Union and Employers Association Regulation; and • Other Laws.	
18.	The Sindh Irrigation And Drainage Authority Act, 1997	The Sindh Irrigation and Drainage Authority Act of 1997 was established to oversee the equitable distribution and effective management of irrigation water in Sindh, Pakistan. This legislation created the Sindh Irrigation and Drainage Authority (SIDA), an autonomous body responsible for administering the region's irrigation and drainage systems, which are crucial for agricultural operations. The Authority's responsibilities include the maintenance and improvement of existing irrigation infrastructure, development of new systems, and ensuring efficient water usage across agricultural lands. Additionally, SIDA plays a pivotal role in managing the financial and administrative aspects of the irrigation and drainage systems, promoting sustainable agricultural practices, and involving community participation in water management	This act will be triggered if construction and operational waste (liquid and solid) disposed into nearby nullahs, Malir river and other distributaries of the Karachi.
19.	Land Acquisition Act, 1894 and Land Acquisition (Sindh Amendment) Act 2019	The primary law for acquisition of land for public purposes in Pakistan is the "Land Acquisition Act (LAA), 1894" (hereinafter referred as the Act). The land acquired under the Act vests in the Province and it is only thereafter that the Province may transfer it to someone else. The Sindh Amendment 2009 of LAA 1894 specifically related to Section 16, Section 23, Section 24 and Section 28-A.	This act will be elicited as proposed Project may involve temporary acquisition of land in the Project area for the construction of contractor camps.
20.	National Disaster Management Act, 2010	National Disaster Management Act, 2010 was passed by Parliament of Pakistan in 2010. The Act applies to whole Pakistan. The Act was passed in	This act is applicable to the proposed Project as the project area is prone to heat strokes and flood hazards.

Sr. No.	Legislation/Act	Brief Coverage	Relevance to the Project
		backdrop of 2010 Floods in Pakistan and strengthens Disaster Management system.	
21.	Hazardous Substances Rules, 2014	The rule describes the procedure of handling, transportation and disposal of hazardous substances and hazardous waste. General safety precautions for handling hazardous substances as well as safety precautions for workers, and notification requirements in the event of an accident are also described in these rules.	This rule is applicable to the proposed Project due to involvement of hazardous waste handling, use and disposal during different construction activities at the construction stage.
22.	Cantonment Board Faisal, Karachi Building Bye-Laws, 2008	This is a regulatory framework guiding all construction, renovation, and land usage within the Cantonment's jurisdiction. It set out requirements for architectural design, structural integrity, setbacks, plot coverage, and adherence to safety standards. These Bye-Laws also detail the procedures for obtaining approvals, ensure orderly development in accordance with prescribed zoning regulations, and aim to maintain aesthetic harmony across the cantonment area. By enforcing these regulations, the Board seeks to safeguard public welfare, promote responsible urban planning, and preserve the overall character of the community.	Cantonment Board Faisal, Karachi Building Bye-Laws will be applicable to the proposed project as it involves the development of IT park within the jurisdiction of Faisal Cantonment.

2.3 COMPLIANCE PROCEDURE FOR OBTAINING NOC FROM SEPA

Sindh Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2014 provides the necessary details on the preparation, submission, and review of the IEE and the EIA reports. Categorization of projects for IEE and EIA is one of the main components of these regulations. Projects have been classified on the basis of expected degree of adverse environmental impact.

The proposed Project falls under Schedule III (Category J - Urban development and Tourism) which requires an EIA study for obtaining NOC/environmental approval from SEPA.

The regulations stipulate that within ten (10) working days of the IEE or EIA study having been submitted, SEPA will confirm that the document submitted is complete for the purpose of review. During this time, should the agency require the proponent to submit additional information, it will return the IEE or EIA to the proponent for revision, clearly listing those aspects that need further discussion. Subsequently, SEPA would make every effort to

complete an IEE review within forty-five (45) days and an EIA review within ninety (90) days of filing (refer **Figure 2.1**).

The prescribed procedure for review of EIA by the SEPA is described in Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021. Article 17(4) of Sindh Environmental Protection Act, 2014 binds the agency to communicate its approval or otherwise within a period of two months from the date that the initial environmental examination is filed, and within a period of four months from the date that the environmental impact assessment is filed complete in all respects in accordance with the regulations, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations.

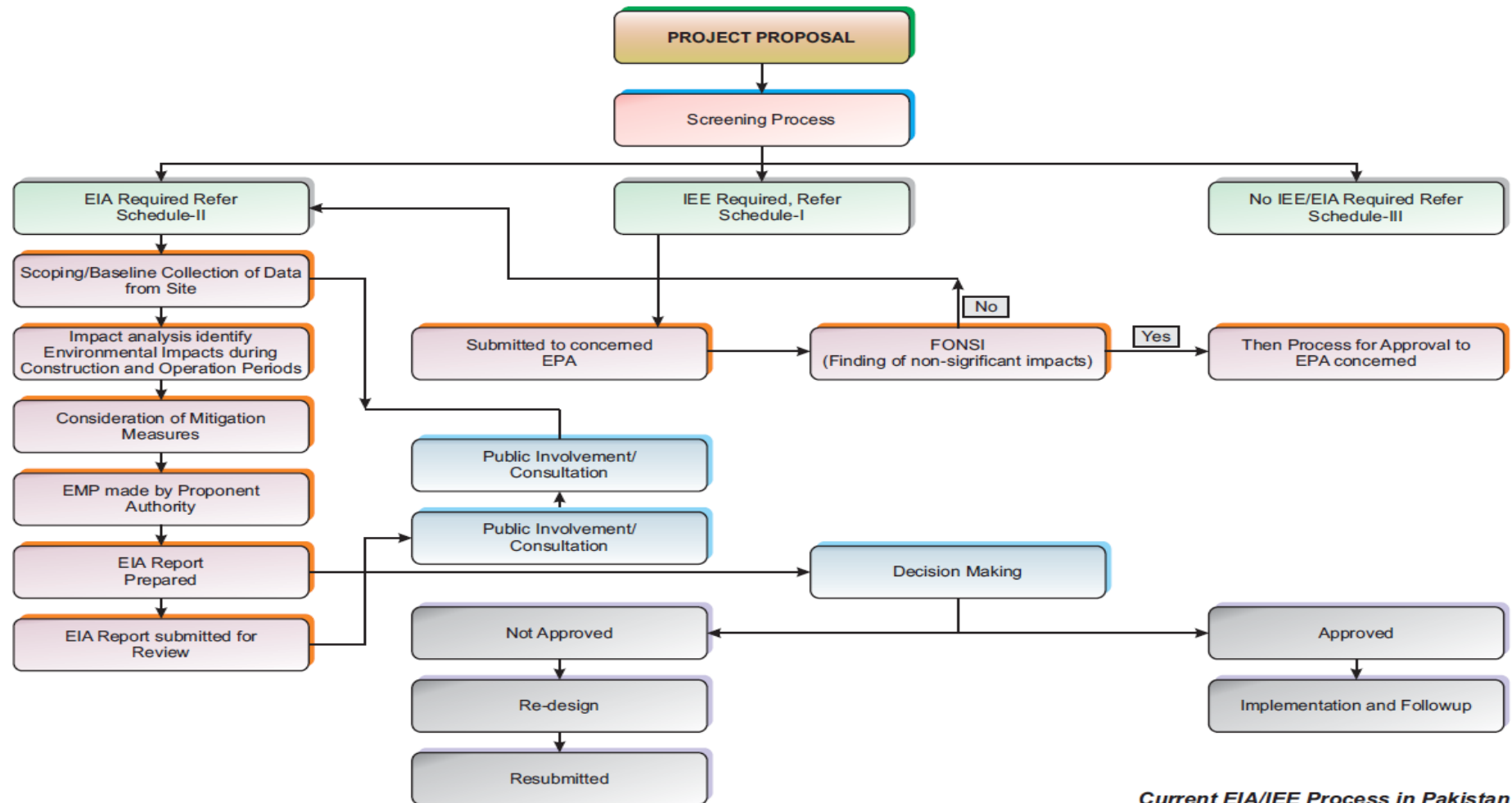


Figure 2.1: EIA Procedure in Pakistan

2.4 INTERNATIONAL PROTOCOL/CONVENTIONS

As Pakistan is a member of a number of international organizations such as United Nations Organization (UNO), Organization of the Islamic Cooperation (OIC), South Asian Association for Regional Cooperation (SAARC), Economic Cooperation Organization (ECO) etc., so it has to follow the international protocols and obligations related to the environment. The major protocols, ratification dates by Pakistan and obligations related to the proposed Project are provided in the **Table 2.3** below.

Table 2.3: International Agreements/Conventions Relevant to the Project

Sr. No.	Agreement/ Convention	Ratification	Description/Relevance
1.	UNESCO Convention on the Protection of the World's Cultural and Natural Heritage, 1972 Web Link: http://whc.unesco.org/en/%20convention%20text/	Pakistan ratified this convention on 23 July 1976.	Convention concerning the Protection of the World Cultural and Natural Heritage - requires parties to adopt a general policy on the protection of the natural and cultural heritage, to set up services for such protection, to develop scientific and technical studies, to take appropriate legal, technical, scientific and administrative measures and to foster training and education for such protection. The chance find procedure will be implemented if any cultural and heritage site is found within project area during construction.
7.	Sustainable Development Goals (SDGs) – 2015-2030 Web Link: https://sustainabledevelopment.un.org/focussdgs.html	Pakistan was the first country to adopt SDGs 2030 agenda through a unanimous resolution of the Parliament of Pakistan.	The Sustainable Development Goals (SDGs) are a good collection of 17 global goals set by the United Nations in 2015. Pakistan has recently committed to Agenda 2030 and has become signatory to SDGs where Goal 6 calls, among others, for ensuring availability and sustainable management of water and sanitation for all, water use efficiency and integrated water resources management. The SDG 5 on gender equality and women's empowerment emphasizes to ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.

Sr. No.	Agreement/ Convention	Ratification	Description/Relevance
8.	United Nation Framework Convention on Climate Change (UNFCCC), 1992 Web Link: https://unfccc.int/process-and-meetings/the-convention/status-of-ratification/status-of-ratification-of-the-convention	Signed on 13 Jun 1992 and ratified on 1 Jun 1994.	The UN Framework Convention on Climate Change (UNFCCC) is a multilateral agreement to address the issue of climate change. The Convention, was sets out and opened for signature at the June 1992 UN Conference on Environment and Development (UNCED), also known as the Rio Earth Summit. The UNFCCC entered into force on 21 March 1994. Pakistan being signatory of this treaty is bound to control the GHG emissions and climate change. Recent conference of parties (COP) for UNFCCC was held from 6 to 17 Nov, 2017 in Bonn Germany. This is relevant as the proposed project will emit GHG emissions which will contribute to global warming and greenhouse effect.
9.	Paris Agreement, 2016 Web Link: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement	Paris Agreement was signed on 22 April 2016 and ratified on 10 November 2016.	The Paris Agreement's long-term temperature goal is to keep the increase in global average temperature to well below 2 °C above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 °C, recognizing that this would substantially reduce the risks and impacts of climate change. It also aims to increase the ability of parties to adapt to the adverse impacts of climate change, and make "finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development." Under the Paris Agreement, each country must determine, plan, and regularly report on the contribution that it undertakes to mitigate global warming. The proposed project will consider using green and sustainable design to reduce GHG emissions.
10.	International Union for Conservation of Nature and Natural Resources Red List, 2000 Web Link: https://www.iucnredlist.org/		This enlists wildlife species experiencing various levels of threats internationally. Some of the species indicated in the IUCN red list are also present in the wetlands of Pakistan. However, no wildlife species experiencing various levels of threats are present in and around the surroundings of Project Area.

3 PROJECT DESCRIPTION

3.1 GENERAL

This section provides the project specific details which include objectives of the project, location, accessibility, salient features, layout plans, construction schedule, machinery, materials and cost.

3.2 OBJECTIVES OF THE PROJECT

Many software companies required sufficient business work space, IT infrastructure and community facilities. Constructing an IT Park satisfying demands from software firms became necessary for further IT industry development. Therefore, the objective of this project is to establish an IT Park in Karachi to form an IT cluster in Pakistan as well as to strengthen the competitiveness of the IT industry in Pakistan. Followings are specific objectives classified in short- and long-term perspective.

- To provide space, facilities and services for local and international IT firms which can become basis for IT industry development thus increasing IT exports.
- To provide the platform where university, industry and research institute can foster a synergistic network which can enhance operational effectiveness and efficiency, and ultimately lead to advance the national IT competitiveness, be benchmarked, and applied to others when proven successful.

3.3 ACCESSIBILITY OF THE PROJECT

The project area is accessible through various roads which include Airport road, Shah Faisal Avenue road etc. The accessibility map is provided in **Figure 3.1**.

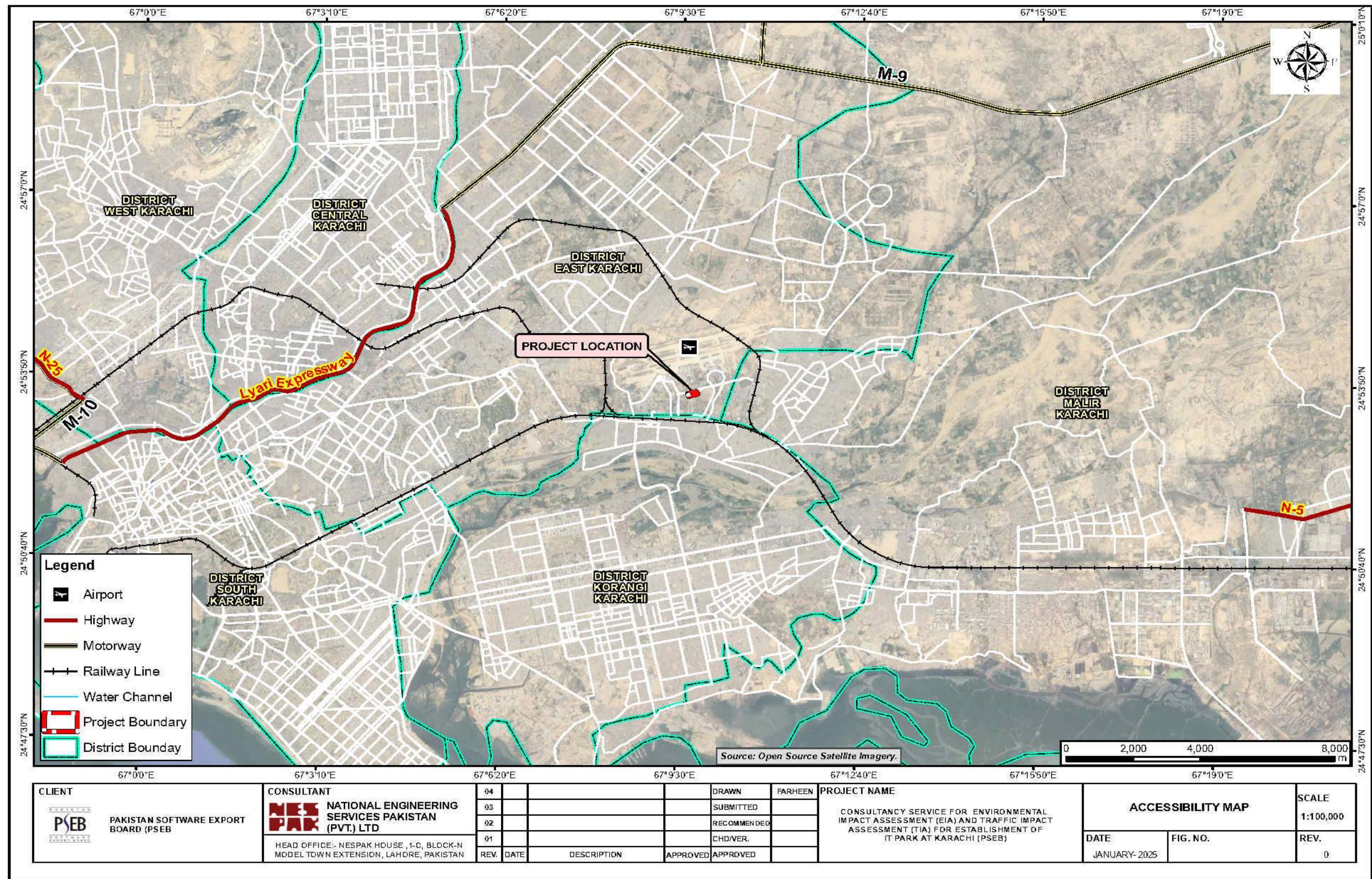


Figure 3.1: Accessibility Map of the proposed project

3.4 SALIENT FEATURES OF THE PROJECT

Following are the salient features of the proposed project:

Location	CAA Colony, Faisal Cantonment, Karachi, Pakistan
Land Area	24,281 m ²
Road Status	NORTH SIDE: 20 m (Airport Road) SOUTH SIDE: (To be expanded by CAA)
Building Use	Office, Data Center, Retails, Education etc.
Building Area	14,146.58 m ²
Building Coverage Ratio - Legal	GF: 70% to 65%, Above GF: 65% to 60%
Building Coverage Ratio – Design	58.26%
Total Floor Area – Above ground	71,949.57 m ²
Total Floor Area – Basement	39,655.43 m ²
Total Floor Area	111,605.00 m ²
Floor Area Ratio - Legal	600% to 550% or 1:5.5
Floor Area Ratio – Design	296.32%
Structure	RC Structure
Floors	GF+7, 3 Floors below ground
Maximum Height – Legal	CAA Approval
Design	44.40 m
Parking- Legal	Car: 652
Design	Car: 959

The site plan and the floor details are provided in **Figure 3.2 and 3.3**

3.5 COMPONENTS OF THE PROJECT

The components of the proposed project are as follows:

- Data Centre;
- Offices;
- Education Support;
- Community;
- Space Program;
- Service;
- Common Area;
- Parking;
- Public Space;
- Visitor Centre;
- Guard Posts;
- KE House;
- Tube well; and
- Other facility.

3D view of the IT Park Karachi is shown in **Figure 3.4**

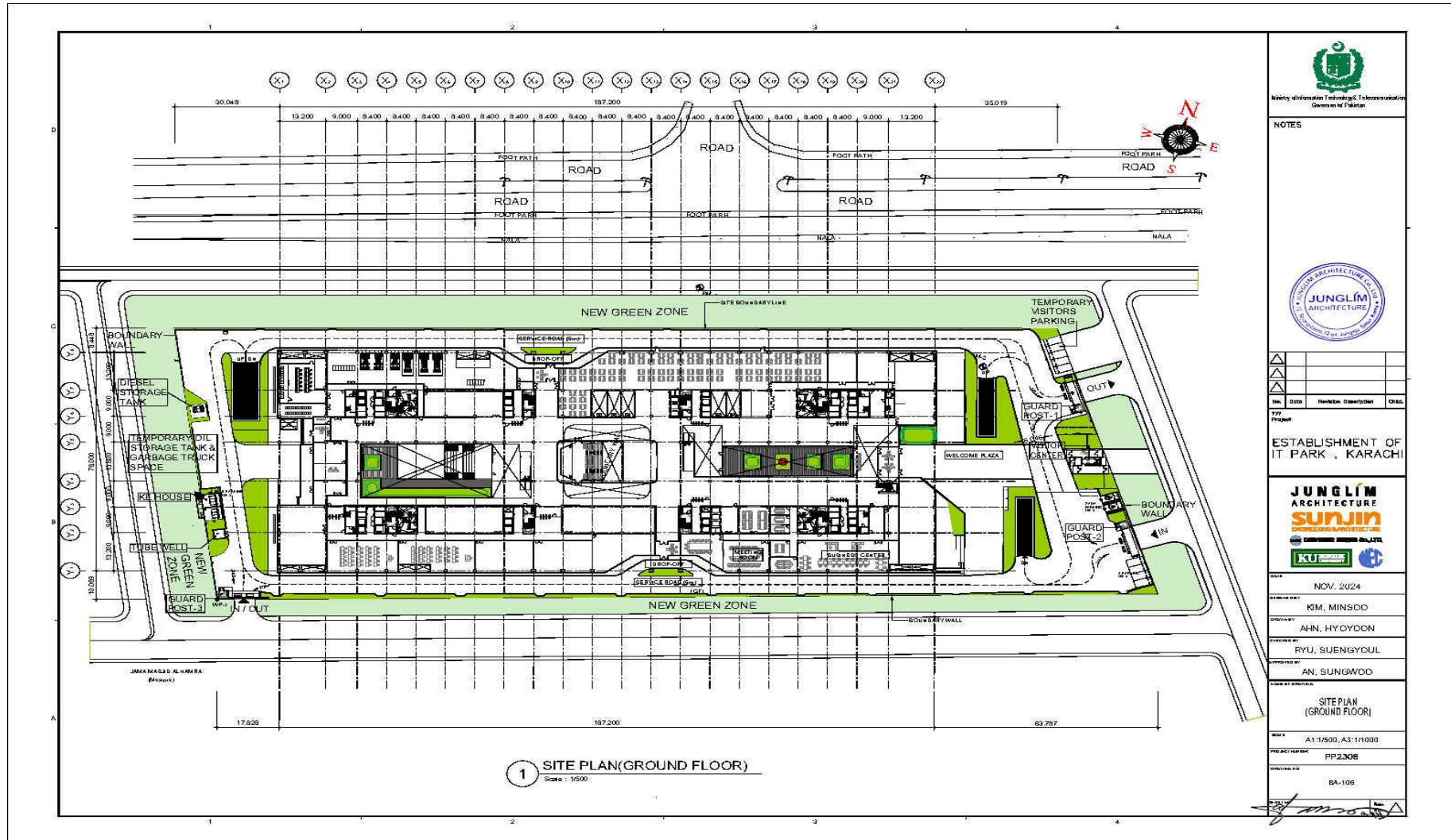


Figure 3.2: Site Plan

SUMMARY

CLASSIFICATION	CONTENTS	NOTE
PROJECT NAME	ESTABLISHMENT OF IT PARK, KARACHI	
EMPLOYER	PSEB (PAKISTAN SOFTWARE EXPORT BOARD)	
SITE STATUS	LOCATION: CAA COLONY, FAISAL CANTONMENT, KARACHI, PAKISTAN	NEAR JINNAH INTL. AIRPORT
	DISTRICT: KARACHI EAST DISTRICT / LAND USE: IT PARK	
	LAND AREA: 24,281.00m ²	
	ROAD STATUS: NORTH SIDE: 20m (AIRPORT ROAD) SOUTH SIDE: 3.5m ROAD (TO BE EXPANDED BY CAA)	
BUILDING STATUS	BUILDING USE: OFFICE, DATA CENTER, RETAILS, EDUCATION AND ETC.	
	BUILDING AREA: 14,146.59 m ²	Include 283.26m ² (other facilities)
	BUILDING COVERAGE RATIO: LEGAL: GF: LESS THAN 70%, ABOVE GF: LESS THAN 65% DESIGN: 58.26%	
	ABOVE GROUND: 71,949.57 m ²	
	BASEMENT: 39,655.43 m ²	
	TOTAL: 111,605.00 m ²	
	FLOOR AREA RATIO: LEGAL: LESS THAN 600% DESIGN: 296.32%	
	STRUCTURE: RC STRUCTURE	
	FLOORS: GF + 7, 3 FLOORS BELOW GROUND	
	MAXIMUM HEIGHT: LEGAL: CAA APPROVAL DESIGN: 44.40m	
PARKING	LEGAL: CAR: 652	
	DESIGN: CAR: 959 (INCLUDING DISABLED 16V B1-B3: 953, GF: 6)	Exclude 5 Cars (Temporary visitors parking)

CLASSIFICATION	CONTENTS	NOTE
LANDSCAPE	LEGAL: N/A	
	DESIGN: TOTAL: 3,270.04m ² (B1F: 14.44m ² + GF: 1,690.36m ² + 2F: 283.65m ² + 3F: 1,296.59m ²)	
PUBLIC OPEN SPACE	LEGAL: N/A	
	DESIGN: N/A	
EXTERIOR MATERIALS	ROOF: TRK3AL SHEET (WHITE) / FLAT ROOF (TEXTURED CO-PO)	
	EXTERIOR WALL: TRK3AL SHEET (WHITE) / TRK3AL SHEET (DARK GRAY) / AL BARS (WHITE) / TRK30 STONE	
	WINDOWS: TRK34 LOW-E GLASS (DARK GRAY / LIGHT GRAY)	
ETC.	AIR CONDITIONING SYSTEM: HEAT RECOVERY VENTILATION UNIT + ENP SYSTEM + ELECTRIC HEATING COIL	
	SEWER SYSTEM: PURRER BY INSTALLED SEPTIC TANK AND DISCHARGED B-TYPE DITCH	
	ELEVATOR: LEGAL: N/A	
	DESIGN: ELEV FOR PASSENGER & HANDICAPPED USE (21 PERSONS): 16EA ELEV FOR EMERGENCY FREIGHT: 4EA / SHUTTLE ELEV: 6EA ELEV FOR GUEST HOUSE (12 PERSONS): 1EA	

FLOOR AREA TABLE

FLOOR	DATA CENTER (sq. m)	OFFICE (sq. m)	EDUCATION SUPPORT (sq. m)	COMMUNITY (sq. m)	SPACE PROGRAM TOTAL (sq. m)	SERVICE (sq. m)	COMMON (sq. m)	PARKING (sq. m)	PUBLIC TOTAL (sq. m)	VISITOR CENTER (sq. m)	GUARD POST-1 (sq. m)	GUARD POST-2 (sq. m)	GUARD POST-3 (sq. m)	KE HOUSE (sq. m)	TUBEWELL (sq. m)	OTHER FACILITY TOTAL (sq. m)	GRAND TOTAL (sq. m)	NOTE
RF	0.00	0.00	0.00	0.00	0.00	0.00	129.02	0.00	129.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	129.02	H:3,000
7F	0.00	3,793.32	0.00	0.00	3,793.32	0.00	860.49	0.00	860.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,653.81	H:4,200
6F	0.00	3,793.32	0.00	0.00	3,793.32	0.00	860.49	0.00	860.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,653.81	H:4,200
5F	0.00	2,815.36	0.00	0.00	2,815.36	674.94	1,034.71	0.00	1,709.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,529.01	H:4,200
4F	0.00	8,417.80	0.00	0.00	8,417.80	292.14	2,733.58	0.00	3,025.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11,443.52	H:4,600
3F	0.00	8,619.39	0.00	0.00	8,619.39	292.14	2,721.62	0.00	3,013.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11,633.15	H:4,200
2F	0.00	8,522.48	0.00	0.00	794.75	9,227.20	292.14	2,825.07	0.00	2,817.21	0.00	0.00	0.00	0.00	0.00	0.00	12,044.41	H:4,200
1F	2,095.35	2,205.52	1,191.74	1,066.44	6,559.05	359.42	3,740.74	0.00	4,296.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10,855.21	H:5,800
GF	0.00	1,786.63	801.98	2,490.28	5,078.89	1,018.03	5,764.75	0.00	6,782.78	66.72	7.29	7.29	7.29	50.76	11.56	150.96	12,012.63	H:5,800
ABOVE GROUND GROSS AREA TOTAL	2,095.35	39,953.79	1,993.72	4,261.47	49,304.33	3,124.81	20,369.47	0.00	23,694.28	66.72	7.29	7.29	7.29	50.76	11.56	150.96	71,949.57	H:37,600
B1	0.00	0.00	0.00	1,143.18	1,143.18	586.97	951.09	11,238.90	12,776.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13,920.14	H:4,500
B2	0.00	0.00	0.00	0.00	0.00	213.96	329.35	11,182.97	11,726.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11,726.28	H:3,500
B3	0.00	0.00	0.00	0.00	0.00	2,108.16	602.97	11,297.88	14,009.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14,009.01	H:3,500
PIT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	341 CARS
BASEMENT GROSS AREA TOTAL	0.00	0.00	0.00	1,143.18	1,143.18	2,909.09	1,893.41	33,719.75	36,512.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39,655.43	H:11,500
TOTAL	2,095.35	39,953.79	1,993.72	5,404.65	49,447.51	8,033.90	22,262.88	33,719.75	62,006.53	66.72	7.29	7.29	7.29	50.76	11.56	150.96	111,605.00	959 CARS

Ministry of Information Technology & Telecommunication
Government of Pakistan

NOTES

JUNGLIM ARCHITECTURE

No.	Date	Revision Description	CHKD

Project:

ESTABLISHMENT OF IT PARK, KARACHI

JUNGLIM ARCHITECTURE

SUNJIN

KU

DATE: NOV. 2024

DESIGNED BY: KIM, MINSOO

DRAWN BY: AHN, HYDYOUN

CHECKED BY: RYU, SUENGYOUL

SUPervised BY: AN, SUNGWOO

PROJECT SUMMARY

NO. 4: NTS

PROJECT NUMBER: PP2308

DRAWING NO: BA-103

Figure 3.3: Floor Details



Figure 3.4: 3D view of IT Park

3.6 TRAFFIC DATA

A Traffic Impact Assessment (TIA) has been conducted for the proposed project to determine the traffic impact of the proposed land development and whether such development can be accommodated by the transportation system. An inadequate transportation system will lead to congestion and result in deterioration of traffic safety, as well as a diminished quality of life and a reduced economic viability of development.

Manual Classified Counts (MCC) Traffic Counts were conducted for one day at all intersections of study area i.e., PSO Chowk, Airport Chowk and Star Gate Chowk. Average Daily Traffic (ADT) of these junction, peak hour volumes and average hourly volumes are given in the **Table 3.1** to **3.9** below.

Table 3.1: Summary of Traffic Volume of Intersection # 1

Intersection	Intersection # 1 (Airport Chowk)
Survey Date and Day	05th March, 2025 (Wednesday)
Type	Volume (PCUs)
Average Daily Traffic (ADT)	39,221
Peak Hour Volume	3,154
Peak Hour	17:00-18:00

Table 3.2: Summary of PCUs and % share of Airport Chowk (Projected Traffic Year 2025 – Peak Hour Volume of one day)

Direction	Traffic From	Turning	Volume	% Share	
A1	Shahra-e-Faisal	Through	172	5%	38%
A2		Right	1036	33%	
B1	Pakistan Post	Left	362	11%	18%
B2		Through	194	6%	
C1	Jinnah International Airport	Left	625	20%	44%
C2		Right	765	24%	
Total			3154	100%	100%

Table 3.3: Distribution of vehicles at Airport Chowk

Vehicle Category		Volume	% Share	
Non-Motorized	Animal Driven Cart	29	0.08%	0.24%
	Bicycle	56	0.16%	
Motorized	Motor Cycle / Scooter	15390	43.60%	99.76%
	Rickshaw/Qingqi	1245	3.53%	
	Car/Taxi/Suzuki Pickup	15921	45.11%	
	Hiace/Wagon	1174	3.33%	
	Medium Bus / Flying Coach	288	0.82%	
	Bus	78	0.22%	
	Loader Pickup	893	2.53%	
	Truck	209	0.59%	
	Tractor with Trolley	13	0.04%	

Vehicle Category	Volume	% Share	
Total	35296	100%	100%

Table 3.4: Summary of Traffic Volume of Jinnah International Terminal Intersection

Intersection	Intersection # 2 (Jinnah International Airport Terminal Intersection)
Survey Date and Day	06th March, 2025 (Thursday)
Type	Volume (PCUs)
Average Daily Traffic (ADT)	44,365
Peak Hour Volume	3,704
Peak Hour	17:00-18:00

Table 3.5: Summary of PCUs and % share of Jinnah International Terminal Intersection (Base Year 2025 – Peak Hour Volume of one day)

Direction	Traffic From	Turning	Volume	% Share	
A1	Jinnah Ave	Through	1050	28%	35%
A2		Right	248	7%	
B1	Shahra-e-Faisal	Left	222	6%	32%
B2		Through	257	7%	
B3		Right	694	19%	
C1	CAA Colony	Left	236	6%	33%
C2		Through	999	27%	
Total			3704	100%	100%

Table 3.6: Distribution of vehicles at Jinnah International Terminal Intersection

Vehicle Category		Volume	% Share	
Non-Motorized	Animal Driven Cart	10	0.03%	0.09%
	Bicycle	24	0.06%	
Motorized	Motor Cycle / Scooter	14983	38.56%	99.91%
	Rickshaw/Qingqi	1194	3.07%	
	Car/Taxi/Suzuki Pickup	20269	52.16%	
	Hiace/Wagon	1480	3.81%	
	Medium Bus / Flying Coach	181	0.47%	
	Bus	51	0.13%	
	Loader Pickup	530	1.36%	
	Truck	129	0.33%	
	Tractor with Trolley	6	0.02%	
Total		38857	100%	100%

Table 3.7: Summary of Traffic Volume of Star Gate Chowk

Intersection	Intersection # 3 (Star Gate Chowk)
Survey Date and Day	2025
Type	Volume (PCUs)
Average Daily Traffic (ADT)	219,962
Peak Hour Volume	17,266
Peak Hour Time	08:30-09:30

Table 3.8: Summary of PCUs and % share of Star Gate Chowk (Base Year 2025 – Peak Hour Volume of one day)

Direction	Traffic From	Turning	Volume	% Share	
A1	Malir	Through	7949	46.03%	46.03%
B1	Drigh Colony	Left	982	5.69%	30.34%
B2		Through	4257	24.65%	
C1	Airport	Left	4079	23.62%	23.62%
Total			17,266	100%	100%

Table 3.9: Distribution of vehicles at Star Gate Chowk

Vehicle Category		Volume	% Share	
Motorized	Motor Cycle / Scooter	80554	52.30%	100.00%
	Rickshaw/Qingqi	7853	5.10%	
	Car/Suzuki Pickup	53370	34.65%	
	Taxis	2305	1.50%	
	Mini Busses & Coasters	3971	2.58%	
	Bus	846	0.55%	
	Single Unit Trucks	1338	0.87%	
	Light Freight Vehicles	3725	2.42%	
	Truck/Trailers	74	0.05%	
Total		154036	100%	100%

3.7 LAND ACQUISITION

Land is already acquired by PSEB from Jinnah International Airport Karachi. The evidence of transferring of 6 acres of land is provided in **Annex-I**.

3.8 PROJECT ADMINISTRATIVE JURISDICTION

The proposed Project falls in Faisal Cantonment Area of Karachi Division, Pakistan.

3.9 PROJECT IMPLEMENTATION SCHEDULE

The proposed Project is expected to be completed within 30 months.

3.10 COST OF THE PROJECT

The estimated total cost of the proposed Project is approximately USD 117.263 Million.

3.11 CONSTRUCTION MATERIAL

The materials used in construction of the proposed project would include following but not limited to: cement, sand, aggregates, stones, reinforced cement concrete frame (RCC Frame), brick infill, brick cladding coarse aggregates (crush), fine aggregates (sand), water, asphalt, reinforcement cement and steel.

- a) Crushed Aggregate of required specifications will be utilized by the contractor from available sources nearby the project area.
- b) Good quality natural fine aggregate or sand of acceptable gradation will be obtained from nearby licensed or approved entities dealing with fine aggregates.
- c) Asphalt, reinforcement and cement material will be transported from the nearby factories or approved dealers for construction purposes.

3.12 EXPECTED EQUIPMENT FOR CONSTRUCTION

The list of the machinery's and the equipment's expected to be used for the propose Project are provided in **Table 3.10**.

Table 3.10: Machinery and Equipment Requirement for the Proposed Project

Sr. No.	Machinery Name	Sr. No.	Machinery Name
1	Grader	2	Concrete Transit Truck
3	Vibratory Roller	4	Concrete Pump
5	Water Tankers	6	Excavator
7	Generators	8	Tower Crane

3.13 CONSTRUCTION CAMPS

One (01) Construction camp for the construction of proposed project components will be located outside the project boundary. During establishment, following criteria will be adopted by the Contractor to identify and for the establishment of the construction camp sites before start of the construction:

- There should be no or minimum resettlement issues for the location of the camps (in case of the proposed project, there will be no resettlement issues);
- Camp site should be away from the residential areas and sensitive receptors;
- Selection of sites for construction camps shall be near the project area having proper access to the nearby main/link road;
- The camps must be located in a place where the drainage from and through the camps will not threaten any domestic or public water supply;
- Camp site must be adequate in size to prevent overcrowding of necessary structures;
- The camp site should consider avoiding any damage of property, vegetation, irrigation, and drinking water supply systems;
- The camp site must not be subject to periodic flooding; and
- There should not be any ecological sensitive areas e.g. wildlife sanctuaries, game reserves, national parks, forest areas, etc. near to the construction camp site.

3.14 WORKFORCE REQUIREMENTS

Man power demand estimation is an essential component to facilitate deployment of manpower. Total man power required on site for proposed Project will be approximately 200-300 workers depending on the type of construction.

3.15 SOURCE OF WATER

Source of Water during Construction Phase

Contractor will be responsible to arrange water for construction works. However, it is estimated that 6,000 gallon water tank will be used by contractor to bring water on the site for construction activities.

Source of Water during Operation Phase

The water requirement for the IT Park will be met by government water supply.

3.16 WATER REQUIREMENT

Construction Phase

The water consumption is estimated to be 24,000² gallons/day for 300 construction workers during construction phase of the proposed Project.

Operation Phase

The water consumption is estimated to be 116,931 gallons/day³ during operation phase of the proposed Project which will be met through government water supply.

3.17 WASTEWATER GENERATION

Construction Phase

The wastewater generation is estimated to be 19,200⁴ gallons/day for 300 construction workers during construction phase of the proposed Project.

Operation Phase

The wastewater generation is estimated to be 93,545 gallons/day⁵ during operation phase of the proposed Project.

² WASA Average Daily Per Capita Water Consumption (80 gallons/day)

³ Karachi Building and Town Planning regulations 2002 estimates water requirements for Business Buildings is 45liter/capita/day and for 8,000 employees with 10% margin and after addition of water requirements for mosque and landscape area comes to 442,000 liters/day i.e. 116,931 gallons/day

⁴ Design Criteria of Public Health Engineering for Water Supply, Sewerage and Storm Water Drain (Domestic sewage generation = 80% of water consumed/day)

⁵ Considering 80% of the water consumption.

3.18 SOLID WASTE ESTIMATION

Construction Phase

The solid waste generation is estimated to be 135kg/day (@ 0.45 kg/capita/day⁶) for 300 construction workers during construction phase of the proposed Project.

Operation Phase

In the operational phase, solid waste generated is estimated to be 3,600 kg per day.

3.19 POWER REQUIREMENT/ POWER SOURCE

Construction Phase

The main source of electricity/electric power during construction phase will be diesel generators for construction camps and construction machinery and also back-up generators. If required, temporary power connection by K-Electric can also be taken.

Operational Phase

During the operational phase power would be taken from main electric power grid, supplying power to the Civil Aviation Authority Colony.

⁶ Source: The World Bank Report 2012 – What a Waste: A global review of solid waste management. Based on UNEP estimates for waste generation in the Asia Pacific. Average is 0.45 kg/capita/day.

4 ANALYSIS OF ALTERNATIVES

4.1 GENERAL

Before finalization of the design, various options have been considered during design phase. The analysis has been carried out critically so as to justify the need of the Project and the selected options. Besides the economic viability, environmental sustainability and social soundness has also been considered for analyzing various alternatives for the proposed Project. The various alternatives which have been considered during the conduct of the study are as follows:

- No Project Option;
- Site Alternatives; and
- Design Alternatives

4.2 NO PROJECT OPTION (NPO)

The “No Project Option” entails a scenario in which the proposed IT Park construction does not proceed. Under this option, the existing land use and environmental conditions in the project area would remain unchanged. While this may avoid the short-term environmental impacts associated with construction such as noise, dust emissions, and resource consumption, it would also mean foregoing the longer-term benefits of the IT Park’s development.

From an economic and social standpoint, not implementing the project would forfeit the opportunity to create a dedicated space for IT firms, both local and international. This would limit the expected contributions to employment generation, skill development, and technology transfer in Karachi and more broadly in Pakistan. In the absence of the project, urban sprawl and unplanned developments could still occur on or around the site, potentially leading to fragmented land use without the structured approach or mitigating measures typically included in an integrated, well-planned development.

In conclusion, the “No Project Option” may preserve the status quo of the site but simultaneously forecloses opportunities to strengthen Pakistan’s IT industry, foster partnerships among academic and industrial players, and bring broad-based economic gains. The net effect would likely be a continuation of existing trends without realizing the potential growth and innovation benefits envisioned by the IT Park project.

4.3 SITE ALTERNATIVE

4.3.1 Alternative-I

The site alternative-I was initially considered for the design and construction of IT Park Karachi which was vertical in shape as provided in **Figure 4.1**. However, this site was not in line with

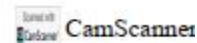


Airport business district master plan. Additionally the site alternative-I involved a greater number of tree cutting.

4.3.2 Site Alternative-II

Another piece of land was considered for the design and construction of IT Park Karachi. This site was found in line with the Airport business district master plan and it also involved a smaller number of trees cutting.

Hence, site alternative-II was selected for the proposed project. Both of the alternatives are shown in **Figure 4.1**. The vertical boundary represent the site alternative-I, while the horizontal boundary corresponds to the site alternative-II which is selected for the proposed project.



4.4 DESIGN ALTERNATIVES

Three design alternatives were considered during the finalization of design which are provided as follows:

4.4.1 Alternative-1: IT Park

The concept of first alternative is provided in **Figure 4.2**.

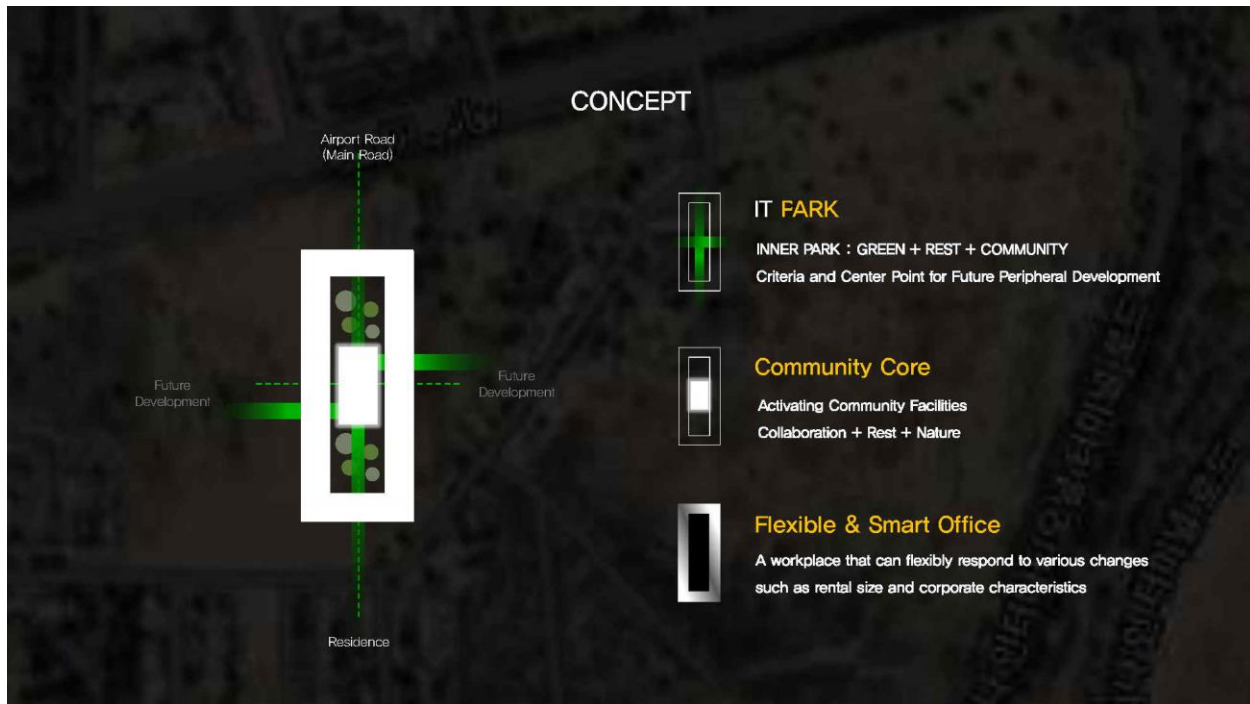


Figure 4.2: Concept of Alternative-I

The first alternative is designed considering the requirement of future development. Three components are considered in the first alternative which include:

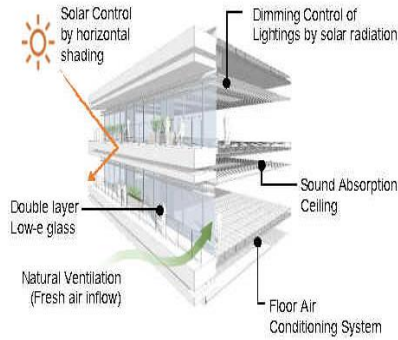
- IT Park
- Community Core
- Flexible and Smart office

The overall design of the first alternative is provided in **Figure 4.3**.

Horizontal Band (Façade for Shading)

The shortcomings of the general curtain wall are supplemented by solar radiation control with BAND-type horizontal shades for each floor.

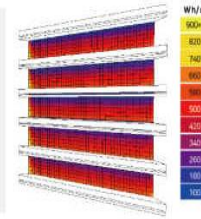
Different protruding lengths of BAND has applied depending on the angle of insolation of each scent.



Cooling Load Reduction by Shading

Analysis of solar radiation in the summer of the southern elevation to verify the effectiveness of the shading device

- Shading Design: 352.9 Wh/m²
- Without Shading: 952.6 Wh/m²
- Exterior Cooling load: **63% reduction**



Cooling Office

Cooling Office Plan to adapt to nature by planter (Plant+Interior) indoor/outdoor and shading to reduce cooling load

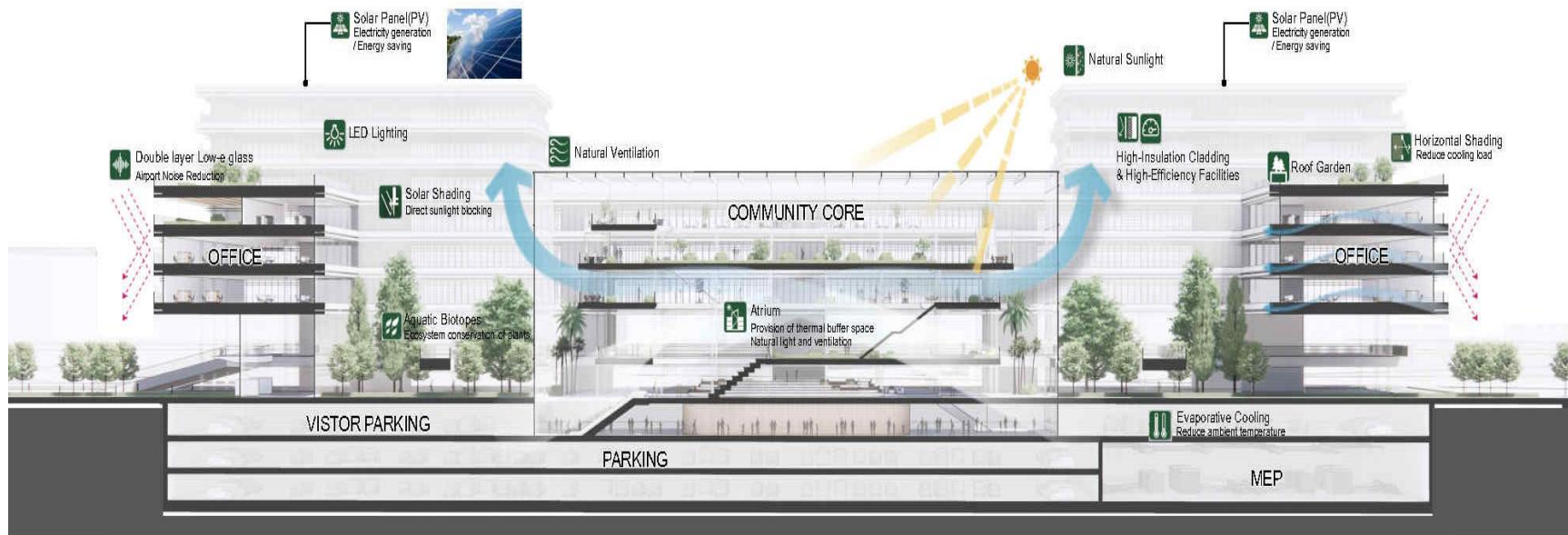


Figure 4.3: Design of Alternative-I

Horizontal shading is provided to reduce the cooling load. The horizontal shading designed for the building will reduce indoor temperature by 7°C. The roof gardens, plantation and waterscape will reduce the ambient temperature by 0.5°C, 6°C and 3°C.

The concept of second alternative is provided in **Figure 4.4**.



- IT Gate
- Community Atrium
- Flexible office & collabo office

Page No.
4-6

Representing Pakistan's IT Industry
IT GATE

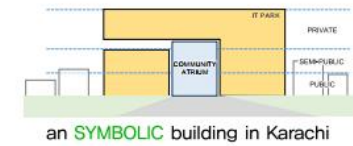


Figure 4.5: IT Gate of Alternative-II

COMMUNITY ATRIUM

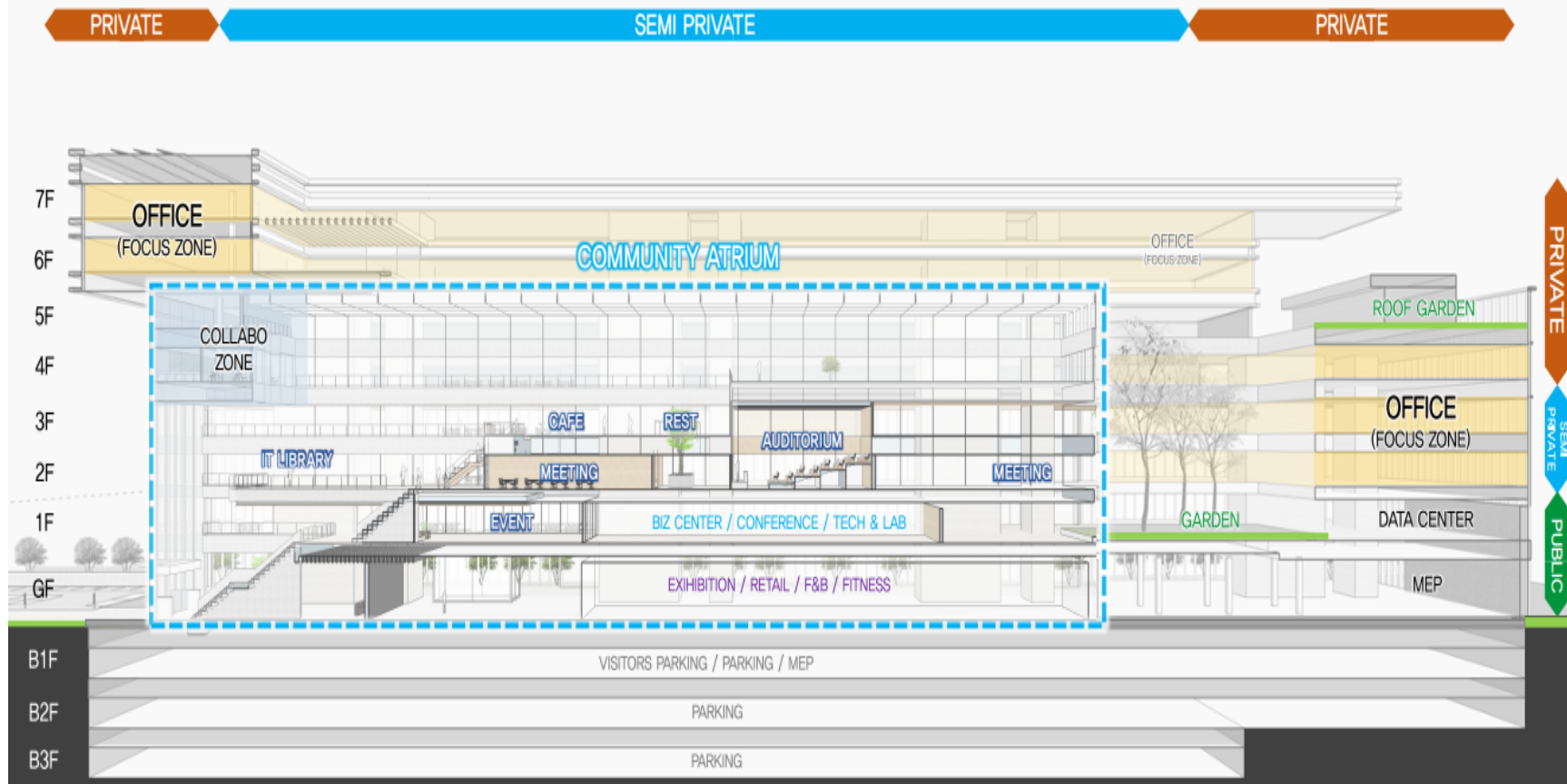


Figure 4.6: IT Community Atrium of Alternative-II

FLEXIBLE OFFICE & COLLABO ZONE

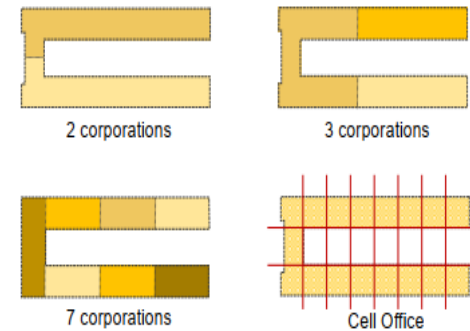
Communication and Expandable Workspace

Modular plans enable flexible office. Each office (focus) zone can be integrated and divided according to size of rental office. In the focus working zone, people do intensive work. And in the collabo zone (open office), people gather freely, meet and create synergy. Based on the zoning plan, it is possible to set the hierarchy of collabo zone and focus zone.



Workplace considering Rentability

Each modular office allows each corporation to use as much space as they need.



Various work spaces by work behavior

Depending on the atmosphere of the company, you can choose the presence or size of collabo zone.

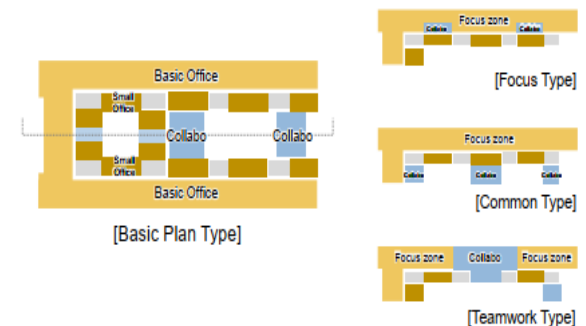


Figure 4.7: IT Office and Collabo Zone of Alternative-II

4.4.3 Alternative-III: Breeze Ways

The concept of third alternative is provided in **Figure 4.8**.

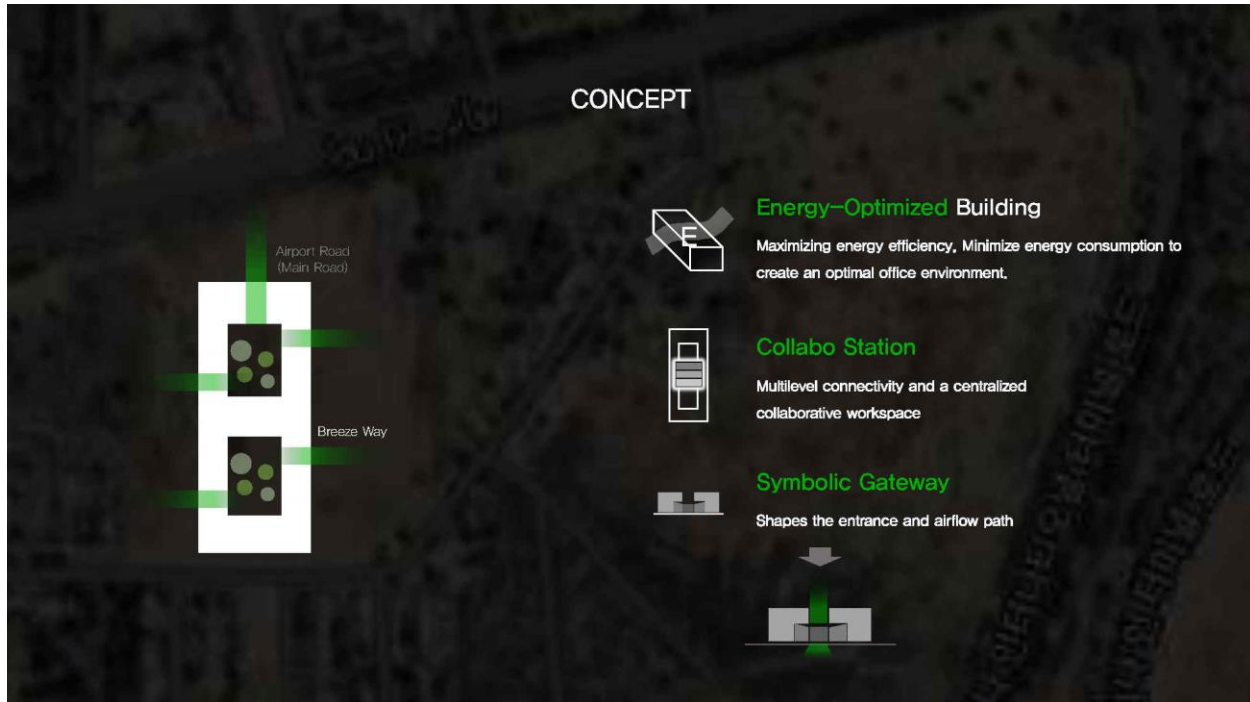


Figure 4.8: Concept of Alternative-III

Three components are considered in the third alternative which include:

- Energy optimized building
- Collabo station
- Symbolic gateway

The symbolic gateway, collabo station, and Flexible & smart office are provided in **Figure 4.9 4.10 and 4.11**.

Representing Pakistan's IT industry
Symbolic Gateway



Figure 4.9: Symbolic gateway of Alternative-III

COLLABO STATION

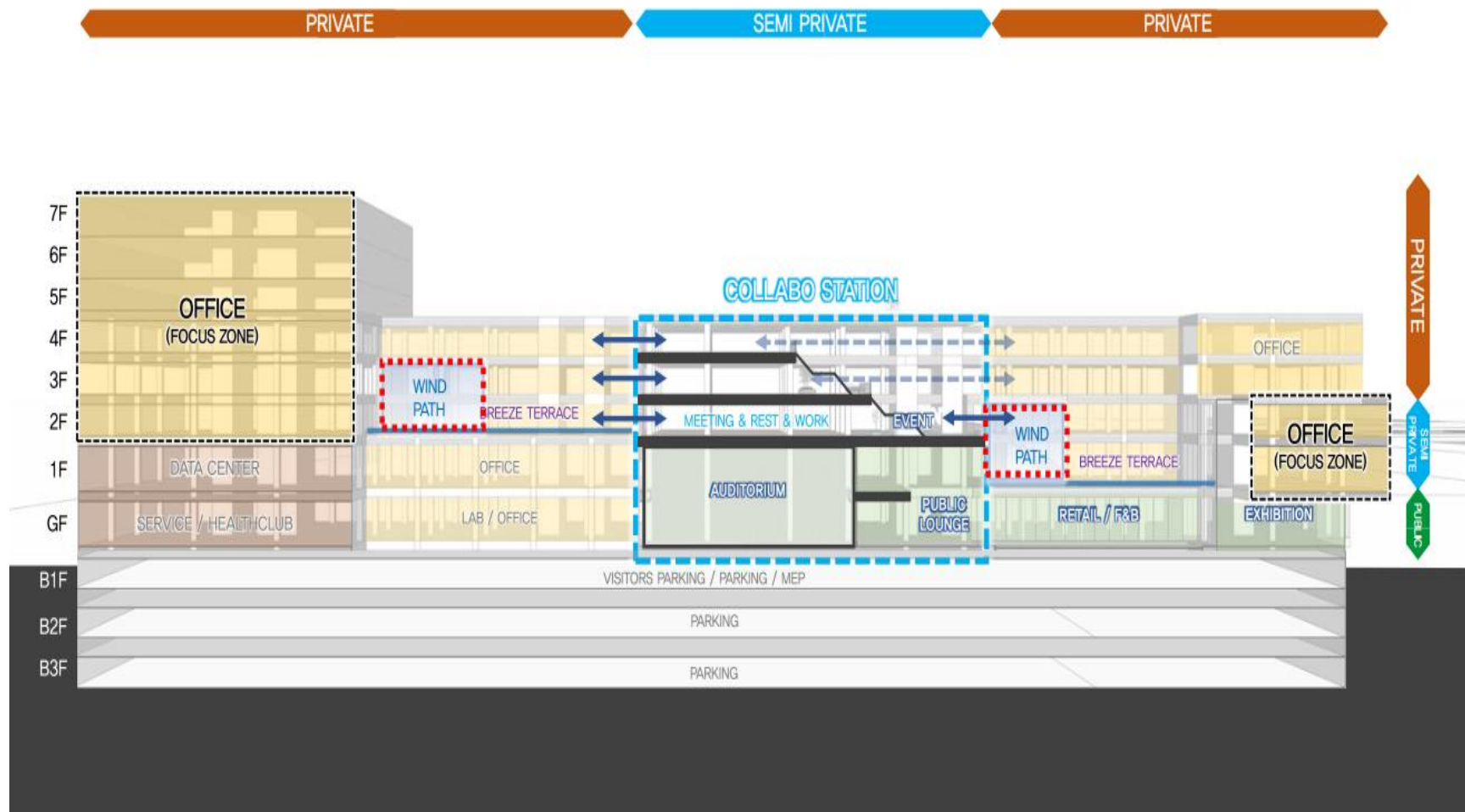


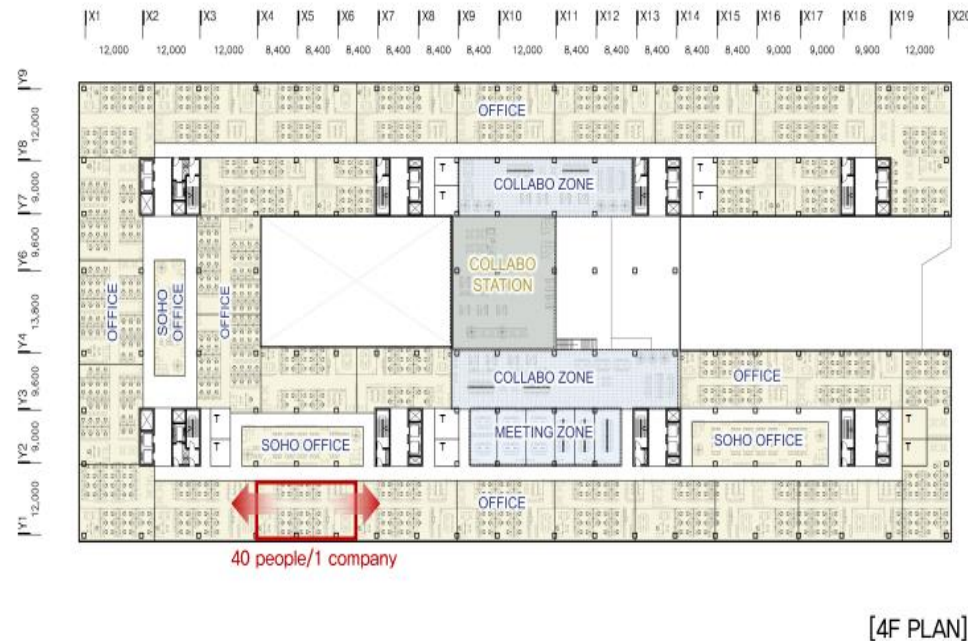
Figure 4.10: Collabo Station of Alternative-III

FLEXIBLE & SMART OFFICE

Communication and Expandable Workspace

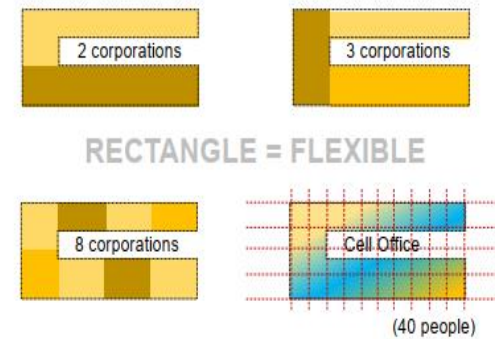
A flexible floor plan is implemented in order to secure an appropriate area that can accommodate 4,000 to 5,000 people and reflect various business performance / sizes of each rental company.

Based on the zoning plan of the work and lounge area, plan can be changed, expanded, and rearranged as necessary.



Workplace considering Rentability

Modular integrated office in square form enables efficient split use across different rental sizes



Various work spaces by work behavior

Proposed Prototype by characteristics of each company

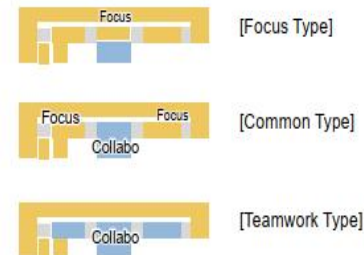


Figure 4.11: Flexible and smart office of Alternative-II

4.5 COMPARISON OF ALTERNATIVES

All three alternatives were evaluated critically. Broad comparison of the alternatives are provided in **Figure 4.12**

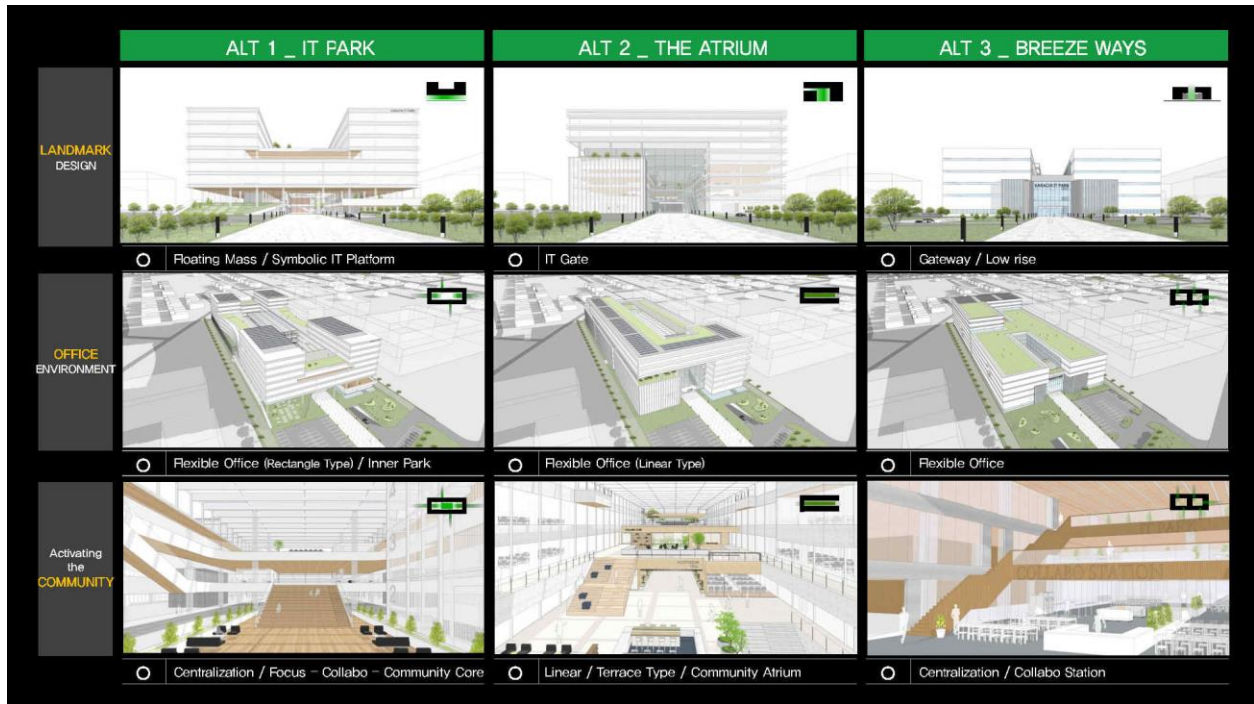


Figure 4.12: Comparison of three alternatives

By comparing all three alternatives, Alternative-I has been selected because of the incorporation of green building principles which will reduce the energy load of the building, installation of roof gardens for managing runoff and huge parking. Additionally Breezeways were incorporated into this design for natural ventilation.

5 DESCRIPTION OF THE ENVIRONMENT

5.1 GENERAL

For any development project, the prevailing environmental conditions need to be assessed prior to the stages of planning, designing and execution of the project. Identification of physical, ecological and social aspects of environment and collection of relevant data is essentially important for the evaluation of impacts as well as for the suggestion of adequate mitigation measures, which forms the basis for the implementation of the proposed project in terms of prevailing environmental conditions in the study area.

5.2 PROJECT STUDY AREA

The existing environmental conditions of the proposed project have been considered within 500 m Study Area i.e. (Area of Influence⁷) from boundary of the proposed Project. The information has been collected from variety of sources, including published literature, previous environmental studies of the nearby areas, field observations, monitoring and surveys, conducted specifically for this Project have been analyzed for this study.

Consultations were also held with the general public and stakeholders of the Project Area in order to seek the public opinion on the implementation of the proposed Project. **Figure 5.1** shows the AOI of Proposed Project.

5.3 FIELD VISIT

For the primary data acquisition, the NESPAK team conducted the detailed field visit to the proposed Project site from January 15, 2025 to January 17, 2025. The major objective of the field visit was to collect the baseline data on physical, biological and social aspects along with identification, assessment and categorization of the significant environmental 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 detailed surveys.

5.4 PHYSICAL ENVIRONMENT

The following section provides an overview of the information on physical environment of the proposed Project study area collected from primary as well as secondary sources. The major parameters covered include Physiographic and Topography, Geology, Soil, Seismicity, Climate and Meteorology, Water Resources, Solid Waste, and Land Use etc.

⁷ Note: Terms “AOI” and “Study Area” are interchangeably used in

5.4.1 Physiography and Topography

Karachi lies very close to a major fault line, where the Indian tectonic plate meets the Arabian tectonic plate. Within the city of Karachi are two small ranges: the Khasha Hills and Mulri Hills, which lie in the northwest and act as a barrier between North Nazimabad and Orangi. Karachi's hills are barren and are part of the larger Kirthar Range, and have a maximum elevation of 528 meters (1,732 feet).

The project area is located in Karachi city, the south of Sindh. The terrain morphology of project area comprise predominantly flat with small sections of ridges and slopes. The physiographic features of the Project Area are divided into two broad categories: Hilly Region (Mountain Highland) and Alluvial Plain (Piedmont Plain). **Figure 5.2** represents the topography of the study area of the proposed Project.

Physiographically the area of study may be divided into the following four zones;⁸

Hub Valley Zone: This zone lies in the northwestern part of the mapped area, extending on either sides of Hub River upto Pab Range in the north and Pir Mangho Hills in the south. This valley is occupied by gravel derived from rocks of Jurassic to Miocene ages with few/ intervening rock outcrops of Eocene and Oligocene ages, which are mostly covered by Aeolian sand deposits. Hub River follows the general slope of this terrain, which is in southwest direction. The Hub River has a gradient of one meter per 2.4 kilometers. The elevation of the area ranges between 13 meters to 137 meters above mean sea level. Highest point is located in the northwest Agricultural fields developed on the terraces of Hub River. They are mostly dry-cropped lands dependent upon rainwater. Some of the land is irrigated by water pumped from Hub River bed.

Pir Mangho Hills Zone: This zone forms the highest terrain of the area. The highest peak is 233 meters above mean sea level and located north of Paradise point in Jhill. The range is cut by numerous faults with horizontal displacement. These displacements have provided natural passes and have made accessibility easy across the range at Sona, Lai Bakhar, Gloamani, etc. The dips of the beds are gentle and climb is not difficult except due to the growth of thorny bushes and cactus. These hills aligned northeast - southwest from Pir Mangho to Cape Monze form water shed of the study area.

Piedmont and Sub-Piedmont Zone: This area extends from Pir Mangho in the north and merges into the coastal zone in south. This Piedmont and Sub-Piedmont Plain /Penne-Plain or Congo-plain has been formed by the receding sea. Whole of this terrain is occupied by gravel and shingle. The general slope of this terrain is towards southwest. Two small rivers, Lyari and Malir, drain this area. Neither of these rivers is perennial. A structurally higher hill is located between Malir and Lyari rivers.

⁸ <http://bscgeology.blogspot.com/2012/04/geology-of-karachi.html>

Coastal Zone: This zone lies in the south of the surveyed area, all along the coast, extending from Got Arab in the west to Got Rehri in the east. It consists of vegetated tidal mud flats, beach sand, coastal dunes, coastal terraces, rock arches, stacks, wave cut platforms, bars and spits.

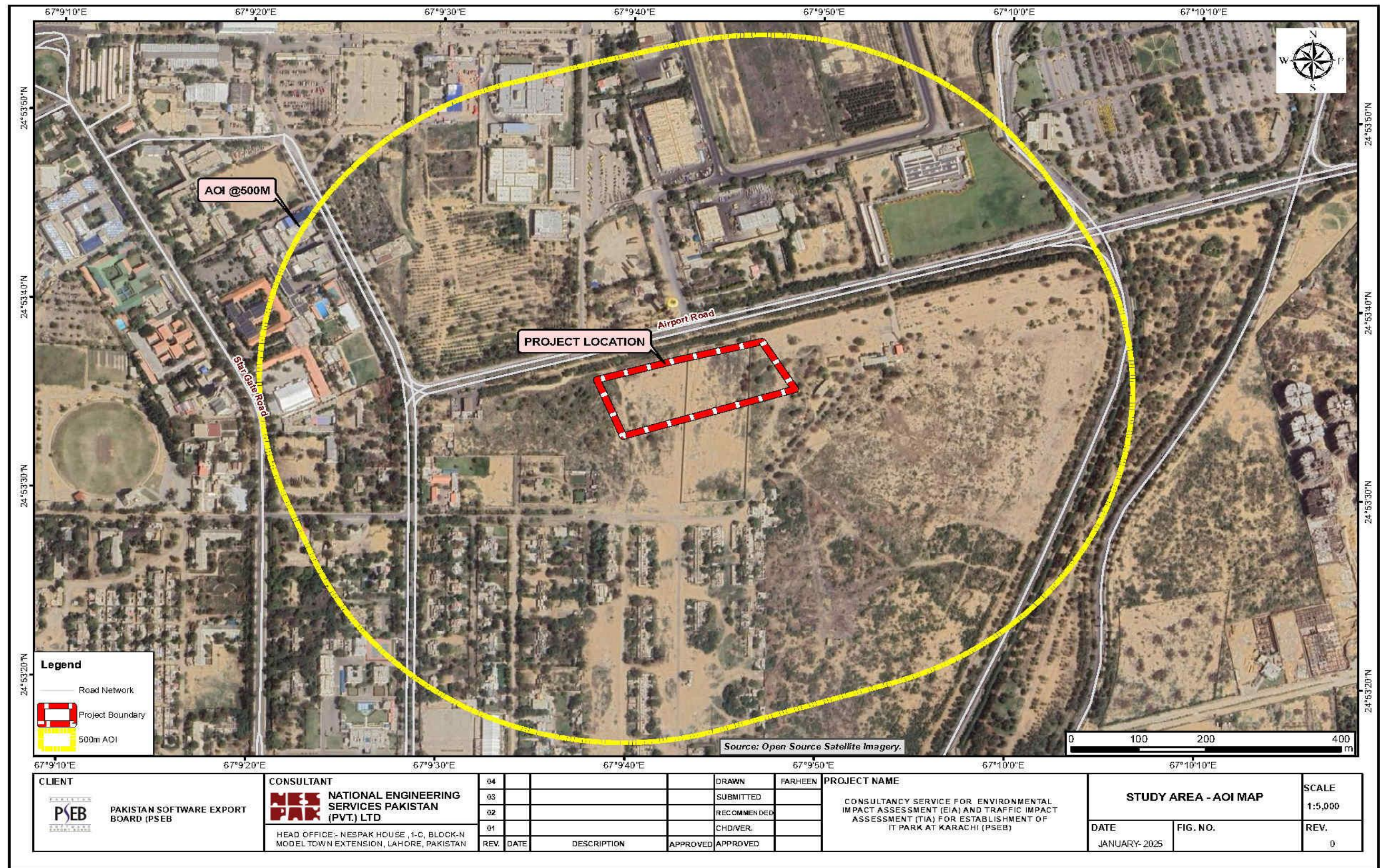


Figure 5.1: AOI of the Proposed Project

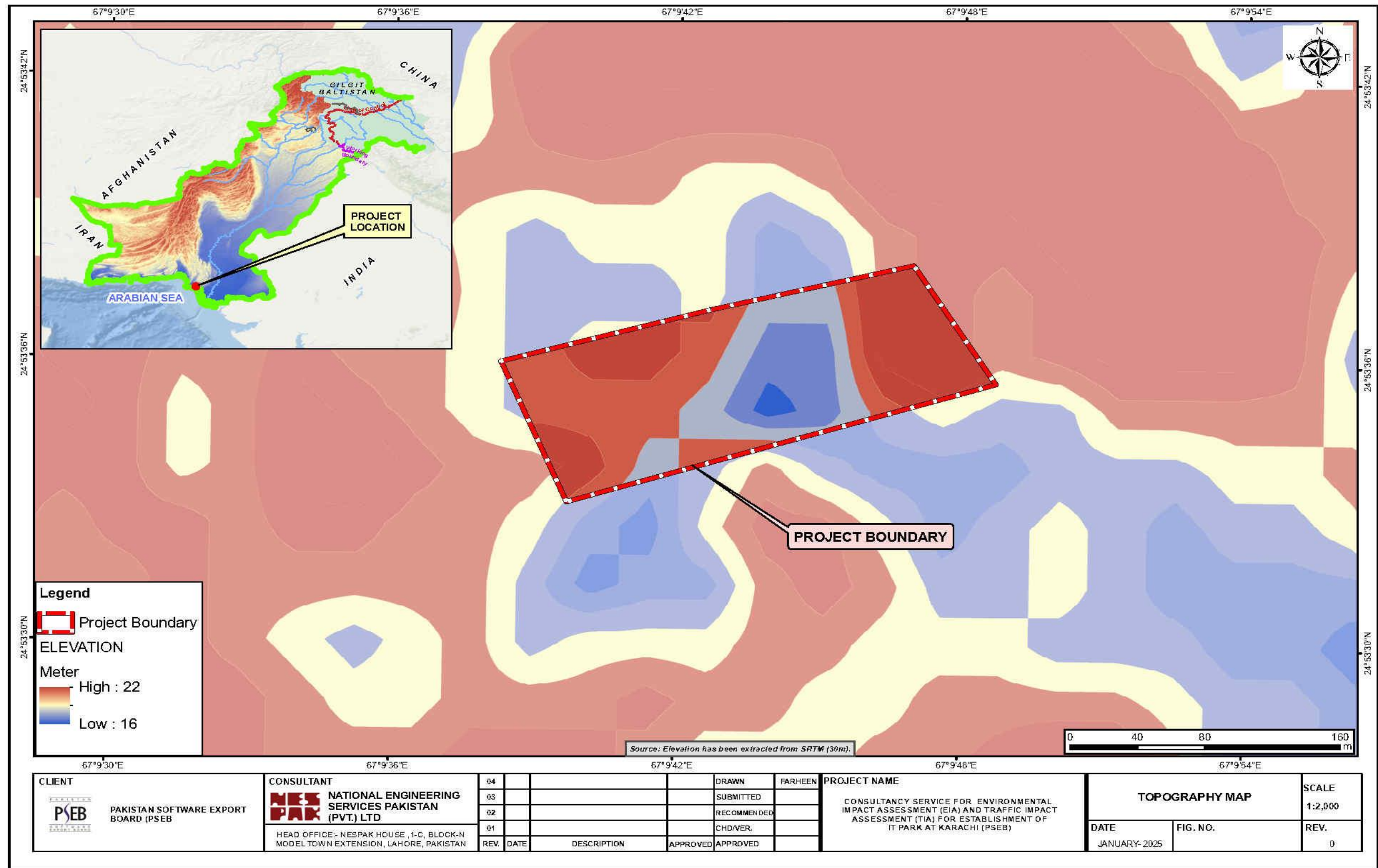


Figure 5.2: Topography Map of Proposed Project Area

5.4.2 Geology

The geological studies have revealed that the formations in this area are fresh and slightly weathered, recent and subrecent shoreline deposits. These deposits are derived from Gaj / Manchar formation of lower Moicene to Middle / Upper Miocene to Pliocene age. Quarternary deposits are represented by an extensive Conglomerate which unconformably overlies the Manchar rocks and slightly overlaps on to the Gaj series. Alluvial sands and gravels are of comparatively 'Recent' origin. The Gaj formation consists of mostly limestone with subordinate shale and sandstone. The limestone is friable to hard and at places fossiliferous. This formation overlies Nari formation which consists of harder limestone beds and shale. Overlying Gaj formation is Manchhar formation. This formation is composed of sandstone, clay beds, cemented sand and gravel (Conglomerate) and shell concrete. The clays are of various colors and consistency. Sandy layers are also found interbedded with clay and gravel.

The geology of the proposed Project Area falls under HOLOCENE surficial deposits comprises of unconsolidated deposits of clay, gravel and moraines and MIOCENE ROCK Gaj Formation comprises of mainly marine shales and limestone, fossiliferous, topmost sandstone and shales estuarine with abundant molluscan and few vertebrate fauna, early miocene. The geological studies have revealed that the soil formations in this area are fresh and lightly weathered, recent and subrecent shoreline deposits. These deposits are derived from Gaj / Manchar formation of Lower Moicene to Middle / Upper Miocene to Pliocene age. Quarternary deposits are represented by an extensive Conglomerate which unconformably overlies the Manchar rocks and slightly overlaps on to the Gaj Series. Alluvial sands and gravels are of comparatively 'Recent' origin. The site specific Geological Map of the area is shown in **Figure 5.3**.

5.4.3 Soil

The soil in the study area varies from mainly loamy to partly gravelly soils. The soil map of the study area is shown in **Figure 5.4**.

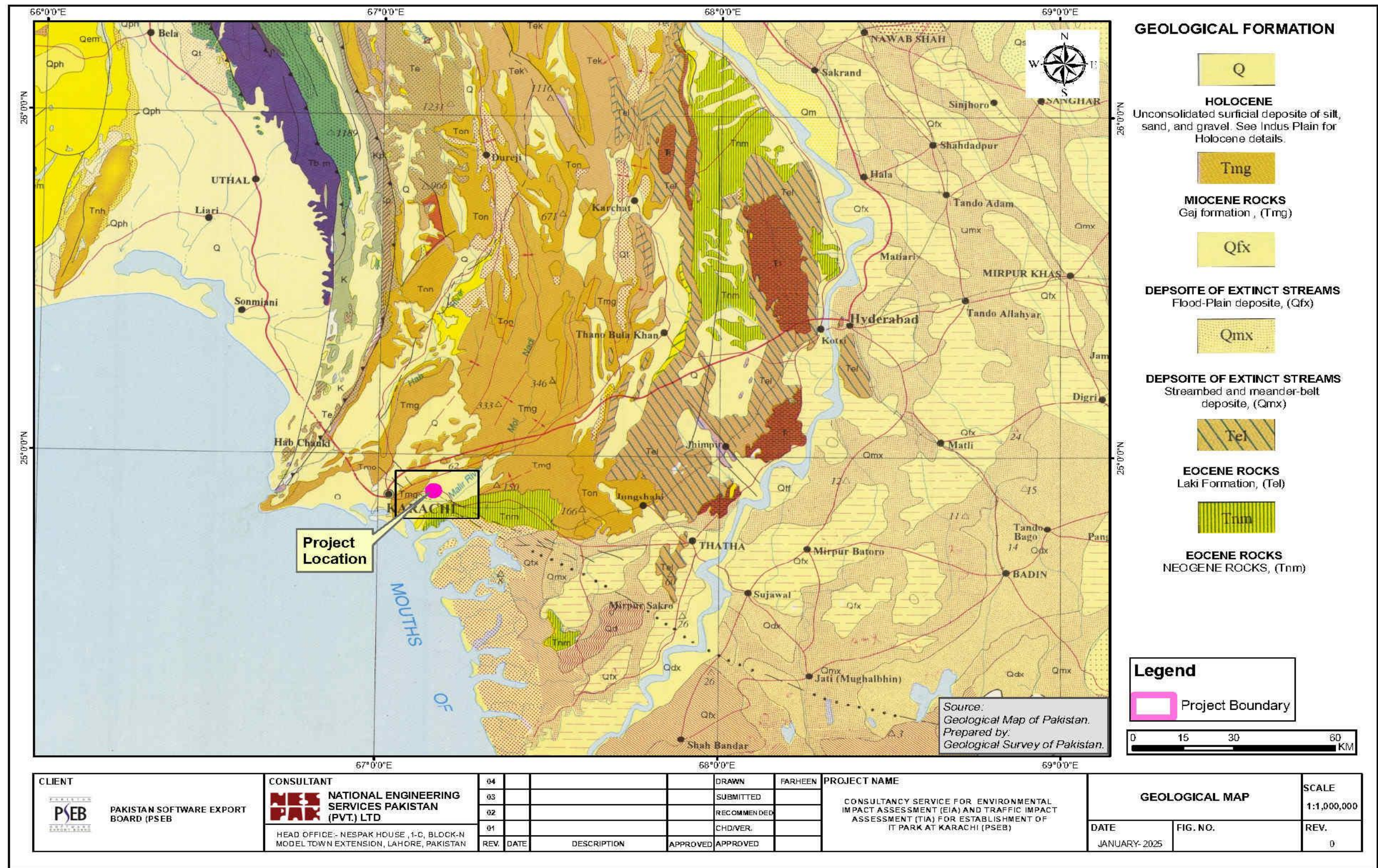


Figure 5.3: Geological Map of Project Area

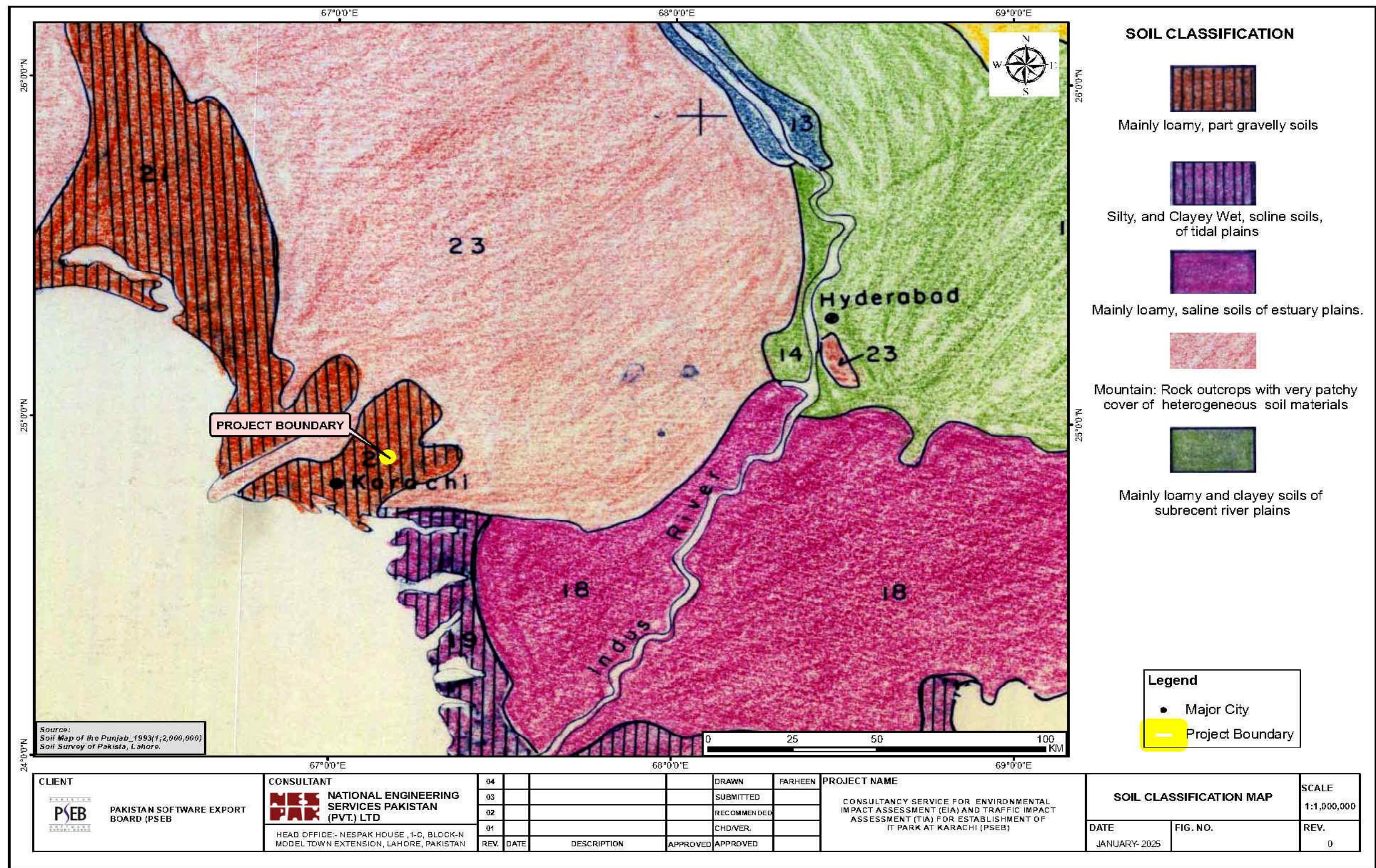


Figure 5.4: Soil Map of Project Area

5.4.4 Seismology

Seismo-tectonics of Pakistan is related to interaction of the following three lithospheric plates: Indian, Arabian, and Eurasian Plate. Tectonically, 75% of Pakistan lies on fault lines. The proposed Project is situated close to the junction of three tectonic plates (Indo-Pakistan, Arabian and Eurasian Plates). The significant faults in the vicinity include Ran of Katch Fault in east and Pub-Null Fault in west. The Rann of Kutch-Karachi fault, also known as Karachi-Jati-Allah Bund fault, passes close to the Eastern Industrial Zone of Port Qasim. It has three other segments namely the Jhimpir fault, the Pab fault, and the Surjani fault.

Figure 5.5 shows the location of Karachi with respect to Tectonic Plate Boundaries:

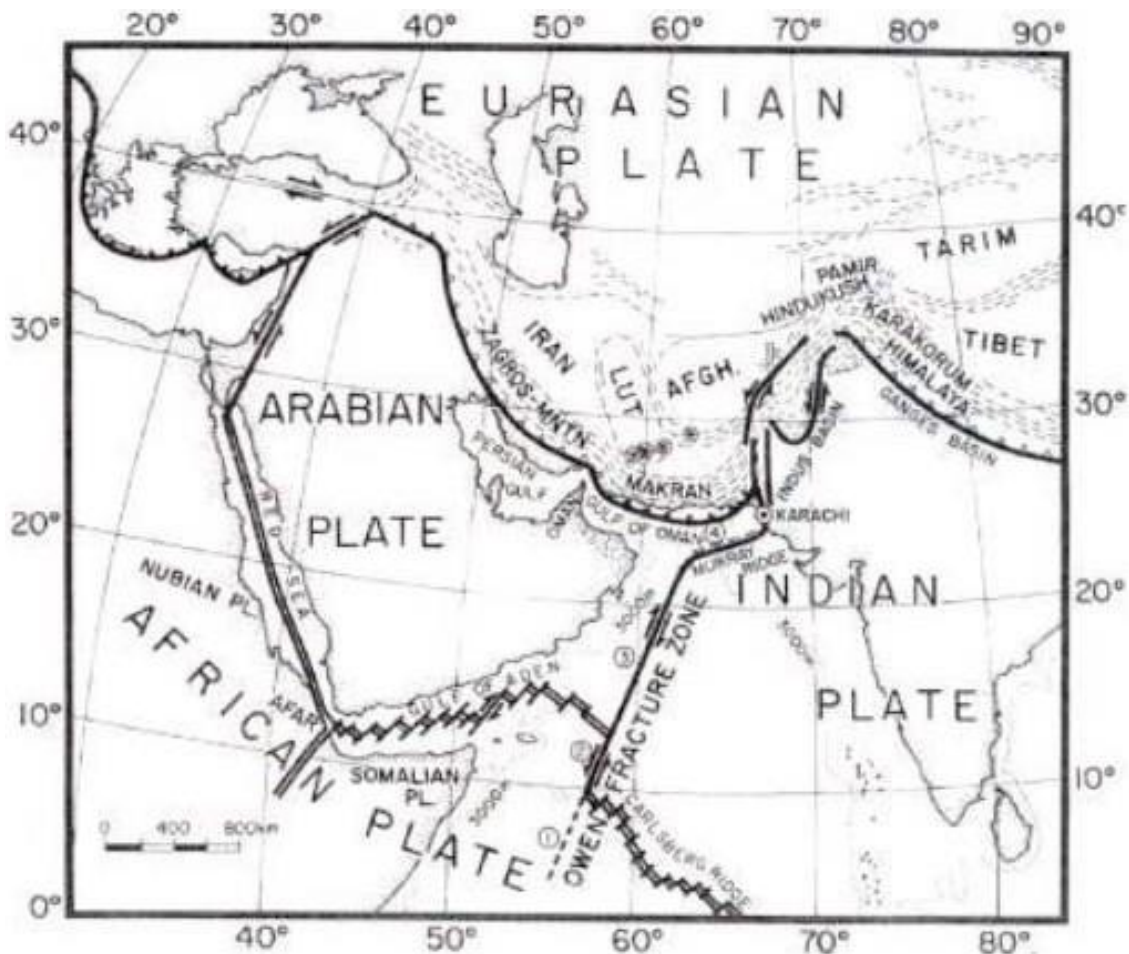


Figure 5.5: Plate-Tectonic Sketch Map

According to one classification, Pakistan has 15 seismo-tectonic regions. The proposed Project is located in the seismo-tectonic region where a moderate level of seismic activity is believed to exist, but large magnitude earthquakes are rare. As per the design of the proposed project, following seismic parameters have been considered/calculated for the earthquake load which are based on Building Code of Pakistan 2021:

- 1) Seismic Importance Factor: $I = 1.25$

2) Soil Profile Type:	SC
3) Occupancy Category:	3
4) Response Modification Factor:	R = 6.0
5) Seismic Parameter:	Ss = 0.7831 S1 = 0.2169
6) Seismic Design Category:	D

5.4.5 Water Sources

The surface water resource map of the project area is shown in **Figure 5.7**. The surface water resources near project area include Malir River and canal.

The Malir River

Malir River is the only natural surface water body that is present near the project area. Malir River basin has total catchment area of about 1,850 square kilometers around southeastern boundary of Karachi. Malir River system consists of two major streams, Mol and Khaddeji, and three tributaries named Konkar, Thaddo and Sukkan. River flows southwards and westwards through Gizri Creek and discharges finally into the Arabian Sea. The central part of the river basin is made-up of sediment deposits comprising coarse conglomerate, sand stone, clay stone and limestone, whereas, the lower plain is composed of alluvial deposits. In the lower plain, the river is wider and shallower and gets braided. During the rainy season, River Malir experiences flooding which is discussed in detail in upcoming sections.

5.4.6 Water Supply System

Over the last three decades, Karachi consistently lagged behind in the maintenance and expansion of water supply system, bulk conveyance system, and distribution network as compared to the city demands due to high population growth rate (4 to 5% per annum), low capacity of institutions, and low level of financing. The consequence is the rationing of water supply currently in practice in most of the areas of the city. Water is supplied only once in every two or three days and for the duration of two to three hours at a time. People are pushed to spend money on ground-level tanks, booster pumps, roof-top storage tanks and water filters and even then, all drinking water is boiled. Many households are compelled to use secondary sources of water such as shallow wells or tanker supplies just to meet their basic needs.

The water supply system of the Karachi Water and Sewerage Board (KWSB) supplies bulk water to the citizen of Karachi City from the Indus River, Hub Dam and Dumlottee Wells through the Greater Karachi Bulk Water Supply System. The existing water supply network is provided in **Figure 5.6**. The Main Water Control is about 5km away therefore, water supply needs to be brought from outside.



Figure 5.6: Existing water supply network⁹

5.4.7 Sewerage System

Four drainage systems are said to encompass Karachi City, the Lyari, the Malir, the Budnai and small streams referred to collectively as the coastal basin. The Malir River Basin and the Lyari River Basin contribute about 80% of the surface runoff from the city. Thus, the natural drainage system of Karachi City includes mainly the tributaries of the Malir and Lyari Rivers. While these are perennial streams, in stream flow is intermittent, and fresh water inflow depends on rainfall and runoff; both rivers also intercept discharges from sewer lines and outfalls and carry sewage to the sea from all parts of the city.

Drainage channels collect surface runoff through hundreds of small/large side channels and lined nullahs (drains) that serve as important components of the drainage network. These are generally dry built channels and streambeds that flow into the main rivers described above. The existing coverage of the sewerage system is only about 30% for the Karachi. The existing sewerage system of overall Karachi Division has a number of problems.

For the proposed project which is situated in the Faisal Cantonment of Karachi Division, the existing sewerage system situation is better. There is a proper urban sewerage collection and disposal system. The sewerage during construction phase will be managed by septic tanks and disposal through third party collectors. During operational stage, the wastewater from IT park building will be connected after treatment through septic tanks, with the existing sewerage collection system in the project area.

5.4.8 Flooding

Climate of Karachi is semi-arid and rainfall is low and highly variable. Previously, there have been four damaging floods in Karachi in the past 50 years; 1967, 1973, 1977, and 1978. The most devastating flood in the history occurred in June 1977. Following the rainfall of 29th June

⁹ Source: Inception Report of IT Park Karachi

1977 which had created a situation favorable for quick runoff. Intense rainfall occurred on 30th June 1977 in the catchment of Malir River which generated a flash flood on land resulting in damage of tremendous life and property loss.

The maximum flow in Malir River at this location had been estimated between 200,000 to 250,000 cusecs. During 1978 (on 18th August) 200,000 to 230,000 cusecs was estimated to be the peak discharge at this location. In recent events, the 2020 Karachi floods were the worst flooding Karachi had seen in almost a century. The floods were caused by record monsoon rains which were inadequately drained by poorly maintained drainage systems in the city. The resulting floods caused deaths and destruction of infrastructure and properties in the city¹⁰.

(The Space is intentionally left blank)

¹⁰ Source: Wikipedia

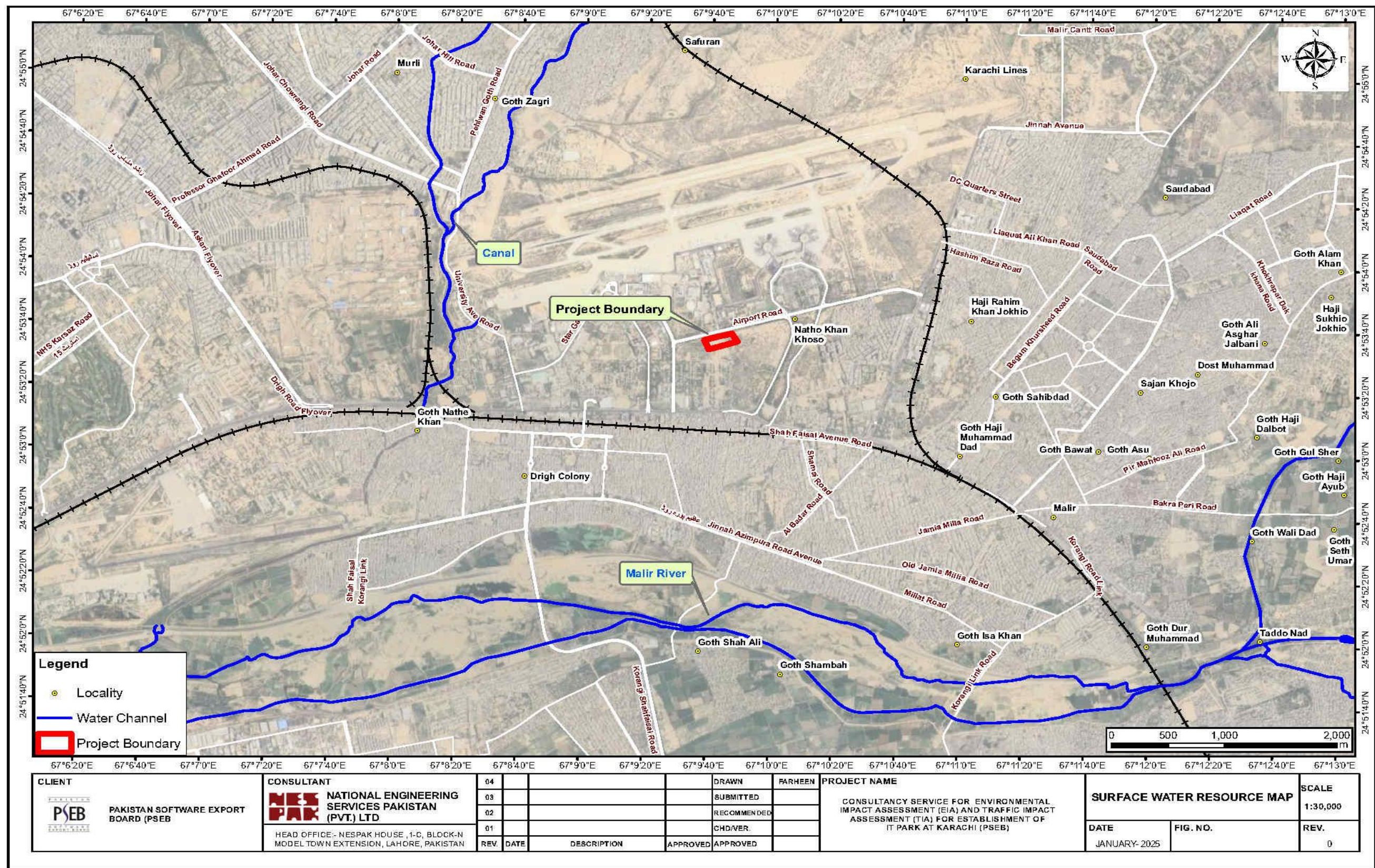


Figure 5.7: Surface Hydrological map of Project Area

5.4.9 Climate and Meteorology

The climate of Karachi can be characterized by dry, hot and humid conditions and in general terms it is moderate, sunny and humid. There is a minor seasonal intervention of a mild winter from mid-December to mid-February followed by a long hot and humid summer extending from April to September, with monsoon rains from July to mid- September. The level of precipitation is low throughout the year, whereas the humidity levels remain high from March to November, while very low in Winter as the wind direction in winter is north-easterly.

The characteristic climatic feature of the four seasons of Karachi is presented in **Table 5.1**.

Table 5.1: Seasonal Characteristics of the Climate of Karachi

Season	Temperature	Rainfall	Wind
Summer (Mid-March to Mid-June)	The summer is hot with temperature increasing from 26.2 °C in March, rising up to 40 °C in June.	There are less frequent rain showers in summer with no more than 1 or 2 rainy days in summer.	The wind speed in summer is variable. It is around 2.5 m/s in March and rises upto 18 m/s in April and drops to 4 m/s for the rest of the season.
Monsoon (Mid-June to mid-September)	The temperature in monsoon remains high but relatively lower than summer and oscillates around 32°C.	Almost 80 % of the yearly rain occurs in the monsoon with July and August being the wettest month.	The wind direction in the monsoon is mostly blowing from East.
Post-Monsoon Summer (Mid-September to November)	The average temperature post monsoon drops and average min temperature may reach 12 °C in November.	The post-monsoon period remains mostly dry and rainfall in November is around 1.8 mm.	The wind speed in September is around 3.7 m/s and drops to 1.4 m/s in November.
Winter (December to mid-March)	The winter is mild with January being the coolest month where average minimum temperature falls to 6 °C.	Like the other seasons, except monsoon, there is little occasional rainfall. The rainfall in winter is less than 50 mm.	The wind speed in the winter season increases from 1.4 m/s in December to 2.6 m/s in March. The wind direction for most part winter season is blowing from NE and changes its course to blowing from West in early March

5.4.9.1 Temperature

The air temperature in Karachi Division and its coastal areas is generally moderate throughout the year due to presence of the sea. Climate data generated by the meteorological station at Karachi Airport represents the climatic conditions for the region. The mean monthly maximum and minimum temperatures, recorded during the last 21 years in Karachi (Karachi Airport) to describe the weather conditions are shown in the **Figures 5.8** and **Figure 5.9**.

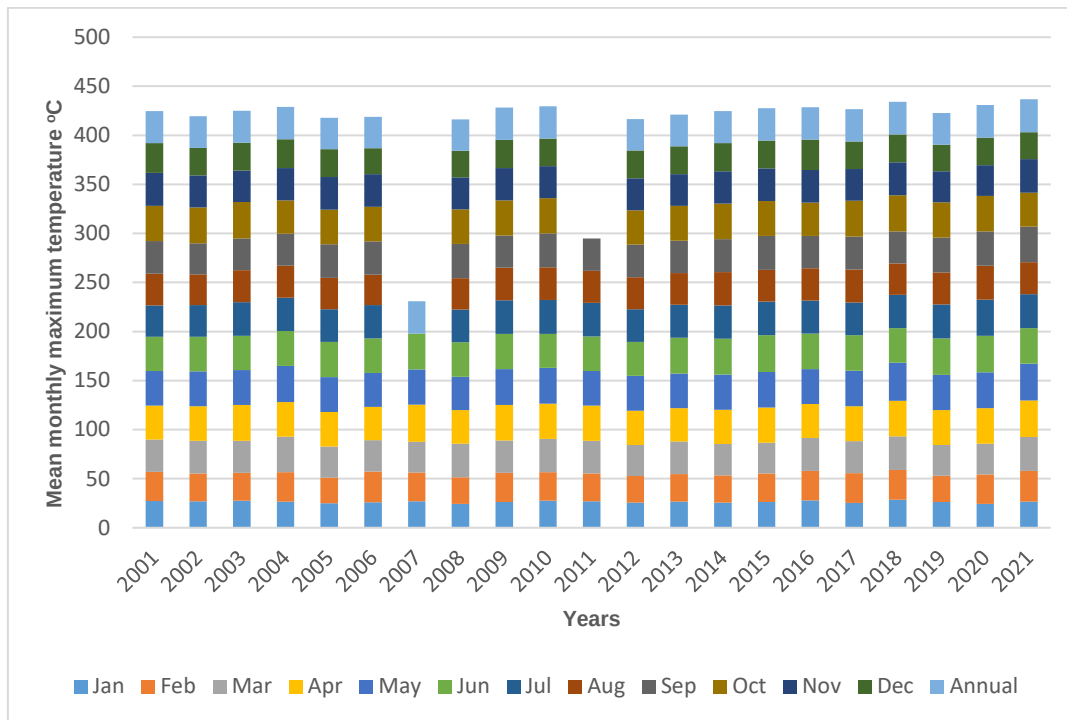


Figure 5.8: Mean Monthly Maximum Temperature

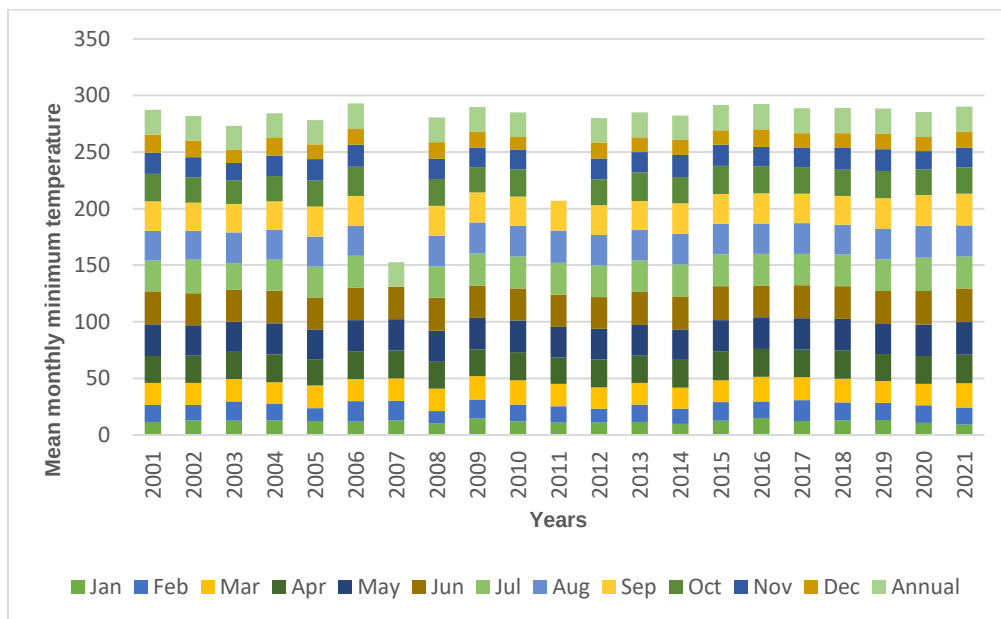


Figure 5.9: Mean Monthly Minimum Temperature

From the above mentioned graphs it can be seen that the highest mean monthly maximum temperature was observed in 2018, while lowest mean monthly minimum temperature was noted in 2003. It is also observed that water demand is higher in Summer. So more work will be done in winters where water disruption causes less impact. During extreme hot weather conditions, work in open air will be reduced to minimize OHS impacts on workers e.g., heat stroke or dehydration.

5.4.9.2 Precipitation

Being in the semi-arid climatic zone, the rainfall which is received is mostly in the months of July to September during SW Monsoon winds and is extremely low otherwise throughout. It is very erratic as some years are very dry and there is no rain. The average yearly rainfall is 217 mm and most of it is received in the month of July. Occasional winter rains are also received in the months of December –February as result of NE winds which count 15-25% of total rainfall.

The record for rainfall of Pakistan Metrological Department (PMD) at Karachi Airport (2001-2009 & 2012-2020) suggests that July and August are the wettest months and that the maximum rainfall recorded in Karachi during 2001-2009 & 2012-2020 period was 366.8 mm in 2020 during the month of August, while the maximum annual rainfall was 474.2 mm during the year 2020, followed by 367.3 mm in 2019 and 324.9 mm in 2003 as shown in **Figure 5.10**. Considering the current heavy rainfall trend during monsoon season in the project area, the rainwater will be accumulated at construction sites and in excavated trenches which not only cause construction delays but also increase the HSE related impacts on workers as well as local community.

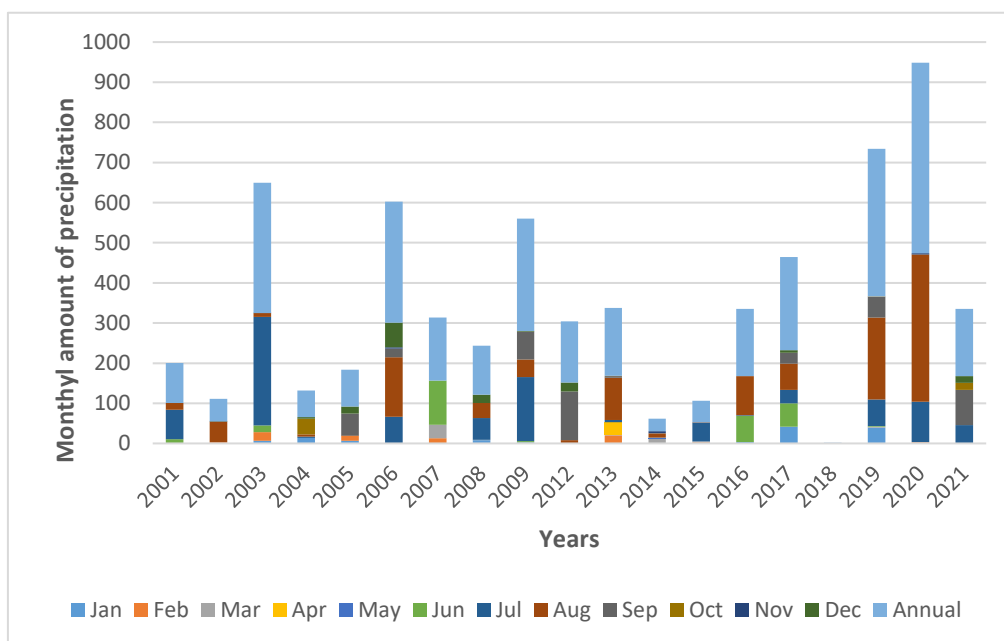


Figure 5.10: Monthly Amount of Precipitation (mm) at Karachi Airport

5.4.9.3 Humidity

The relative humidity of the project areas typically ranges from 25% (dry) to 70% (humid) over the course of a year, rarely dropping below 20% (very dry) and reaching as high as 90% (very humid). The **Figure 5.11** represents the humidity that prevails in project areas throughout the year. During the extreme hot and humid weather, the significance of health related impacts on workers such as heat stroke or dehydration will be increased which may cause delay in construction activities.

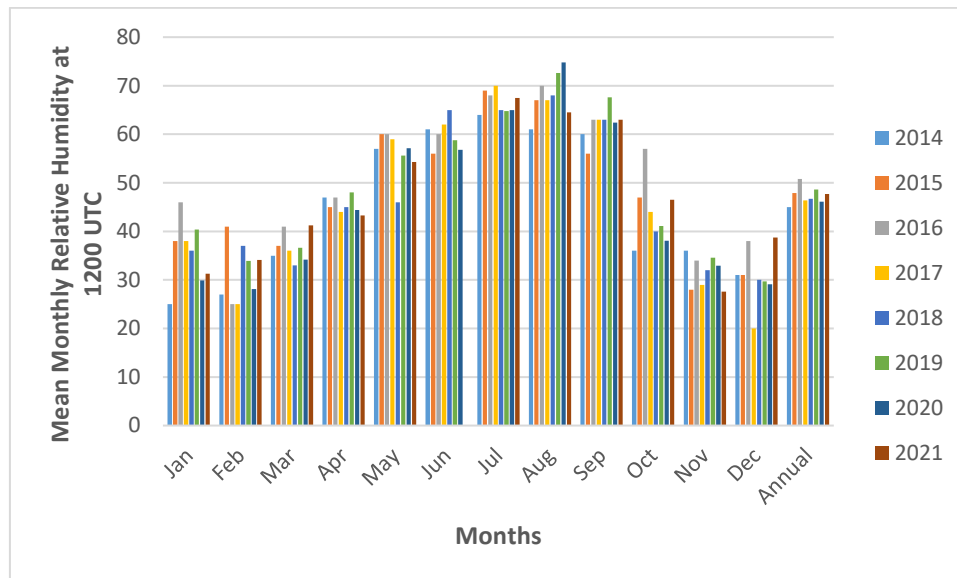


Figure 5.11: Mean Monthly Relative Humidity (Mean) at 1200 UTC (%)

5.4.9.4 Wind Speed & Direction

The wind direction and speed between the summer and winter monsoon seasons are rather unsettled and large variations are noted both with respect to speed and direction. The wind velocity record (2001-2009 & 2012-2021) indicates that the velocity varies and ranges between 1.0 m/s to 13.4 m/s. **Figure 5.12** show the wind speed.

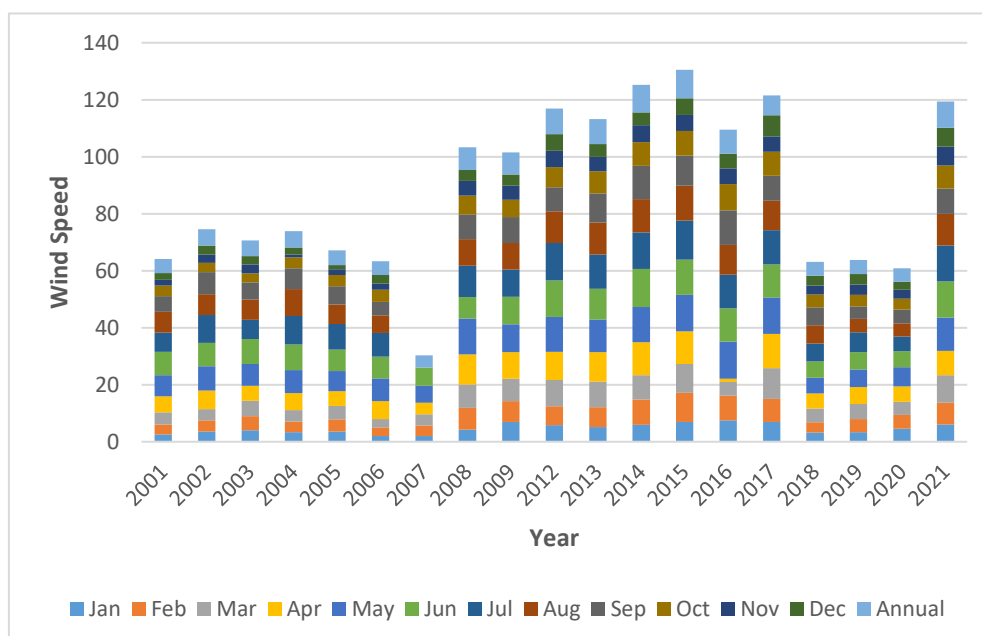


Figure 5.12: Wind Speed (knots) at 12:00 UTS

5.4.9.5 Climate Vulnerability

Karachi city has an arid climate with low rainfall which is highly variable, with torrential rain taking place from time to time and bringing with it heavy rainfall within a short duration, leading to an intensification of the surface runoff. This is because the rate of water percolation into soil is lower than the amount of rain water falling on the surface. Heavy showers take place in the city either due to the effects of tropical storms usually in June, which rarely affect coastal areas but bring heavy showers for short periods and cause flooding.

The heavy monsoon rain mostly occurs in July and August and is the main cause of flooding in the city as well as in Project Area. However, its re-occurrence is estimated to occur at about 3 to 5¹¹ year intervals. Major flood affected areas and areas susceptible to flooding include the old city areas such as Kharadar, Mithadar, Bunder Road, Ram-swami and Arambagh.

In July-2020¹², weather system brought heavy rains in Karachi. According to data provided by the MET Office, the highest rainfall was recorded in Gulistan-e-Johar, at 66 millimeters (mm), while 55 mm was registered at Old Airport, 55 mm in Pehlwan Goth, 42 mm in Malir, Saddar 43 millimeters (mm), while 26 mm was registered at Pakistan Air Force (PAF) Faisal Base, 22mm in Nazimabad, 12mm at PAF Masroor Base, 8.8mm at Karachi's Jinnah International Airport, 3.1mm in Landhi, and 1.2mm in Surjani Town.

According to PMD, city received more than 80 mm rainfall in the third spell of the monsoon. The heavy to moderate rainfall caused flooding in low lying areas of the city and inundated several key roads, causing problems for the commuters.

5.4.9.6 Cyclones

The Arabian Sea is known to be frequented by general cyclonic storms and some of these had been among the worst cyclonic storms of the world from their severity point of view, resulting in huge losses to life and property in the coastal areas. A significant number of the cyclonic storms produced in the Arabian Sea move towards north and northeast and some of them land in Pakistan. However, most of these cyclones which tend to move towards southern part of the Pakistan coast very often reciprocate towards eastern coast of India. Coastal Sindh is more vulnerable than the west coast of Pakistan to storm surges, associated with the severe cyclonic storm generated in the adjoining Arabian Sea.

The available data on cyclones and storm reveals that Pakistan coast is vulnerable mostly during the period from April through June while no storm have ever been observed during January to March (news report). Tropical cyclones squander between Gulf of Cambay and Karachi. The size of the tropical cyclones is generally 270 -720 Km with an average speed of 7 to 18 Km/hr.

¹¹ Mott Macdonald Pakistan, (2018), EIA study for Karachi BRT – Red Line

¹² Rapid Need Assessment Urban Flooding Karachi July 2020, Monitoring Evaluation & Research Program by HANDS

5.4.10 Solid Waste System

The municipal solid waste of the project area will be linked with the solid waste collection and management system of the Cantonment.

5.4.11 Environmental Monitoring

Environmental monitoring, sampling and testing of the proposed project has been carried out by a third party laboratory certified from SEPA in March, 2025. The sampling locations for the proposed environmental monitoring of ambient air, noise and water for proposed project are shown in **Figure 5.13** respectively. Detailed environmental monitoring, sampling and testing results have been provided as **Annex-II** of this report.

A total of one surface water and one drinking water samples have been collected. Similarly, one point has been selected for ambient air and noise monitoring at site.

Ambient Air

Ambient air quality data for CO, SO₂, NO, NO₂, CO₂, SPM, O₃, Lead PM₁₀ and PM_{2.5} was monitored at one (01) point. The results were compared with the SEQS. The summary of ambient air monitoring points along with averaging periods are provided in **Table 5.2**.

Table 5.2: Ambient Air Monitoring Results

Monitoring Point	Pollutants								
	CO mg/m ³	NO ug/m ³	NO ₂ ug/m ³	SO ₂ ug/m ³	O ₃ µg/m ³	PM ₁₀ ug/m ³	PM _{2.5} ug/m ³	Lead (Pb) ug/m ³	SPM ug/m ³
AA	1.009	12.47	29.81	32.76	80.9	165.2	80.2	0.09	452.7
SEQS	5 8-hrs	40 24-hrs	80 24-hrs	120 24-hrs	130 24-hrs	150 24-hrs	75 24-hrs	1.5 4-hrs	500 24-hrs

NS = Not Specified

ND = Not Detected

Note: The 24hr concentration has been estimated based on the average of hourly monitoring data whereas the peak value of hourly monitoring data indicated the 1hr time period concentration of pollutant determined by the sensor based monitoring instruments.

Background Noise Levels

The background noise level monitoring was carried out at one location. The results were compared with the SEQs for noise limits in Commercial areas (B) with limiting value of 65 dB(A) - day time, 55 dB(A) - night time, where applicable. The summary of background noise monitoring points along with averaging period are provided in **Table 5.3**.

Table 5.3: Noise Level Monitoring Results

Measurement Points Location and Area Type ¹³	Duration		Comparison Values (SEQS)	Noise Level in dB(A) Leq	Remarks
NL (Commercial Area)	24 Hours	– Day Time	A = 65 dB(A)	60.6	Within SEQS Limits
		– Night Time	A = 55 dB(A)	53.6	Within SEQS Limits

Day Time hour: 06:00am to 10:00pm Night Time hour: 10:00pm to 06:00am

A = Residential Area Noise

B = Commercial Area Noise

Surface Water

In order to document the existing quality of surface water, one grab samples of surface water/wastewater were collected and after being labeled and preserved, it was transported to the laboratory for testing. The results were compared with the SEQs for surface water, which are shown in **Table 5.4**.

Table 5.4: Surface Water/Wastewater Sampling Results

Sr. No.	Parameter	Units	WW	SEQS
1	Temperature	°C	23.2	40 + ≤ 03
2	pH @ 25 °C	pH	7.281	6 to 9
3	Biological Oxygen Demand (BOD5)	(mg/L)	48	80
4	Chemical Oxygen Demand	(mg/L)	70	150
5	Total Dissolved Solids	(mg/L)	3910	3500
6	Total Suspended Solids	(mg/L)	50	200
7	Oil & Grease	(mg/L)	BDL	10
8	Chloride	(mg/L)	410	1000
9	Phenolic compound	(mg/L)	BDL	0.1
10	Fluoride	(mg/L)	4.1	10
11	Anionic Detergent	(mg/L)	0.246	20
12	Selenium	(mg/L)	BDL	0.5
13	Sulphide	(mg/L)	BDL	1.0
14	Ammonia	(mg/L)	10.8	40
15	Cadmium	(mg/L)	BDL	0.1
16	Chromium	(mg/L)	BDL	1.0
17	Copper	(mg/L)	BDL	1.0
18	Lead	(mg/L)	BDL	0.5

¹³ The area classification was done based on the existing landuse and land classification criteria set out by the Revenue Department considering the nearby settings of monitoring locations.

Sr. No.	Parameter	Units	WW	SEQS
19	Mercury	(mg/L)	BDL	0.01
20	Nickel	(mg/L)	BDL	1.0
21	Silver	(mg/L)	0.0121	1.0
22	Zinc	(mg/L)	1.2468	5.0
23	Total Iron	(mg/L)	0.1618	8.0
24	Manganese	mg/L	0.0245	1.5
25	Boron	(mg/L)	BDL	6.0
26	Sulphate	(mg/L)	280	600
27	Arsenic	(mg/L)	BDL	1.0
28	Chlorine	(mg/L)	BDL	1.0
29	Total Toxic Metals	(mg/L)	0.0121	2.0
30	Barium	(mg/L)	BDL	1.5
31	Cyanide	(mg/L)	BDL	1.0

NS: Not Specified ND: Not Detected

Groundwater / Drinking Water

In order to document the existing groundwater quality, one sample was collected and after being labeled and preserved, it was transported to the laboratory for testing. The sample was tested against all parameters. Results of the sample along with the respective values are shown in **Table 5.5**

Table 5.5: Groundwater / Drinking Water Sampling Results

Sr. No.	Parameter	Units	GW	SEQS
1	pH @ 25 °C	pH	8.231	6.5-8.5
2	Total Dissolved Solids	(mg/L)	610	<1000
3	Phenolic compound	(mg/L)	BDL	0.002
4	Chloride	(mg/L)	65	<250
5	Total Hardness as CaCO ₃	(mg/L)	160	<500
6	Aluminum	(mg/L)	BDL	0.2
7	Residual Chlorine	(mg/L)	BDL	0.2-0.5
8	Antimony	(mg/L)	BDL	<0.005
9	Arsenic	(mg/L)	BDL	0.05
10	Taste		Non-Objectionable	Non-Objectionable
11	Odor		Non-Objectionable	Non-Objectionable
12	Barium	(mg/L)	BDL	0.7
13	Boron	(mg/L)	BDL	0.3
14	Copper	(mg/L)	BDL	2.0
15	Lead	(mg/L)	BDL	<0.05
16	Mercury	(mg/L)	BDL	<0.001
17	Nickel	(mg/L)	BDL	<0.02
18	Manganese	(mg/L)	0.0095	0.5
19	Zinc	(mg/L)	0.0108	<5
20	Selenium	(mg/L)	BDL	0.01
21	Chromium	(mg/L)	BDL	<0.05
22	Fluoride	(mg/L)	0.6	1.5
23	Cadmium	(mg/L)	BDL	0.01
24	Nitrate	(mg/L)	BDL	0.5
25	Nitrite	(mg/L)	BDL	3

Sr. No.	Parameter	Units	GW	SEQS
26	Color	TCU	0.000	<15TCU
27	Turbidity	NTU	0.25	<5
28	Total Coliform	count/100ml	Nil	0/100ml
29	Escherichia Coli	count/100ml	Nil	0/100ml
30	Pesticides	mg/L	ND	0.15
31	Potassium	mg/L	897	-
32	Sodium	mg/L	48.8207	-

NS: Not Specified ND: Not Detected

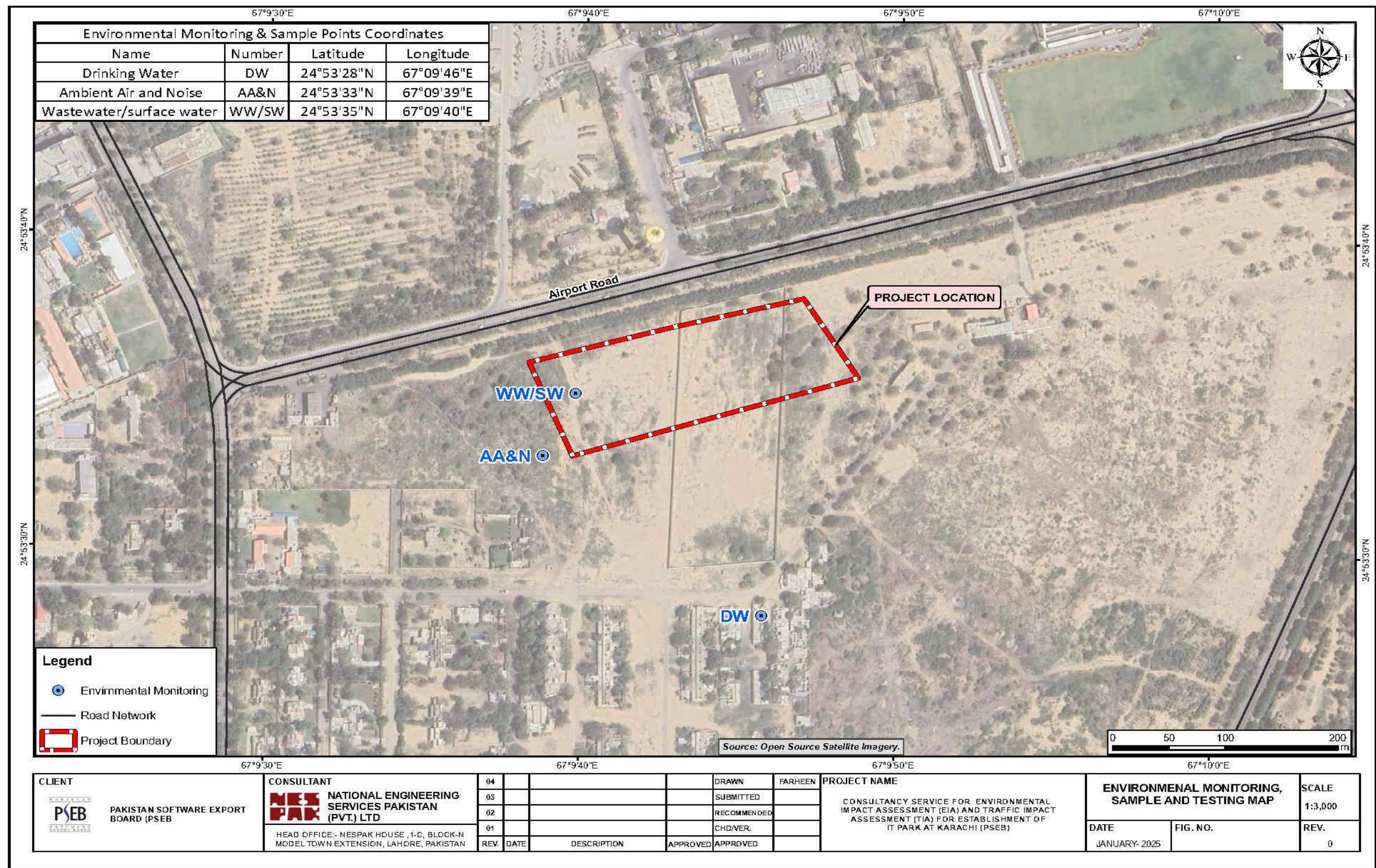


Figure 5.13: Sampling Location Map of Monitoring Parameters for Project area

5.4.12 Land Use Pattern

The Project area is situated near Jinnah International Airport Karachi (JIAK). Land use of the project site includes built-up area, roads, graveyard, barren/ open land. Land-use pattern was studied within a radius of 500m of the Project Area while only built-up area is involved in the Project Land. **Figure 5.14** shows land use pattern at project site and AOI. **Table 5.6** provide statistical data regarding proportion of Landuse at project site.

Table 5.6: Project Area Land use of IT Park

Land use	Area in Acres
Barren / Open land	6
Total	6

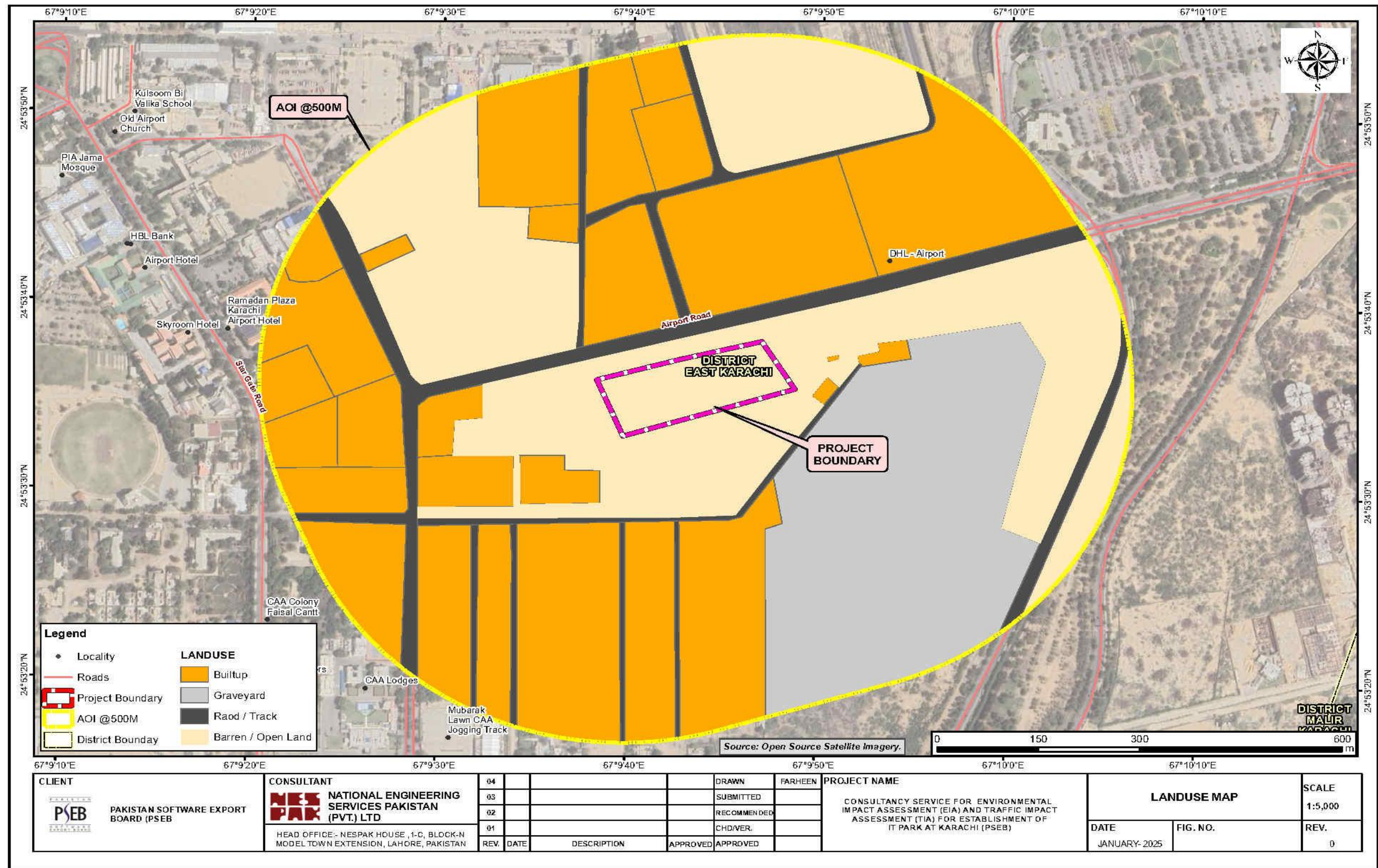


Figure 5.14: Land Use Map of Aoi

5.4.13 Environmental Sensitive Receptors

Sensitive receptors are mainly people or other organisms that may have a significantly increased sensitivity and exposure to the pollutants and social disturbance, due to the developmental projects. Thus, sensitive receptors are necessary to be identified, to evaluate the potential impacts of the proposed project on public health and the surrounding environment.

The sensitive receptors identified for the within 500m radius is Federal Government Dispensary, Junior Model School, Government Boys School, Al shifa trust special school and center, CAA mini medical, and SAPA Aviation college, Jamia Masjid Alhamra idara Hunar o Danish, Ali Masjid and Jamia Habibia Masjid as shown in **Figure 5.15**.

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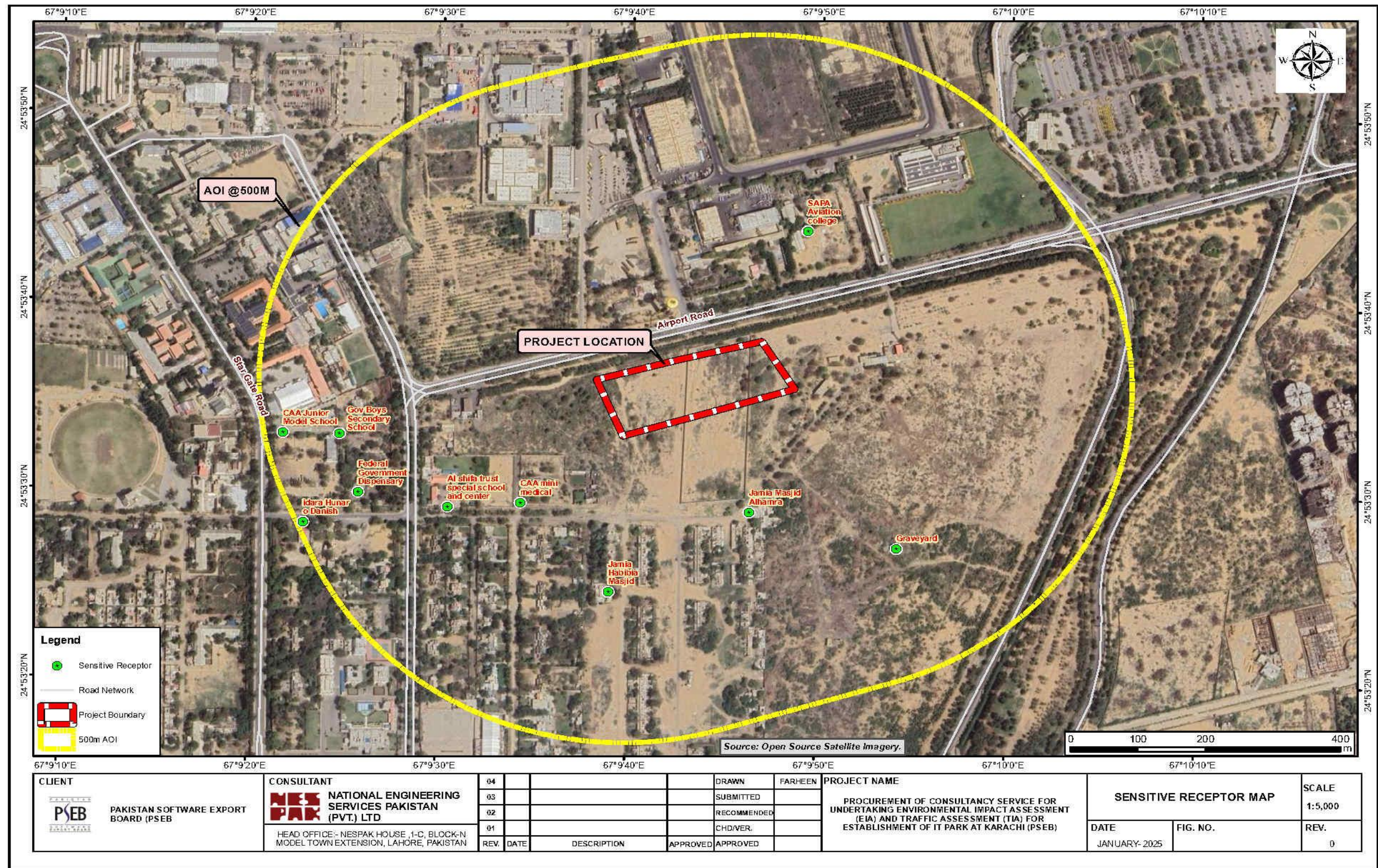


Figure 5.15: Sensitive Receptors Map of the Study Area

5.5 ECOLOGICAL ENVIRONMENT

5.5.1 Methodology

All the available literature was thoroughly reviewed to better understand the project area and its surroundings including habitat, flora, and fauna. The route alignment was thoroughly examined based on the primary (field visits) and secondary (Flora of Pakistan-MI-Sheikh, Birds of Pakistan-ZB-Mirza-Mammals of Pakistan-TJ Roberts, Previous EIAs of the proposed area, Manual of silviculture for Pakistan [1965] Champion, Sir H.G.; Pakistan Forest Inst., Peshawar eng; Seth, S.K. Khattak, G.M.) data. The stakeholders Forest, Wildlife, PHA, and EPA were also consulted. This survey broadly covers ecosystem sensitivities (If any), vegetation, other flora, and fauna, and the number of trees in the project area.

The project area is located through the eastern outskirts of Karachi metropolis. The proposed project area is a barren, unproductive and undulating landscape with low biodiversity values. The adjacent areas also lack the presence of noteworthy terrestrial fauna.

5.5.2 Flora

Due to the gradual degradation of the habitat caused by climatic changes and anthropogenic stresses, the area has lost its original ecological identity and associated status of biodiversity. Following are the species found in and around the project area.

Table 5.7: List of Floral Species in the nearby project area

Sr. No.	Local Name	Scientific Name
1.	Neem	<i>Azadirachta indica</i>
2.	Alstonia	<i>Alstonia scholaris</i>
3.	Paper mulberry	<i>Broussonetia papyrifera</i>
4.	Jhand	<i>Prosopis cineraria</i>
5.	Ghaz	<i>Tamarix aphylla</i>

5.5.3 Habitat

The ecological zone is included in the Indus ecoregion which covers about 65% of the land area of Sindh Province. Being included in the Indus ecoregion, the flora and fauna of the project site is linked with Indomalayan biogeographical origin, concerning microecological response. In general, the project area is an urban environment. The natural fauna and flora-based ecosystems and species are less significant and less in number. Due to disturbances and the absence of favourable habitats, the faunal frequency is observed to be low in the project area.

Reptiles and amphibians are unable to maintain their habitats (shelter and food) because of severe/extreme anthropogenic pressure which leads to destruction, the native species are mostly extinct or migrated. It was observed that these habitats are now converted into commercial buildings. Chaudhary, I.I. 1961. The vegetation of Karachi. Vegetation, 10: 229- 246.

5.5.4 Fauna

Mammals

Environments for flourishing of faunal species are not encouraging, on the other hand these habitats are impoverished and degraded, resulting from commercialization, ill planned urbanization, non-availability of surface as well as groundwater and discharge of untreated in the city. This process has irreversibly reduced the indigenous biodiversity as well as introduced invasive vegetation and hence it offers very little chance for the survival/growth of fauna in the targeted environment of Project Area. There are even otherwise, no major habitats of large and small animals, birds or reptiles within or near the Project site, except few species of birds and small mammals.

The project area sustains few insignificant mammals such as five striped palm squirrel, roof rat and house mouse. These mammals are common while small indian mongoose is less common. None of the species of nearby of the project site is threatened.

Table 5.8: List of mammals of the study area

Sr. No.	English Name	Scientific Name	Occurrence Status
1.	Five striped palm squirrel	<i>Funnambulus pennuntii</i>	common
2.	Roof rat	<i>Rattus ratlus</i>	common
3.	Small Indian mongoose	<i>Herpates javanecus</i>	common
4.	Rabit	<i>Liporidae</i>	common
5.	House mouse	<i>Mus musculus</i>	common

5.5.5 Birds

Species identified near the project area are of less ecological importance. However few birds such as Reef Heron, Little and Cattle Egret are of ecological importance.

Table 5.9: List of birds of the study area

Sr. No.	English Name	Scientific Name
1.	House Crow	<i>Corvus splendens</i>
2.	Little Egret	<i>Egretta garzetta</i>
3.	Cattle Egret	<i>Bubulcus ibis</i>

Sr. No.	English Name	Scientific Name
4.	House Sparrow	<i>(Passer domesticus)</i>
5.	Common Myna	<i>(Acridotheres tristis)</i>
6.	White cheeked Bulbul	<i>(Pycnonotus leucogenys)</i>

5.5.6 Reptiles

The project site shows deficiency in occurrence of reptile species due to degraded status of habitat. Amongst the rarely found reptiles in nearby urban area are the following:

Table 5.10: List of Reptiles in the nearby project area

Sr. No.	English Name	Scientific Name
1.	Roof Rat	<i>Rattus Rattus</i>
2.	Small Indian Mongoose	<i>Herpestes javanicus</i>
3.	House Mouse	<i>Mus musculus</i>

5.5.7 Wetlands

There are no wetlands of significance in the Project Area.

5.5.8 Endangered species

No rare or endangered species occur in the project direct area impact.

5.5.9 Protected Areas

There are no protected areas in the AOI.

5.6 SOCIO-ECONOMIC ASPECT

The socioeconomic aspect has been studied with respect to human and economic development and quality of life values of the population in the Project Area. Baseline information was gathered from literature, study reports, district census reports and through field surveys comprising interviews and meetings by the Consultants' EIA team, using survey tools. During the field survey interviews and meetings with the different categories of respondents were held and observations were also recorded after giving due consideration during survey.

The proposed site exists in Faisal Cantonment and settlements around proposed project site area (CAA Colony, Model Colony and Shah Faisal Colony) falls in the administrative jurisdiction of the

Malir District mainly and some falls in the small portion of Korangi District and the socio-economic survey focused on the project area and relevant information related to the district.

5.6.1 Socioeconomic Baseline Survey

The information regarding socioeconomic baseline survey is based on the primary data collected from the Project Area through field visit that was carried out from January, 2025. Baseline survey was carried out for:

- Informing the stakeholders about the proposed Project;
- Providing an opportunity to those involved with the planning of Project to ensure that the benefits of the proposal are maximized and that no major impacts have been overlooked;
- Providing an opportunity for the public to influence the Project design in a positive manner;
- Increasing public confidence in front of proponent, reviewers and decision makers;
- Providing better transparency and accountability in decision making;
- Reducing conflict through the early identification of contentious issues, and working through these to find acceptable solutions; and
- Creating a sense of ownership of the proposal in the minds of the stakeholders.

The information regarding socio-economic conditions is collected from primary and secondary sources. Methodology adopted for survey was based on collection of comprehensive information by utilization of all available resources with time effectiveness. Following methodology was opted for socio-economic survey, impact assessment and development of baseline socio-economic conditions.

All available document related to socio-economic condition of the project area were studied i.e. (District Population Census Reports for the concerned districts, documents related to designs, maps for socio-economic survey. Meetings were held with the officials of relevant departments; feedback of all these meetings is also kept in view in study of socio-economic environment. Maximum information was utilized to complete the report.

Before conducting field survey first of all reconnaissance survey was conducted by the Consultant team. After familiarization of the area and requirement for the study a comprehensive survey was carried out and primary data was collected through following data collection methods:

- Socio-economic Survey
- Public Consultations

Moreover, expensive public consultations were conducted at different locations along the proposed project site and gender consultation were also done by female staff to get their apprehensions about the project and their suggestions were recorded to improve the design of the project. A sample of 105 respondents including (males and females) was taken from the

different locations depending on the proportion of the nearby areas on the basis of random sampling technique, which included local residents, farmers, shopkeepers, pedestrians, drivers, hospital management, government employees, Imam Mosque etc. The purpose of this survey was to assess socio-economic condition of the area and get responses about the perceived impacts and preferences towards the project implementation.

Detailed findings of the survey comprising of different parameters are discussed in the following section.

5.6.2 Demographic Characteristic

Demography is defined as statistical analysis of data about the characteristics of a population, such as the age, sex / gender, religion, ethnic structures, mother tongue of the people within the population. According to survey, demographic characteristics of sampled population are described hereunder.

Gender Distribution of the Respondents

About 105 respondents, comprising 100% male population in the project were contacted to carry out socio-economic and impact assessment survey.

Population and Family Size

A socio-economic survey of 105 households was conducted as per methodology which indicated that the population of the surveyed households is about 756 persons and among them, there were more males (52.3%) than females (47.7%). The average family size is 7.2 persons per household and mostly people live in nuclear family system. The gender wise distribution of the 105 respondents families are given in **Table 5.11**.

Table 5.11: Population and Family Size of the Respondents

Total Respondents	Population				Total Population	%
	Male	%	Female	%		
105	395	52.3	361	47.7	756	100

Based on the social survey carried out in January 2025

The sex ratio is an important demographic indicator, which is defined as the “number of males per hundred females”. As per social survey, sex ratio based on the household was 109 males per 100 females.

Age Composition

The demographic characteristics of the survey show **Table 5.12** that 19% of the respondents were 15 to 25 years of age. About 26% of the respondents were between the age group of 26 to

35 years and 36 to 45 years respectively. The remaining 41% were up to 46 years of age and above. These age brackets of the respondents show that large respondents were mature enough to express their opinion/concerns about construction of proposed project and foresee its impacts.

Table 5.12: Age Composition of the Respondents

Sr. No.	Age Composition	Number of Respondent	Percentage (%)
1	15 – 25	20	19
2	26 – 35	27	26
3	36 – 45	15	14
4	46 and above	43	41
Total		105	100

Educational Level

Educational distribution of the respondents is shown in **Table 5.13**. The data in the table presents that majority 39% of the respondents were illiterate. Contrary to this, 10% were educated up to primary level, 03% were with middle schooling, and 4% were matriculate. Whereas, 21% respondents were reported themselves intermediate level. Remaining 23% respondents were found graduates, masters and above.

Table 5.13: Educational Level of the Respondents

Sr. No.	Educational Level	Number of Respondent	Percentage
1	Illiterate	41	39
2	Primary	11	10
3	Middle	3	3
4	Matric	4	4
5	Intermediate	22	21
6	Graduation & Above	24	23
Total		105	100

Occupation

Occupation of the respondents was also studied during the field survey. Majority (26%) of the respondents were doing private service, 19% running their own business or shops, 17% were doing Government Jobs. While 12% of the respondents were doing different types of labor including industrial and general labor for earning their livelihood, 10% reported themselves as mechanic and 7% drivers of buses, vans, auto, taxi, etc., Remaining 5% were hotel operators and 4% were students. The detailed statistics regarding occupational status of the respondents is presented in **Table 5.14** given below.

Table 5.14: Occupation of the Respondents

Sr. No.	Profession	Number of Respondent	Percentage
1	Private Service	27	26
2	Shopkeepers/ Business	20	19
3	Govt. Employee/ Retired	18	17
4	Labor Workers	13	12
5	Mechanic	11	10
6	Driver	7	7
7	Hotel	5	5
8	Students	4	4
Total		105	100

Religion

Respondents were asked about their religion status during the survey and majority of the respondents' i.e. 96% reported their religion as Islam while remaining 3% belongs to Christian and 1% Hindu religion in the Project Area as shown in the **Table 5.15**.

Table 5.15: Religion of the Respondents

Sr. No.	Religion	Number of Respondent	Percentage
1	Muslim	101	96
2	Christian	3	3
3	Hindu	1	1
Total		105	100

Ethnic Structure

There are various castes and sub castes in the area such as Meyo, Sheikh, Syed, Memon Magsi, Bhandhari, Lashari, Jokhio Bloch, Jut, Gujar, Bhutto, Rajpoot and Arain in the project area.

Languages

In the Project Area, Urdu is the dominant language being spoken by 67% respondents. It was reported that 13% of the respondents speak Sindhi, 5% Balochi and Pashto respectively speaking. Remaining 12% respondents speak other different languages i.e., Punjabi and Saraiki etc., as shown in **Table 5.16** below:

Table 5.16: Languages Spoken in Project Area

Sr. No.	Language	Number of Respondent	Percentage (%)
1	Urdu	70	67
2	Sindhi	14	13

Sr. No.	Language	Number of Respondent	Percentage (%)
3	Balochi	5	5
4	Pashto	4	5
5	Others	12	12
Total		105	100

Family System

About 44% sampled population were living in joint family system where grandparents are also living under same roof and 56% percent respondents reported as nuclear family system. The detail is shown in **Table 5.17** below:

Table 5.17: Family Structure

Sr. No.	Family Structure	Number of Respondent	Percentage
1	Joint	46	44
2	Nuclear	59	56
Total		100	100

5.6.2.1 Socio- Economic Characteristics

Monthly Income of the Respondents

From the **Table 5.18**, it is clear that 14% of the respondents fall in the low income group by earning up to rupees 37,000 per month, 20% from the range 37,001 to 47,000 rupees, and 13% of the respondents were earning their monthly income between the ranges of 47,001 to 57,000 rupees per month. Whereas, the income ranges of 57,001 to 67,000 reported by 10% and majority 43% were getting above 67,000 per month.

Table 5.18: Average Monthly Income of the Respondents

Sr. No.	Average Monthly Income	Number of Respondent	Percentage (%)
1	Up to 37,000	15	14
2	37,001 – 47,000	21	20
3	47,001 – 57,000	14	13
4	57,001-67,000	10	10
5	Above 67,000	45	43
Total		105	100

Expenditure of the Respondents

Household expenditure depends on the earning and about 19% of respondents reported their monthly expenditure up to Rs. 37,000, and 20% respondents found within the range of 37,001-

47,000 per month. While, 11 percent fall between the expenditure range of 47,001 to 57,000 and 10% recorded their monthly expenditures between the range of 57,001, 67,000 per month. While 40% of the respondents were having their expenses above 67,000 per month. The average monthly expenditures is shown in **Table 5.19** below:

Table 5.19: Range of Monthly Expenditures of the Respondents

Sr. No.	Average Monthly Expenditures	Number of Respondent	Percentage (%)
1	Up to 37,000	20	19
2	37,001 – 47,000	21	20
3	47,001 – 57,000	12	11
4	57,001-67,000	10	10
5	Above 67,000	42	40
Total		105	100

Ownership Status of the Houses

Sampled respondents were asked about their housing ownership status in order to know their level of living standard as reflected in **Table 5.20**. Forty-eight (48%) of the respondents were living in their own houses and 52% rented in houses.

Table 5.20: Ownership Status of Houses

Sr. No.	Ownership Status	Number of Respondent	Percentage
1	Owner	50	48
2	Rented	55	52
Total		105	100

Housing Construction Pattern

A mix housing pattern has been observed in the Project Area where 88% of the respondents live in pacca houses that are constructed with superior materials and workmanship while 12% respondents have semi pacca houses that are houses made of bricks masonry with mud mortar. **Table 5.21** shows construction pattern of houses in project area.

Table 5.21: Housing Construction Pattern

Sr. No.	Type of House	Number of Respondent	Percentage
1	Pacca	92	88
2	Semi Pacca	13	12
Total		105	100

Mode of Transport

Table 5.22 describes the mode of transport being used by the respondents. The facility of public transport in the project area is infrequent, therefore, about 53% of respondents reported using their own private transport and only 33% of the respondents were using public transport. While,

14% respondents were enjoying both mode of transport, including public and private for travel purpose.

Table 5.22: Mode of Transport

Mode of Transport	Number of Respondents	Percentage (%)
Personal	56	53
Public	35	33
Public & Person (both)	14	14
Total	105	100

5.6.2.2 Civic Amenities

Basic Amenities in the Project Area

Social infrastructure and amenities are crucial to creating sustainable communities. This assessment sets spaciousness of a household's dwelling, household amenities like availability of electricity and modern appliances, nature of access to water, fuel for cooking, and type of sanitation facilities available as primary indicators for assessing standard of living.

The result of the survey revealed that 100% of the households had electricity facility, water supply was available for the 83% of the sampled households, while the health care facilities were mentioned by 90% of the surveyed population. Providing basic level of education is the responsibility of the government, which was available in the area to 100% of the respondents and facility of mettle road mentioned by 100% households. Facility of Sui gas was available to 71% of the respondents in the project corridor. Only 85% of the respondents mostly living in the city area mentioned that sewerage facility exists in the area where they are living. Mobile service is available in the project area and its surroundings at satisfaction level. The information with respect to access to social amenities is given in **Table 5.23**.

Table 5.23: Access to Social Amenities in the Project Area

Sr. No.	Social Amenities	Number of Respondents	Available (%)
1	Electricity	105	100
2	Water Supply	87	83
3	Health Facilities	95	90
4	School	105	100
5	Mettle Road	105	100
6	Mobile Service	105	100
7	Sewerage	90	85
8	Sui Gas	75	71

Source: field survey

Mostly educational and health facilities are available in the city where people of the surrounding areas avail these facilities. Majority of the respondents were not stratified about the supply of electricity, sui-gas, water supply condition of the roads and sewerage system residents of Shah Faisal and Model colonies.

Source of Drinking Water in the Project Area

Access to safe drinking water supply is not only a basic need and a precondition for healthy life, but is also a basic human right. The quality of water is directly linked to the quality of health. Drinking water is not available in adequate quantity for human and livestock population as the ground water in the area is brackish. There are different sources of the drinking water in the project area.

Table 5.24 shows the source of water for domestic usage. The findings of the impact study indicate that (83%) of the respondents have the facility of water supply, and 17% of the households purchase water through tankers.

Table 5.24: Sources of Drinking Water

Sr. No.	Source of Water	Number of Respondent	Percentage
1	Water Supply	87	83
2	Tanker	18	17
Total		105	100

Satisfaction about Quality of Water

Table 5.25 shows the current situation of the water quality in the project area. Majority of the respondents (67%) were not satisfied with the quality of water available in the project area, while 33% respondents were happy with the quality of water. The reasons for showing dissatisfaction are brackish and contaminated ground water.

Table 5.25: Satisfaction about Quality of Water

Sr. No.	Satisfaction about Quality of Water	Number of Respondent	Percentage
1	Yes	35	33
2	No	70	67
Total		105	100

5.6.2.3 Common Diseases in the Project Area

The climate of the sub-project area is typically arid and characterized by low rainfall. Moreover, there is less vegetation cover and no fresh ground water. The ground water is brackish and contaminated which is not fit for drinking purpose in most part of the project area. During the survey, diarrhea, pain in joints, hepatitis, and sugar were the commonly pointed out diseases. The medical officer of the Indus hospital pointed out that during the construction mostly workers inhale dust and suffer from respiratory diseases. Mouth masks should be provided to all workers at the workplace.

5.6.2.4 Awareness Regarding the Proposed Project

A large number of respondents (81%) were those, who had no prior knowledge of the project. Only 19% were aware about the project as shown below in **Table 5.26**. All respondents were briefed about the features of the proposed project.

Table 5.26: Awareness about the Project

Sr. No.	Awareness of the Project	Number of Respondent	Percentage
1	Yes	20	19
2	No	85	81
Total		105	100

5.6.2.5 Pressing Needs of the Area

Water scarcity is a natural and human-made phenomenon, while inexorable rise in demand for water to grow agriculture, food, supply industries and sustain urban and rural populations has led to a growing scarcity of freshwater in many parts of the world; consequently, water scarcity emerged as a global issue. Pakistan and specially Sindh faces one of the worst situations of water quality due to poor water governance. The majority of the residents in the project area are (Shah Faisal and Model colonies) facing problems of clean drinking water, sewerage, shortage of medical facilities and schools. Facility of sui gas is also not available for the majority. Situation in the CIA Colony is entirely different where water is supplied through RO Plants. Mostly people in Shah Faisal and Model colonies get water for drinking and domestic use through water supply and tankers. Underground water has turned contaminated due to many reasons.

The use of poor water quality causes several environmental health related problems and number of diseases related to renal complexities, skin allergies, reproductive, blood disorders and carcinogenic problems. During the survey most pressing need voiced by the respondents was the provision of clean drinking water (water filtration plants) in the Shah Faisal and Model colonies. The local people also demanded supply of clean drinking water (filtration plants) sui gas and medical facilities in the area. Employment in different sectors was also expressed by the people of the Project Area.

6 STAKEHOLDER CONSULTATION

6.1 GENERAL

Timely and broad-based stakeholder involvement is an essential element for an effective environmental assessment, as it is linked with Project Planning, appraisal and development in general. Public involvement during Environmental Impact Assessment (EIA) has a tendency to improve project design environmental soundness and social acceptability.

Public involvement, undertaken in a positive manner and supported by a real desire to use the information gained to improve the Project design, will lead to better outcomes and lay the basis for on-going positive relationships between the stakeholders. It gives the feeling of an ownership to the local population. Public involvement is necessary for smooth implementation of the project and especially the local community whose support is also required for the success of the project.

The project management and implementation authorities are committed for undertaking public consultation at Provincial and local levels as a part of project planning/design for getting necessary environmental permissions.

This Chapter presents the objectives, process, and outcome of the consultations carried out with the key stakeholders of the project during the present EIA study. Also provided in this Chapter is a consultation framework, describing the consultations to be carried out during the subsequent phases of the project implementation ensuring ongoing and inclusive dialogues with key stakeholder.

6.2 OBJECTIVE

The objectives of stakeholder consultation were to contribute to the openness, transparency and dialogue. Special efforts were made to ensure that the communication with the public should be efficient and well balanced. The concerned stakeholder groups were identified to participate in the assessment process. Specific tasks and purposes of consultations with stakeholders have been given in the **Table 6.1**.

Table 6.1 Tasks and Purposes of Consultations

Task	Purpose of Consultation with Stakeholders
Why consultation with the stakeholders?	- To build trust to ensure sustained support for the Designing and Detailed Supervision of IT Park Karachi. - To learn about public concerns that need to be addressed and considered in designing of the project concept and preparation mitigation measures and programs. - To learn about the strengths, skills and organizations that the stakeholders can bring to support project planning and implementation.
Modes and benefits of consultation	- Listening and dialogue with stakeholders to keep the project at tuned to public concerns early, to pre-empt breakdowns in public confidence - Engaging the public as advocates for the project construction and to support the implementation of social, environment and health programs.

Other objectives of public involvement include:

- Informing the stakeholders about the proposed project;
- Providing an opportunity to those who remained unable to present their views and values, therefore allowing more sensitive consideration of mitigation measures and trade-offs;
- Providing those involved with planning the proposal with an opportunity to ensure that the benefits of the proposal are maximized and that no major impacts have been overlooked;
- Providing an opportunity for the public to influence the project design in a positive manner;
- Increasing public confidence in front of proponent, reviewers and decision makers;
- Providing better transparency and accountability in decision making;
- Reducing conflict through the early identification of contentious issues, and working through these to find acceptable solutions;
- Creating a sense of ownership of the proposal in the minds of the stakeholders; and
- Developing the project which is truly sustainable.

6.3 IDENTIFICATION AND CATEGORIZATION OF STAKEHOLDERS

Identification of stakeholder is an important step which ensures that all the concerned stakeholders are identified for the following.

- Sharing of information with stakeholders about the proposed project activities and potential impacts of proposed project on the physical, ecological and socio-economic conditions in the Aol; and
- To address the most relevant concerns of the stakeholders on project and its activities including the upfront negative impacts.

Primary Stakeholders

Primary stakeholders are those who are directly concerned with the project or directly affected both positively and negatively by the project interventions. The primary stakeholders of this project include project owner, the Project Affected Persons (PAPs). Apart from this, the beneficiaries of the project and the implementing agency are also primary stakeholders for the proposed project.

Secondary Stakeholders

Secondary stakeholders are people or groups that are indirectly affected from the project activities or have their interest in the proposed project such as Sindh Environmental Protection Agency SEPA, Pakistan Airport Authority, Forest Department, Wildlife Department, Karachi Metropolitan Cooperation (KMC), Sindh Solid Waste Management Board (SSWMB), Karachi Water and Sewerage Board (KWSB) and other various line agencies / departments of GoS.

Details regarding roles and responsibilities of the concerned agencies and departments are given below **Table 6.2**.

Table 6.2: Role of Concerned Agencies/Departments

Project Stakeholders	Roles and Responsibilities
Sindh Environmental Protection Agency	- SEPA is the regulatory authorities and mainly responsible for the development and implementation of the environmental policies and strategies in order to integrate the environmental issues and sustainable development approaches into the legal and regulatory frameworks as per Sindh Environmental Protection Act, 2014. - EPAs are responsible for the issuance of NOC of the Proposed Project. - EPA Sindh is responsible for the compliance of EMMP and NOC provision during the construction and operation stages of the Project.
Pakistan Airport Authority	Provide land and use of available facilities for the proposed Project. Facilitation of the Project activities.
Forest Department	- Protection, improvement and maintenance of existing forests - Increase forests by planting new trees - Extension and advisory services to the general public about tree plantation
Wildlife Department	To save and protect wildlife
Airport Health Department and CAA Medical Center	Provide medical facilities, emergency response and health care during implementation of the Project.
Karachi Water and Sewerage Board (KWSB)	- Undertake bulk production, filtration / treatment transmission and retail distribution purifying of water. - Under take collection, pumping, treatment & disposal of sewage & industrial waste. - Billing and collection of water & sewerage charges including arrears thereof.
Sindh Solid Waste Management Board (SSWMB)	Responsible for the waste management in Sindh
Social Welfare Department	Implementation Social Corporate Responsibilities and welfare of the local communities.

Considering the importance of the project, consultations were carried out at all possible levels i.e. departmental and local level. The process of consultation is an on-going process which continues during the project life cycle and even after the submission of this report and so on. Stakeholders were identified, categorized and consulted at Departments and Communities level.

6.4 CONSULTATIONS

A series of public consultations were required to get the feedback/concerns of the different category of stakeholders including provincial departments, district level departments, local community and other general public residing in the Study Area.

Consultation process includes group discussion, Town meetings and semi-structured interviews and one to one meeting or interviewed with the government, private and civil society institutions. During the consultation process, the stakeholders were briefed about the project objectives and scope. Their fears and suggestions were recorded.

Consultations were conducted at two levels:

- Institutions/Departments Level
- Community level

6.4.1 Consultations with Stakeholders at Departments Level

The stakeholder consultation was held with relevant departmental officials. Details of the officials contacted are given in **Table 6.3**.

Table 6.3: List of Government Officials Consulted

Sr. No.	Date	Designation	Name of Department/ Office
1.	15-01-2025	Assistant Director	Sindh Environmental Protection Agency
2.	16-01-2025	Divisional Forest Officer	Forest Department
3.	16-01-2025	Divisional Forest Officer	Wildlife Department
4.	16-01-2025	Assistant Director	Sindh Solid waste management board
5.	16-01-2025	Medical officer	Health department
6.	15-01-2025	Admin and Finance Officer	Al- Shifa Trust (Special School & rehabilitation Centre)
7.	15-01-2025	Director Karachi Division	Social Welfare Department
8.	15-01-2025	Medical Officer (MO)	CAA Medical Center
9.	15-01-2025	Director	Airport Health Department Karachi
10.	15-01-2025	Director Estate and Land	Pakistan Airport Authority

The **Table 6.4** indicates the detail of issues raised/discussed and suggestions given during the consultation:

Table 6.4: Detail of Issues/Points Raised/Discussed during Departmental Consultations

Sr. No.	Department/ Organization	Suggestions
1.	Social Welfare Department	• Proposed project should help Social Welfare Department to digitized the data; • Maximum skilled & unskilled labour should be hired from the local community during the Project construction activities. • Occupational health and safety should be taken care with respect during construction; • During the construction period safe moment of the pedestrian should be ensured and proper Traffic Management Plan should be devised.
2.	Al- Shifa Trust (Special School & rehabilitation Centre)	• Maximum construction work should be done after closing the educational institutions or during the late night hours.

Sr. No.	Department/ Organization	Suggestions
		Awareness among the students should be created about the projects. Traffic should be managed properly during the civil work construction.
3.	CAA Medical Center	- Health and Safety measures should be implemented - Awareness among the population about the risks associated the project activities and mitigation measures should be created. - The environment of the most part of Project area is friendly, but due to construction activities dust & air pollution may lead to respiratory diseases. Medical camp should be established in the area during the period of construction.
4.	Sindh Environmental Protection Agency	NESPAK E&S team briefed the project. The official responded that the project is of government interest, we want it to be completed at earliest. Moreover, he suggested that building should be designed considering the climate of Karachi. The design should include insulating building envelope.
5.	Transport Department	- Traffic Impact assessment should be carried out to assess the capacity of the accessible road. - During construction, traffic management plan should be devised and implemented to avoid traffic congestion problems.
6.	Forest Department	- DFO informed that there is no reserved and protected forest in the vicinity of proposed Project. - He further added to plant the native species in the project area in consultation with officials of Forest Department.
7.	Wildlife Department	- The official informed that there is no protected area in the vicinity of proposed Project. - No such impact is envisaged due to the urban area.
8.	Sindh Solid waste management board	- Construction and demolition waste should be re-used in nearby construction work - Resource conservation should be given due importance. - Implement the integrated solid waste management to minimize the generation of waste. - Ensure that the workers/labors do not openly dump or burning of waste.
9.	Pakistan Airports Authority	- Design team is instructed to share the layout of the proposed project. - Maximum allowable floors of the building should be in compliance PAA.
10.	Health department	- Awareness among the population about the risks associated the Project activities and mitigation measures should be created. - Due to construction activities dust & air pollution may lead to respiratory diseases. .



Meeting with Representative of Airport Health Department



Meeting with Representative of Forest Department



Meeting with Director Karachi Division Social Welfare Department



Meeting with Assistant Director SEPA



Meeting with Representative of the SSWMB



Meeting with Representative of the Transport Department



Meeting with Admin and finance officer of AL-Shifa Trust



Meeting with Wildlife Department Official

Figure 6.1: Photolog of departmental consultations

6.4.2 Community Consultation and Participation Process

For ascertaining the perceptions of different stakeholders about the project (during/ after construction) meetings were held within the project area of influence. These meetings were held in an open atmosphere, in which participants expressed their views freely. Informal group discussions were also held as an additional tool for the assessment of the perceptions of the stakeholders about the project and potential impacts both positive and adverse likely to occur due to its implementation.

a) Methods of Public Consultation

The following methods were used for public consultation with project stakeholders in order to ascertain their stakes regarding project implementation. The views of the beneficiaries were formally recorded. The locations selected randomly situated near the proposed Project area.

- Formal Group Meetings
- Informal Group Meetings
- Individual meetings

b) Locations of the Public Consultations

The detail of the locations with number of participation is provided in the **Table 6.5**.

Table 6.5: Stakeholders Contacted in the Villages/Town

Sr. No.	Village/ Town	Participants
1	Shah Faisal Colony	35
2	Model Colony	15
3	CAA Society	14

c) Categories of Stakeholders Contacted

Different categories of stakeholders contacted, during consultation is shown in the **Table 6.6**.

Table 6.6: Stakeholders Contacted in the Project Area

Sr. No.	Stakeholder Category
1	Residents
2	Business/ shop owners
3	Government and private Servants
4	Representatives of Educational and Religious Institutions
5	Laborers

6.4.3 Consultations with Local Communities and Project affected Persons

Extensive consultations have been conducted with the local communities and Affected People in the Project area to take their views and incorporating in the project planning. Three consultative meetings were held with more than 64 participants in the Study Area. The major categories participated in these meetings were local population and community groups. The details of the participants with villages are given in **Table 6.7** below:

Table 6.7: Consultation Meetings and Participants

Sr. No.	Date	Venue	Occupation	Name
1	17-01-2025 & 20-01-2025	Shah Faisal Colony	Business Operator	Malik Ghulam Rasool
			Private Job	Muhammad Ali
			Labourer	Muhammad Bilal
			Private Job	Umair Ahmed
			Labourer	Hidiyatullah
			Government Job	Haroon Akbar
			Business Operator	Muhammad Ysin
			Private Job	Muhammad Talha
			Business Operator	Muhammad Khuram
			Labourer	Allah Bux
			Private Job	Sajjad Ahmed
			Private Job	Naveed Ahmed
			Private Job	Asad Ullah
			Driver	Muhammad Riaz
			Retired Govt. Servant	Jaffar Shah
			Mechanic	Javed Ali
			Driver	Nazakat Ali
			Mechanic	Muhammad Bilal
			Driver	Muhammad Riaz
			Retired Govt. Servant	Jaffar Shah
			Mechanic	Javed Ali
			Driver	Nazakat Ali
			Mechanic	Muhammad Bilal
			Retired Govt. Servant	Subhan Khan
			Business Operator	Naseeb Ullah
			Driver	M. Zheer Ullah
			Driver	Muhammad Saleem
			Driver	Arshad Ali
			Shopkeeper	Iqbal Ahmed
			Shopkeeper	Muhammad Aman
			Mechanic	Muhammad Salman
			Labour	Muhammad Ahsan
			Driver	Muhammad Nadeem
			In charge Cricket Ground	Muhammad Raza
			Driver	Muhammad Nadeem
2	18-01-2024	CAA Colony	Government Job	Ishfaq Ahmed
			Government Job	Muqem Ahmed
			Business Operator	Muhammad Babar Khan
			Business Operator	Nazar Muhammad
			Labourer	Hamza
			Labourer	Jarrob
			Labourer	Peter
			Labourer	Mechail
			Private Job	Asim Zahoor
			Private Job	Syed Zahoor
			Private Job	Syed Safdar

Sr. No.	Date	Venue	Occupation	Name
3	17-01-2025	Model Colony	Private Job	Ali Raza
			Private Job	Axviera
			Government Job	Noor Muhammad
			Private Job	Syed Sarwar Hussain
			Syed Zeshan	Private Job
			Zeshan	Government Job
			Alli Abbas	Private Job
			Rahil Ali	Private Job
			Danish	Shopkeeper
			Arslan	Shopkeeper
			Zeshan	Shopkeeper
			Suleman	Shopkeeper
			Rehan	Shopkeeper
			Shahroaz	Shopkeeper
			Salman	Labour
			Waheed Abbass	Labour
			Ahmad Ali	Business
			Asad	Shopkeeper

6.5 STAKEHOLDERS AND THEIR APPREHENSIONS

Among all stakeholders some major stakeholders were identified in the proposed project area. **Figure 6.1** shows the pictorial view of interviews and consultation meetings held with the stakeholders. **Table 6.8** contains the list of major stakeholders and their apprehensions.

Table 6.8: Major Stakeholders and their Apprehensions in the Project Area

Sr. No.	Stakeholders	Apprehensions
1	Local Residents/ Communities (CAA Colony)	- Due to construction and operation of multi- story building in the residential areas, social problems will arise along with the environmental issues. The flow of the air in the residential area will be interrupted. Privacy of the local residents would be another social issue which will arise due to construction of multi-story building. The local residents also considered negative impacts on health and safety. The multi-story buildings can cause unpleasant living conditions. - During the construction period, local residents will face difficulties while walking to nearby places existing in the vicinity of the proposed project area. Movement problem for local residents, dust and noise problem, privacy / safety issues, disturbance of public utilities, traffic jam and environmental pollution are the major concerns. - Due to increase large number of number of people and activates in the area the pressure on the public utilities will also increase and the local residents will face inconvenience.
2	Private business owners/ Shopkeepers	Due to purchasing of construction material outside from the local market, the local business operators will not benefit from the Proposed project.

Sr. No.	Stakeholders	Apprehensions
3	Labours	Contractor mostly brining the labour outside of the project area. Maximum labour should hired from the nearest locations.

6.5.1 Suggestion of the Consulted Communities

Keeping in view the possible negative impacts of the proposed project, the participants of the consultation meetings presented following suggestions to minimize the adverse social Impacts of the proposed project;

Suggestions of the Participants

- Construction material should be purchased from the local markets to benefit the local peoples;
- Civic facilities should be restored during the construction period of the building and after completion of the civil work;
- Civil work should be completed in the shortest possible time to avoid the adverse impacts on the daily activities and health of the people;
- Proper arrangements should be done to avoid construction hazards;
- The local communities during the stakeholder consultations have shown great desire to be included in the project's workforce.

In general, the consulted communities consider the Project beneficial for the area. The IT Park will provide the best environment for IT businesses and the allied sectors will be benefitted. Indirect benefits include solution of employment opportunities for the locals in project area, resulting in the increase of income and reduction in poverty.





Figure 6.2: Pictorial view of community consultation meetings.

6.6 PROPOSED CONSULTATIONS PROGRAM

The stakeholder consultation and engagement is an ongoing process and will continue throughout the project's construction as well as operation and maintenance phases. The ongoing consultation process could be scheduled on need basis with the stakeholders

including but not limited to the concerned government departments, local administration, the community representatives and affected Persons from the proposed project area.

The overarching goal of consultations and community engagement is to support and facilitate the project's design and implementation, to reduce conflicts and project opposition, and to increase project's acceptability.

The community members will be encouraged to participate in project activities during construction and operation phases. The consultations will be made in future to facilitate the community at the local level.

The consultations will be carried out during the construction and operation phases of project. Consultations will be undertaken in all the communities twice or more time in a year, depending on the number of concerns raised under each consultation. Ongoing stakeholders' engagement activities include:

- Ongoing reporting on progress on the implementation of environmental and social management measures identified during the EIA process and recording of comments on the effectiveness of these measures;
- Updating communities and other stakeholders about project developments and recording comments on these; and,
- Ongoing action of the grievance mechanism.

Efforts will be made to maximize the consultations during the project implementation. The consultations will be carried out with the objectives to develop and maintain communication linkages between the project promoters and stakeholders, provide key project information to the stakeholders, and to solicit their views on the project and its potential or perceived impacts, and ensure that views and concerns of the stakeholders are incorporated during the implementation with the objectives of reducing or offsetting negative impacts and enhancing benefits of the proposed project. The framework for the future consultations is elaborated in **Table 6.9**, but not limited to the following:

Table 6.9: Proposed Consultations Framework

Sr. No.	Stakeholders	Project Phase	Frequency of Consultation
1	Institutions/Departments	• Pre-Implementation • During the Project Implementation • At Closure period	• One round of consultation before start of implementation of project. • Bi-annually during operation phase • Once before the closure of the project.
2	Local Communities/ Key Persons	• Pre-Implementation • During the Project Implementation • At Closure period	• Consultation at different stages, before implementation, periodic meetings during construction phase and at the time of Project completion.
3	NGOs/CBOs	• Pre-Implementation • During Project Implementation	• Periodic meetings will be conducted as per requirement of the Project.

Sr. No.	Stakeholders	Project Phase	Frequency of Consultation
		• At Closure period	

During the operational phase of the project consultation of stakeholder are important to assess the benefits of the project and impacts on the local communities. A comprehensive plan should be prepared by the contractor(s) to get feedback from the stakeholders and to resolve the issues.

6.7 INFORMATION DISCLOSURE PLAN

After suggesting the possible solutions of the stakeholders' concerns, the solutions will be disclosed once again before the stakeholders and general public. EIA report will be accessible to interested parties on request and the version of final report will be available in the project office and its summary will be available in national language.

Stakeholders are those who have a direct interest in project development, and who will be involved in the consultative process during the socio-economic survey. The first step in developing plans for consultation and participation is to identify the primary and secondary stakeholders.

- Primary stakeholders include the communities of the Project, Project Affected Persons (PAPs), the beneficiaries of the project and the implementing agency.
- Secondary stakeholders are individuals or groups with an interest in the project, such as local or national government, policy makers, advocacy groups, elected officials, and NGOs in the project area.

Considering the importance of the project, consultations were carried out at all possible levels i.e. departmental and local level. The process of consultation is an on-going process which continues during the project life cycle and even after the submission of this report and so on.

During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. Key stakeholders of the Project include government department of (Karachi) such as Sindh EPA, Forest and Wildlife department, Pakistan Airport Authority, Social welfare department, health department, Sindh Solid Waste Management Board (SSWMB), Transport department and local community members.

7 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

7.1 GENERAL

This chapter identifies the beneficial as well as the potentially significant adverse environmental impacts during design/pre-construction, construction and operation phases of the proposed project on the physical, ecological and socio-economic domains of the environment. The appropriate mitigation and remedial measures are proposed in this chapter. A project impact evaluation matrix has been developed to evaluate the potential impacts of the proposed Project. A brief qualitative description of each aspect and the affected environment in Study Area / AOI is presented below.

7.2 CATEGORIZATION OF IMPACT

The term “**Environmental Impact**” or simply “**Impact**” covers the negative, adverse or harmful as well as positive, desirable or beneficial impacts of the project on environmental settings. Prediction of impacts of the proposed activity is based on factual data; however, the significance of these impacts involves a value judgment technique. The nature of the impacts may be categorised in terms of:

Element	Type	Definition
Nature	Beneficial	An impact with positive effect.
	Adverse	An impact with negative effect.
Duration	Temporary	The impact will cease once the activity ceases.
	Permanent	The impact is permanent, even after the activity ceases.
Extent	Site	The impact is restricted to site.
	Local	The impact will affect the AOI and nearby areas.
	Regional	The impact will affect a larger area on a regional, national or greater level.
Reversibility	Reversible	The impact can be reversed.
	Irreversible	The impact cannot be reversed.

7.2.1 Magnitude Assessment Criteria

Magnitude of Impact	Criteria	Description of Magnitude
Major (4)	Adverse Permanent Local or Regional Irreversible	Loss of resource and/or quality and integrity, serve damage to key characteristics, features, or elements (Adverse). Large scale or major improvement of resource quality, extensive restoration or enhancement, major improvement of attribute quality (Beneficial)
Moderate (3)	Adverse Temporary or Permanent Local or Regional Reversible	Significance impact on the resources, partial loss of/damage to key characteristics, features, or elements (Adverse) Benefit to, or addition of, one (maybe more) key characteristic, feature or element, some beneficial

		impact on attribute or a reduced risk of negative impact (Beneficial)
Minor (2)	Adverse Temporary Site Reversible	Some measurable change in attributes quality or vulnerability, minor loss of, or alteration to, one (maybe more) key characteristic, feature, or element (Adverse) Minor Benefit to, or addition of one (maybe more) key characteristic, feature or element, some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial)
Negligible (1)	Adverse Temporary Site Reversible	Very minor loss or detrimental alteration to one or more characteristic, feature or element. (Adverse) Very minor benefit to positive addition of one or more characteristic, feature or element. (Beneficial)

Likelihood

Element	Rating	Score	Definition
Likelihood	Low	1	Impact is unlikely to occur.
	Medium	2	Impact is likely to occur
	High	3	Impact is very likely to occur.

Significance Matrix

SIGNIFICANCE MATRIX TABLE		Magnitude of Impact				
		Negligible (1)	Minor (2)	Moderate (3)	Major (4)	Beneficial (positive)
Likelihood (Sensitivity)	High (3)	3	6	9	12	+++
	Medium (2)	2	4	6	8	++
	Low (1)	1	2	3	4	+

Negligible	Minor	Moderate	Major
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Impact Assessment

Impact significance depends on both the nature of the impact and on the sensitivity of the receptor. The more sensitive the receptor the greater will be the significance of impact from that proposed activity. For this EIA, activities and nature of impact are combined with the sensitivity of the receptor to evaluate the significance of the impact. The significance of impact is characterized as very low, low, moderate, high and very high. Environmental issues having “moderate”, “high” and “very high” significance is provided with mitigation measures.

Following the assessment of magnitude, the quality and sensitivity of the receiving environment or potential receptor has been determined and the significance of each potential impact established using the impact significance criteria matrix as shown below. Most of the potential impacts can be mitigated by implementation of various types of mitigation measures; however, some residual environmental impacts may remain after mitigation.

7.3 METHODOLOGY FOR IMPACT EVALUATION

The methodology adopted for the evaluation of the impacts included the following assessment tools, (i) project impact evaluation matrix and (ii) overlays. These tools were used to identify the significance and magnitude of the impact as well as the nature, reversibility, extent etc.

7.3.1 Project Impact Evaluation Matrix

The Impact Evaluation Matrix was developed by placing project activities along one axis (i.e. Y-axis), and on the other axis (i.e. X-axis) the different environmental parameters likely to be affected by the proposed Project actions grouped into categories i.e. physical, ecological and socio-economic environment. For the impact assessment, project impact evaluation matrix was used by dividing the project action into different phases (design/pre-construction, construction and operational phases). A Project Impact Evaluation Matrix is given as **Table 7.1**.

7.3.2 Overlays

In order to identify spatial based impacts, overlays were used. An overlay is based on a set of transparent maps, each of which represents the spatial distribution of an environmental characteristic (for example, land acquisition). Information for an array of variables such as land use, infrastructure, vegetation etc. was collected for the standard geographical units within the project's AOI, recorded on a series of maps, typically one for each variable. These maps were overlaid to produce a composite map. The resulting composite maps characterize the Project area's land use, physical, social, ecological and other relevant parameters related to proposed intervention. The overlays maps used in this EIA for the quantification of the land use categories referred in Chapter 5: Description of the Environment.

Table 7.1: Project Impact Evaluation Matrix

Project Impact Matrix																														
Environmental Component Project Component	Physical Environment					Ecological Environment						Socio Economic Environment																		
	Soil (Erosion/Stability/Contamination)	Air Quality	Noise Level	Surface & Ground Water Quality	Solid Waste Generation	Aquatic Ecosystem	Terrestrial Ecosystem	Endangered Species	Migratory birds	Beneficial Plants	Loss of trees/crops	Conflict over Resources	Mobility of Locals	Public Infrastructure	Accessibility	Housing Infrastructure	Cultural Properties (Mosque, Shrine, Graveyard)	Community Stability	Tourism And Recreation	Grazing Area	Gender Issues	Cultural & Social Issues	Health & Safety	Aesthetic	Security Situation	Living Standards	Employment Opportunities	Restoration of Livelihood	Economic Uplift	
A. Planning & Design Phase	1	2	3	4	5	8	8	9	10	11	12	14	15	16	17	18	18	20	21	22	23	24	25	26	27	28	29	30	31	
Topographic Survey	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Geotechnical Investigation	2	2	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
Temporary Acquisition of Land	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
B. Construction Phase																														
RoW / Site Clearance	9	9	9	6	8	0	2	0	0	4	6	0	0	0	0	0	0	0	0	0	0	2	9	2	2	0	6	0	4	
Earthwork in Filling and Excavation	9	9	9	6	6	0	6	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	9	2	2	0	6	0	4	
Establishment of Construction Camps & Workshop	2	2	2	2	4	0	2	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	6	2	0	0	6	0	4	
Transportation & Storage of Construction Materials	4	6	6	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	4	0	2	
Use of Construction Material and Heavy Machinery	4	8	9	4	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	2	0	4	0	2	
Installation and operation of Batching Plants	4	8	8	2	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	4	0	2	
Spoil Disposal	3	3	0	6	6	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	2	0	0	0	0	0	
Structural & Civil Work	6	6	6	6	7	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	9	2	2	0	8	0	8	
Drainage Work	6	6	6	6	6	0	4	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	9	2	2	0	8	0	8	
Miscellaneous Work (Road Ancillaries,water supply, sewerage system, and Signals etc.)	4	4	6	4	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	0	6		
Landscaping	2	2	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	8	0	6	6	4	6	
Finishing and Comissioning	0	2	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	4	0	4	
C. Operational Phase																														
Operation of IT Park Karachi	0	2	2	0	4	0	4	0	0	0	6	0	6	0	4	0	0	2	0	0	0	6	6	8	4	8	6	6	6	
Inspection & Monitoring	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	4	0	0	
IT Park Karachi Waste Handling	6	4	4	6	9	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	9	6	0	0	4	0	0	
Building Maintenance	0	4	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	4	0	0		
Miscellaneous Work	2	2	2	2	2	0	2	0	0	0	0	2	2	2	2	0	0	2	0	2	0	2	4	2	2	2	4	0	4	

Positive Impact Score
0
2 to 4
5 to 8
9 to 12
>12

Impact Significance
Negligible
Low
Medium
High
Very High

Adverse Impact Score
0
2 to 4
5 to 8
9 to 12
>12

7.4 POSITIVE IMPACTS OF THE PROPOSED PROJECT

The positive impacts anticipated due to the proposed Project are mentioned below:

- Enhancement of the local IT industry, encouraging innovation and entrepreneurship;
- Creation of new jobs, reducing unemployment in the area and providing employment opportunities in various tech-related fields;
- Attraction for foreign companies and investors looking for opportunities in Pakistan's growing tech sector;
- Development of better infrastructure in the area, including roads, utilities, and telecommunications;
- Enhancing learning opportunities and providing a skilled workforce trained in the latest technologies;
- Adoption of new technologies and innovations within the local market, which can lead to more efficient business practices and modernized approaches across industries;
- Boost the country's exports by developing software products and services that are competitive on a global scale;
- Revitalization of the surrounding areas, potentially increasing property values and improving the local economy; and
- Creating an environment where businesses and professionals can network and collaborate, leading to synergies and partnerships that can enhance productivity and innovation.

7.5 ANTICIPATED ADVERSE IMPACTS DURING DESIGN PHASE

Impacts envisaged during design phase and the recommended mitigation measures have been described under physical, ecological and socio-economic categories. Significance rating of the potential design phase impacts is summarized in the **Table 7.1**.

7.5.1 Impacts on Physical Environment

7.5.1.1 Topography

The topography in the project area will change due to the construction of proposed building. Construction of proposed Project will result in considerable earthworks and excavation.

Mitigation

Visual changes to the topography will be permanent and need no mitigation measures. However, following enhancement measures are proposed:

- The project design considered aesthetic concerns such as the Tree Plantation which is already recommended in the EIA Report and will be implemented;
- Best sustainable and engineering design measures will be adopted keeping in view the aesthetics of the project area; and
- Ground disturbances will be limited to only the areas necessary for project related construction activities.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Topography	Adverse	Permanent	Site	Irreversible	Minor (2)	High (3)	Moderate	Minor

7.5.1.2 Technical Design and Layout Planning

Incompatible layout plan and engineering design of the Project can undermine the overall aesthetic beauty and ambience of the Project area. Also low utilization of the available spaces and designing the structures without considering the prospective and futuristic needs can result in structures with low social acceptability and functionality. Other possible impacts are as follows:

- Drinking water contamination can originate due to improper design of internal water network of the proposed building. If the pipes and the underground water storage tanks are not scheduled to be clean properly, they may lead to bacteriological contamination of the potable/drinking water and thus will lead to infectious diseases/health problems to the staff;
- The quality of surface water may be contaminated due to disposal of untreated wastewater generated from the proposed building into nearby water body. Inadequate drainage design or natural cloud burst may lead to ponding on impervious surfaces such as roofs of building, access road and parking lots and consequently may cause damage to internal roads in addition to vector breeding;
- Inefficient firefighting system and insufficient storage of fire water may pose a severe threat to human life and to the Project building;
- Lightning strike can damage the buildings and may cause failures to the electronic devices inside the building and sometimes it may even result in fire leading to human and financial loss;
- Air quality of the Project Area may be affected due to movement of vehicles and unnecessary idling of diesel run engines;
- Incompatible planning and engineering design of the structures can result in poor ventilation, low air circulation and reduced sunlight;
- Due to inefficient electrical systems, the workers of the proposed building may be exposed to electrical hazards including shocks, fires and burns caused by faulty electrical wiring, unsafe installations, frayed cords, substandard power trips, and defective equipment;
- Inefficient firefighting system and insufficient storage of fire water may cause severe damage to the project in case of any fire incident. Non-provision of escape routes and firefighting arrangements / equipment in the layout design of the building may take a heavy toll in case of outbreak of any emergency; and
- Effects of the shadow of a high-rise can cause an environmental impact in terms of loss of light and energy for properties upon which the shadow falls.

Mitigation

- All structural, layout and engineering designing of Project will be in strict accordance with the applicable national and international bylaws and engineering parameters including Cantonment bylaws;
- A Water filtration plant of required capacity will be proposed in the design of proposed building in order to avoid any bacterial contamination in the drinking water;

- Location of water storage tanks will be planned carefully. Water storage tanks meant for drinking will not be located directly beneath any sanitary plumbing or any other pipes conveying non-potable water;
- Water storage tanks will be provided with a cover, designed to prevent the entry of dust, roof water, surface water, birds, animals or insects; and
- Option of water dispensers may also be considered in the proposed building.
- Septic Tanks will be considered in the design for the treatment of wastewater prior to its disposal into the nearby channel in the Project area;
- Introduction of dual flush system to reduce the wastage of water by excess use in the low or high level cistern will be planned;
- The design of storm water systems shall conform to the methods and criteria set out within the current versions of national/cantonment /international criteria's;
- Proper paving shall be provided adjacent to the exterior walls of the structures. These arrangements would stop ingress of surface water into the ground in the vicinity of the building and would provide safety against any possible distress;
- Rainwater harvesting technique may be planned for the use of rainwater;
- Provision of firefighting pump is being kept by the design consultant in the design to maintain constant pressure of 4.5 bars in the system;
- The Project building will have emergency exits at appropriate distances. These exits along with staircases are designed by designed consultant for easy evacuation of users (staff, patients & visitors) during any emergency situation. Emergency Exits have been proposed in all the buildings as per code requirements of Building Code of Pakistan 2021.

In addition to above mentioned provisions taken by the Design Consultant regarding safety of fire outbreaks in building, following mitigations have also been proposed that may be incorporated in the design.

- Building Code of Pakistan will be considered by Design Consultant while designing firefighting system;
- Separate water storage tank will be designed for firefighting;
- Fire Hose Cabinets connected to pressurized water line at different locations of the building may also be considered in the design;
- System will be pressurized by means of an automatic booster system consisting of two duty pumps and jockey pump; and
- A separate fire alarm system will be designed for the Project building.

Following provisions for fire safety will also be made in the proposed Project during the design phase:

- Assigning of special number to be dialed to inform about the fire to emergency response team; and
- Fire Extinguishers

Following provisions for electrical safety will also be made in the proposed Project during the design phase:

- Appropriately grounded and double insulation of every single piece of equipment, machine, and device should be kept in the design;
- Proper installation check and periodic maintenance by a competent electrician should be planned; and
- All power strips should be planned in the design to place in well-ventilated areas for adequate heat dispersion.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Technical Design and Layout Planning	Adverse	Permanent	Local	Irreversible	Moderate (03)	Low (1)	Minor	Minor

7.5.1.3 Seismicity

The Study Area is located in Seismic Design Category D as per the Building Code of Pakistan 2021. A low to moderate intensity earthquake affecting the Project site can affect the development. These factors should be kept in mind by the designer so that there will be no damage to the building during earthquake.

Mitigation

- The proposed structure will be designed and constructed to withstand high earthquakes. For seismic hazard analysis, updated structural, hydrogeological, hydrological, flood, geotechnical and seismic studies will be conducted; and
- To mitigate the seismic hazard, Building Code of Pakistan 2021 (BCP-21) will be adopted. This code specifies minimum requirements for seismic safety of buildings and has to be applied and used by engineers in conjunction with the necessary understanding of the concepts of structural, geotechnical and earthquake engineering.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Seismicity	Adverse	Permanent	Local	Irreversible	Moderate (03)	Low (2)	Minor	Minor

7.5.1.4 Building Illumination/ Lighting

Design of a good illumination is necessary for the building as if a building is designed without taking into consideration for illumination, it may affect safety of the people who are using the building; adversely affect the performance of the workers and other activities within the building. Light can also have an adverse impact upon our local environment, typically through the unwanted effects of exterior lighting at night, often referred to as Light Pollution or Obtrusive Light.

Mitigations

- Illumination/ lightning system will be designed for the Project building in such a way so as to maximize the use of natural day light and minimize the use of electric lighting; and
- Special consideration will be given to control obtrusive light (light pollution) to safeguard the night time environment which can affect surroundings of the building.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Building Illumination/ Lighting	Adverse	Permanent	Site	Reversible	Minor (2)	Low (2)	Minor	Minor

7.5.1.5 Resource Conservation

Resources involved in the construction of proposed Project would include construction materials, water and fuel. Construction material to be used for construction activities includes reinforced concrete, coarse aggregates, fine aggregates, Cementous materials, reinforced and structural steel etc. Almost all the materials to be used in the construction of proposed Project building and access road are non-renewable and therefore their sustainable use is necessary for the future use.

Excessive water consumption for drinking and washing purposes by the construction staff may pressurize water resources in the Project area.

Fuel (diesel and petrol) will be used to operate construction machinery. Sustainable use of energy resources is very important not only to continue future use but also to reduce air emissions.

Mitigations

- Plan for reuse of construction waste materials may be formulated;
- Plan for use of Solar panels at operation phase will be considered;
- A good camp design and an efficient worksite management plan will be prepared during design stage that may help the contractor to reduce the water demand, wastewater and solid waste volumes to the lowest levels; and
- Rain water harvesting system may be considered through collection of water from roofs and its proper usage to irrigate green areas and also for domestic use with proper treatment.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Resource Conservation	Adverse	Temporary	Site	Reversible	Minor (2)	High (3)	Moderate	Minor

7.5.1.6 Traffic Congestion

At present; the Project site is primarily accessible through include Airport road and Shah Faisal Avenue road. During construction phase, the congestion on the road may increase due to the movement of heavy vehicles for the materials transfer and other activities.

Traffic Impact Assessment (TIA)

As described in the Project Description section of this EIA report, the findings of the TIA have been provided as under:

Impact of IT Park Development:

- There is a significant impact of the IT Park on the airport intersection since this intersection is very close to the development and all the generated trips will travel to this intersection.
- Star gate will also be affected due to the development as it is the only intersection which is heavily feeding the Airport Chowk and parallel intersection is closed due to security concerns.

Future Traffic Conditions (5-Year Projection - Year 2030):

- Without the IT Park impact, the projected average delay at Airport Chowk will be 59.2 sec, at Jinnah International Terminal Intersection will be 54.1 sec, and at Star Gate Chowk will be 51.8 sec.
- With the IT Park development, delays increase slightly to 65.8 sec, 57.9 sec, and 57.3 sec at Airport Chowk, Jinnah International Terminal Intersection, and Star Gate Chowk, respectively.
- The increase in delay is mainly due to normal traffic growth, the IT Park development and less accessibility to the development from the Shahra-e-Faisal.

Overall Traffic Impact Assessment:

- The Level of Service (LOS) will deteriorate over time due to normal traffic growth and the impact of IT Park.
- Airport Chowk will require future signaling and its adjustments to optimize traffic flow.

The detailed results of TIA are presented in **Table 7.2** to **7.7** below.

Table 7.2: Base year traffic analysis results of all four intersections

Sr. No.	Intersection Name	Type of Intersection	Description	Average Delay (sec)	Intersection Level of Service (LOS)
1.	Airport Chowk	Un-signalized three Leg intersection	Peak Hourly Volume	48.5	E
2.	Jinnah International Terminal Intersection	Un-signalized three Leg intersection	Peak Hourly Volume	43.8	E
3	Star Gate chowk	Unsignalized (Give way)	Peak Hourly Volume	44.2	E

Table 7.3: Growth Rate

YEARS	MOTOR CYCLE	RICKSHAW	CAR/JEEP/TAXI/PICK-UP/	BUS / MINI-BUS	DELIVERY VAN / LOADER PICK-UP	TRUCK / TRAILER
2026	2.92	3.46	2.41	1.94	2.69	3.22
2027	2.82	3.33	2.35	1.9	2.64	3.22
2028	2.73	3.2	2.29	1.86	2.59	3.22
2029	2.64	3.09	2.23	1.83	2.55	3.22
2030	2.57	2.98	2.18	1.79	2.5	3.22

Table 7.4: Summary of forecasted peak hour PCUs and % share of Airport Chowk with Project Development (Year 2030)

Direction	Traffic From	Turning	Volume	% Share	
A1	Shahra-e-Faisal	Through	194	5%	38%
A2		Right	1257	33%	
B1	Pakistan Post	Left	408	11%	18%
B2		Through	219	6%	
C1	Jinnah International Airport	Left	1060	20%	44%
C2		Right	854	24%	
Total			3154	100%	100%

Table 7.5: Summary of forecasted peak hour PCUs and % share of Jinnah International Terminal Intersection with Project Development (Year 2030)

Direction	Traffic From	Turning	Volume	% Share	
A1	Jinnah Ave	Through	1216	28%	34%
A2		Right	277	6%	
B1	Shahra-e-Faisal	Left	282	6%	31%
B2		Through	287	6%	
B3		Right	783	18%	
C1	CAA Colony	Left	264	6%	36%
C2		Through	1311	30%	
Total			4419	100%	100%

Table 7.6: Summary of forecasted peak hour PCUs and % share of Star Gate Chowk with Project Development (Year 2030)

Direction	Traffic From	Turning	Volume	% Share	
A1	Malir	Through	8141	46.00%	46.00%
B1	Drigh Colony	Left	1094	6.18%	30.83%
B2		Through	4362	24.65%	
C1	Airport	Left	4523	25.55%	25.55%
Total			18,121	102%	102%

Table 7.7: Scenario-4 traffic analysis results of all three intersections

Sr. No.	Intersection Name	Type of Intersection	Description	Average Delay (sec)	Intersection Level of Service (LOS)
1.	Airport Chowk	Un-signalized three Leg intersection	Peak Hourly Volume	65.8	F
2.	Jinnah International Terminal Intersection	Un-signalized three Leg intersection	Peak Hourly Volume	57.9	F
3	Star Gate chowk	Unsignalized (Give way)	Peak Hourly Volume	57.3	F

Mitigation

- The construction activities will be planned and managed in close consultation with stakeholders to minimize the vulnerability of above impacts;
- Special arrangements will be ensured to the accessibility and safety of the educational institutes. Workers will not be allowed to crowd together in the surroundings and working during the peak time (school start and closure time) will be avoided;
- Mobilization of vehicles and equipment/machinery will be restricted during the peak hours to reduce traffic load on the roads;
- Vehicles, machinery and equipment will be parked at designated areas to avoid un-

- necessary congestions along the roads;
- Prior to creating diversions and detours the citizens will be consulted well in advance through electronic and print media and will be informed to the public through proper signs and displays;
- A traffic study will be carried out before the construction to assess the existing and future capacity of existing road and evaluate the possible solutions to overcome the future traffic problems (if any) and Traffic accidents.

Signal Timing Adjustments:

- Airport Chowk should be changed to a signalized junction with proper slip lanes for left-turning and signal timing should be adjusted to optimize capacity utilization.
- Future LOS Considerations:
- The LOS at Airport Chowk and Jinnah International Terminal Intersection is expected to deteriorate, over time.
- Without geometric improvements or capacity enhancements, congestion will increase.

Access & Entry Design Considerations:

- The proposed entry and exit locations are expected to have a significant impact on intersection performance due to the proximity of the development to the intersection.
- Proper planning and design of entry and exit access points are critical to mitigating potential congestion and ensuring smooth traffic flow on the adjacent roadway network.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Traffic Congestion	Adverse	Permanent	Local	Reversible	Minor (3)	High (3)	Moderate	Minor

7.5.2 Impact on Ecological Aspects

7.5.2.1 Flora

During the pre-construction phase, activities such as installation of construction camps, construction of temporary roads and mobility of construction staff may damage the local vegetation/trees. As the heavy machinery and camps will be moved and installed, which require significant space due to which available vegetation in nearby areas may get impacted.

Mitigation

- The camps, mobility of machinery and construction of temporary road shall be properly planned and well designed to avoid any loss to local green cover. It is recommended to establish the construction camps where minimum or no vegetation exists;
- Similarly, the alternate routes for roads and points for camps are recommended where no loss of vegetation is expected; and
- The location of construction camp will be selected so, as to have limited environmental effect during construction phase and to reduce the cost and land requirement.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Flora	Adverse	Permanent	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.5.2.2 Fauna

No threatened faunal species were recorded in the study area during the field survey. The habitat values for fauna in the study area are generally limited. However, movement and installations of machinery and vehicles during the construction phase will generate noise that will create nuisance for avi-fauna and domestic mammals. The habitats of avi-fauna and domestic mammals may also be affected due to construction camps set-up and due to cutting of trees.

Mitigation

- The engineering design to integrate the principles of green infrastructure including habitat conservation, animal trespasses etc.;
- The sites for the construction camps will be carefully selected keeping in mind the available faunal habitats along the study area. Moreover, the layout of camps need to be designed while considering the faunal habitat of the area;
- Prior to commencing any construction work, any works required outside the construction footprint verified will be referred to the Project Director for advice on further assessment and approval requirements so that damage to any available habitat over there could be avoided at maximum; and
- Proponent will take NOC from the relevant department prior to construction phase if any ecological sensitivity reported on later or mature stage of the Project.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Fauna	Adverse	Temporary	Site	Reversible	Minor (2)	Low (1)	Minor	Negligible

7.5.3 Impact on Socio-Economic Aspect

7.5.3.1 Land Acquisition

Six (6) acres of land for the construction of the Information Technology (IT) Park near Jinnah International Airport (JIAP) Karachi has been handed over to PSEB by PAA. No private land acquisition is involved in the project as the construction activities will be carried out within available land. Therefore, no any land acquisition impacts are envisaged at the design phase under this project. Hence no mitigation is required.

Similarly, the construction of IT Park building will not be affecting any built-up area, private, residential, or commercial outside the acquired land. Therefore, this project does not have any impact on any private structures, crops, and any other resettlement related impact.

7.5.3.2 Temporary Acquisition of Land

Potential Impacts

The Contractors will require temporary land acquisition for:

- The development of Contractor camps and facilities i.e. storage, workshops, equipment parking and washing areas;
- Aggregate quarries; and
- Access roads and transportation etc.

The approximate area required for the establishment of one Contractor's camp facilities will be 1500m². Land utilization for Project activities and subsequent operation of Project may induce temporary as well as permanent changes in the existing land use pattern. Moreover, the contractor will provide the estimated quantity of excavation material during the construction phase.

Mitigation Measures

It is the foremost option to establish the construction camps at the acquired land to eliminate the issues of land leased etc. however, if this option is not feasible than the land for above mentioned facilities should be selected and leased prior to the start of construction phase.

Land for above mentioned facilities will be directly rented from the CAA by the Contractors. The provisions of the Land Acquisition Act (LAA), 1894 will not be involved as the acquisition of the land will be temporary and will be covered by short-term lease agreements between the CAA and Contractor. Rental terms should be negotiated to the satisfaction of the concerned and the agreement should be in local language to make the process clear.

In addition, the construction camps and batching plant should be located at least 300 meters away from the sensitive receptors. Prior to the commencement of the construction activities, the Contractor should submit a construction camp development/management plan to the Engineer-in-charge and the SEPA (if required) for its scrutiny and approval. As far as possible, barren land i.e. areas not under agricultural or residential use and natural areas located at high elevation should be used for setting up the contractor camps.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Temporary acquisition of Land	Adverse	Temporary	Local	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.5.3.3 Public Utilities

Potential Impacts

Although at project site, no public utilities exist. However, during provision of these facilities for the proposed project, public utilities in the nearby areas may be affected that may cause inconvenience to the local residents and general public.

Mitigation Measures

Mitigation measures will include:

- All public utilities (e.g. electric lines, water pipes, power/ telephone lines, etc.) likely to be affected by the proposed project will be relocated well ahead of time before the actual commencement of the construction work.
- Timely notification of disruption and minimizing time to relocate the utilities.
- The provision in the design and budget for the relocation of the existing utility infrastructures wherever required shall be finalized in consultation with the concerned department; and
- All public utilities (e.g. electric lines, water pipes, power/ telephone lines, etc.) likely to be affected by the proposed project will be relocated well ahead of time before the actual commencement of the construction work.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Public Utilities	Adverse	Temporary	Local	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.6 ANTICIPATED ADVERSE IMPACTS DURING CONSTRUCTION PHASE

Following are the impacts envisaged during construction phase resulting directly or indirectly from construction activities:

7.6.1 Impact on Physical Aspect

7.6.1.1 Soil Erosion and Contamination

Due to the proposed construction activities, soil erosion and contamination may occur. Soil erosion may occur on Project site and at contractors' camps as a result of excavation of earth/cutting operations whereas contamination of soil may be caused by oil and chemical spills at asphalt plant sites, camp sites and temporary construction site office.

Mitigations

- The base of foundation excavation will be properly proof rolled before pouring lean concrete;
- Stored excavated material will be covered and preferably reused;
- Prepare a plan for use and movement of construction vehicles within the area based on the nature of soil;

- Vehicles and equipment movement will be confined to dry areas with hardened soil; no vehicle and equipment will enter the damp areas and areas with soft soil;
- Do not drive or park machinery or vehicles within 10 feet of the edge of the excavation unless the banks are frequently inspected and confirmed to be stable;
- Sprinkling of water may help in reducing the erosion of soil;
- Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the guidelines for dump sites, and must be covered;
- If excavations have to be made very close to the existing foundation or roads/Structures, suitable excavation support system will be provided to stop any untoward incident. The Contractor will submit method statement for dewatering, excavations, their supporting etc. to Engineer for approval before taking up these works;
- During construction of foundation, the excavation will be inspected by an experienced Geotechnical Engineer before of pouring lean concrete;
- Confining excavations to the specified spots as per the approved engineering drawings and unnecessary excavations will be avoided;
- Excess spoil will be reused where possible and residual spoil can be disposed of at designated site to prevent erosion;
- Loss of topsoil can be avoided by stripping and storing topsoil prior to construction, then re-using it for green areas of the building;
- Mat / pile foundation will be used for transferring the loads of the proposed multistory building safely to the underlying soil stratum. However, spread foundation will be used for lightly loaded structures;
- Assure that proper sloping, benching, or shoring techniques are utilized in excavations of five feet or greater in depth;
- Use trench shields during trenching operations, when required;
- Review the impact loading near the trench to ensure that adequate bracing is in place;
- Oil separators will be installed at equipment or machinery washing yards to prevent soil contamination from oily water;
- Septic tanks of adequate capacities will be constructed for receiving and treating wastewater from all temporary worksite toilets and construction camps to avoid soil contamination;
- Regular inspection of the wastewater disposal from construction camps;
- Construction work will be scheduled to be completed before monsoon season to avoid the soil erosion through surface run-off; and
- Jute erosion protection mats can be applied in areas where erosion is noticed during inspections.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Soil Erosion	Adverse	Temporary	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor
Contamination	Adverse	Temporary	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.6.1.2 Deterioration of Ambient Air Quality

Air quality will be affected by various construction activities such as: movement of construction machinery and asphalt plant operations. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric

stability. In certain climatic condition such as hot summer in the city of Karachi, airborne dust can become a major nuisance if control techniques are not properly employed. The critical sources of air pollution during the construction phase will be:

- Asphalt plants that generate toxic emissions which contain unburnt carbon particles, sulphur compounds and dust particles (PM_{2.5} and PM₁₀) from batch preparation;
- Traffic diversion routes marked along dirt tracks that generate fugitive dust when in use by vehicular traffic;
- Transportation of materials and other construction activities that create dust emissions;
- Vehicular exhaust emissions;
- Excavation operations;
- Construction equipment's; and
- Burning of fuel for cooking by workers.

The air emissions may cause health impacts such as dryness and roughness of the throat; eyes and nose, to the workers and staff of the contractor. These emissions may also affect the bio-physical environment.

Mitigations

- All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition, properly tuned and maintained in order to minimize the exhaust emissions;
- Open burning of solid waste from the contractor's camps will be strictly banned;
- Use of fuel with substantially lower sulphur content;
- Proper maintenance and repair of power generators and construction machinery is needed to minimize the hazardous emissions;
- Strict monitoring of un-necessary idling of diesel runs vehicles;
- Personal Protective Equipment's (PPEs) like masks, goggles and gloves will be provided to workers; and
- SEQS, 2016 applicable to gaseous emissions generated by construction vehicles, equipment and machinery will be enforced during construction works.

Dust problems caused during the construction phase of the Project could be effectively mitigated by the implementation of simple procedures, by the contractor including but not limited to the following:

- Regular water sprinkling on the site and access roads will be carried out to suppress excessive dust emission(s);
- Earth work is limited to a raft structure. Mitigation for dust generation will be spraying water to sand stockpile;
- The contractor will build a temporary wall around the construction;
- Blowing of dust from potential sources at the worksite will be avoided by shielding them from the exterior, for example using polythene curtains or raising a fence of corrugated sheets around areas of active constructions;
- Blowing of dust and particulate matter from stockpiled loose materials (e.g. sand and soil) can be avoided either by sheeting them with tarpaulin or plastic sheets or by sprinkling them with light shower of water;
- During times of windy conditions, where feasible, construction operations that generate greater levels of dust may be avoided or reduced. Instead, these activities can be conducted when more favorable weather conditions occur. Increased application of other dust suppressant techniques may also be considered in times of very windy weather;
- For the concrete mixing stations, the dumping of stone, sand, gravel and containers

will be carried out in daytime; and the loading and unloading works for trucks, mortar mixing and pumping work may be carried out in daytime, or far from populated areas;

- Storage pile activity (i.e. loading and unloading) will be confined to the downwind side of the storage pile. This practice applies to areas around the storage pile as well as the pile itself. Storage piles will also be located away from downwind site boundaries;
- Asphalt, hot mix and batching plants will be equipped with the appropriate dust control equipment to reduce level of dust emissions;
- Earth moving be done under dump conditions as much as possible to prevent emission of dust into the air;
- Preventive measures against dust will be adopted for on-site mixing and unloading operations;
- Construction workers will be provided with masks for protection against the inhalation of dust;
- The vehicles carrying construction materials and the construction material storage areas will be covered with tarpaulin;
- Vehicle speed in the Project area will be prescribed not more than 20 kilometers per hour and controlled accordingly;
- Tires of all the vehicles leaving the site will be washed. No earth, mud and dust shall be deposited on the public road;
- Immediately consolidate the backfilled soil and restore the road surface; if immediate road restoration is not possible, provide a layer of plain cement concrete (PCC) of suitable mix on the backfilled trench so that dust generation, erosion is arrested and it will also provide a smooth riding surface for the traffic until the road is properly restored;
- Contractors will be asked to provide maintenance records for their fleet as part of the contract bid and at regular intervals throughout the life of the contract; and
- Air emission monitoring program for NO₂, SO₂, CO and PM₁₀ will be undertaken by the construction contractor, according to the Programme specified in the Environmental Management and Monitoring Plan (EMMP) in Section 8.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Deterioration of Ambient Air Quality	Adverse	Temporary	Regional	Irreversible	Moderate (3)	High (3)	Major	Moderate

7.6.1.3 Noise and Vibration

The noise and vibration will be produced due to the operation of construction machinery and equipment. Sources of noise and vibration during construction are heavy machinery such as bulldozers, excavators, concrete mixing plant, asphalt plants and other equipment's. The above machineries are expected to generate noise levels and vibration that may be severe in the Study Area.

The likely impacts due to noise are:

- Psychological effects of distraction of attention, irritation and short temperedness in the exposed persons due to persistently higher noise levels; and
- Noisy settings and higher background levels can cause temporary threshold shift and the consequent habit of speaking loud, which may cause damage to vocal cords in the

persons exposed.

Mitigations

There are a variety of ways by which construction equipment and worksite noise can be controlled. The following is a list of ways to control noise level at worksites that may be adopted by the contractor in coordination with the supervision consultant:

- **Quieter Equipment**

A cost-effective way to reduce noise at a construction worksite is to buy quiet equipment. In addition, equipment in use will be the most suitable for the job. Avoid using equipment that is over-powered and, conversely, avoid using under powered equipment. Whenever possible the quietest equipment alternative will be used. In general, electronic powered equipment is quieter than diesel powered equipment and hydraulically powered equipment is quieter than pneumatic power.

- **Modifying Existing Old Equipment**

The most common way to reduce the noise levels of common construction equipment is through worksite modifications. Some common worksite modifications consist of retro-fitting existing equipment with damping materials and mufflers.

- **Barrier Protection**

An effective way of reducing noise is to locate noisy equipment behind purpose-built barriers. The barriers can be constructed on the work site from common construction building material (plywood, block, stacks or spoils) or the barriers can be constructed from commercial panels which are lined with sound absorbing material to achieve the maximum shielding effect possible. To be effective, the length of the barrier will be greater than its height. The noise source will not be visible and barrier will be located as close as possible to either the noise source or the receiver.

- **Work Activity Scheduling**

Work activity scheduling are administrative means to control noise exposure. Planning how noise sources are sited and organized on a work site can reduce noise hazards.

Jobs can be rotated so that exposure time is limited. Transferring workers from a high exposure task to a lower exposure task could make the employee's daily noise exposure acceptable. Administrative controls include activity planning, for example, scheduling pavement breaking operations so as to reduce the number of work site workers exposed. In addition noisy equipment will not be run for periods longer than necessary and will be switched off when not in use.

- **Maintenance**

Increased attention to maintenance of tools and equipment will reduce worksite noise levels. Maintaining plant and equipment in good order not only increases its life, but makes it safer to use and quieter. Loose and worn parts will be fixed as soon as possible. Ideally, the worksite will have a system in place for checking and servicing the various machines and power tools.

Other mitigation measure includes:

- Educational Institutions and government organizations in and around the area of influence of the proposed Project site will be notified earlier, before commencement of construction activities;
- Horns will not be used unless it is necessary to warn other road users or animals of the vehicle's approach;

- Earth retaining walls will be constructed to contain the vibrations;
- Contractors will comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures;
- Sensitize truck drivers to avoid hooting, especially when passing through sensitive areas such as mosques, churches, residential areas educational institutions and hospital buildings;
- Planting of buffer trees and shrubs in the proposed Project site, if possible;
- Heavy machinery like percussion hammers and pneumatic drills will not be used during the night without prior approval of the Client; and
- The plants and equipment used for construction will strictly conform to noise standards specified in the SEQS, 2016.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Noise and Vibration	Adverse	Temporary	Local	Reversible	Moderate (3)	High (3)	Major	Minor

7.6.1.4 Water Quality

The potential sources of water pollution associated with the construction of proposed Project have been identified and includes:

Construction Site Runoff

Runoff from the construction works area may contain increased loads of sediments, suspended solids and other contaminants. Potential sources of pollution from the site include:

- Runoff and erosion from exposed soil surfaces, earth work areas and stockpiles e.g. grouting and cement material with the rain;
- Wash water from dust suppression sprays;
- Fuel and lubricants from maintenance of construction vehicles and mechanical equipment;
- Spillage of liquids stored on-site such as oil, diesel, and solvents etc. are likely to result in water pollution; and
- Uncontrolled discharge of debris and rubbish such as packaging, construction material and refuse.

Wastewater produced by On-Site Work Force

The estimated Wastewater that would be generated from the workforce during the construction phase will be 19,200 gallons/day. However, wastewater can be adequately treated by interim sewage facilities, such as septic tanks, which can be installed within the construction site.

Construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating groundwater. There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater and channels carrying water.

Mitigations

- Protection of water reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality;
- Water required for construction may be obtained in a sustainable way that the water availability and supply to nearby communities remain unaffected;
- Stockpiles of cement and other construction materials will be kept covered when not being used;
- Avoid stockpiling of earth fill especially during the intense rainfall events unless covered by tarpaulins or plastic sheets;
- Avoid fuel and other chemicals being stored at numerous locations around the site;
- Maintenance of vehicles and plant will be carried out only on impermeable areas where any oil spillages can be contained;
- Oils, fuel and chemicals must be stored at bonded fuel stores and mobile bonded stores;
- Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- Careful planning of the works to avoid soil excavation works during intense rainfall events;
- All kinds of waste will be stored in covered containers and disposed of safely as soon as possible;
- Regular water quality monitoring will be carried out as per SEQS , 2016 according to determined sampling schedule as specified in Section 8;
- Open washing of machinery and vehicles will be prohibited, sealed washing basins will be provided and wastewater will be collected in sedimentation/retention pond;
- A licensed contractor will be responsible for appropriate disposal and maintenance of the septic tanks;
- No refueling, storage, servicing, or maintenance of equipment will be allowed within 150 feet of drainages or other sensitive environmental resources; and
- Sand and silt removal facilities such as sand traps, silt traps and sediment basins must be provided to remove the sand and silt particles from run-off. These facilities will be properly and regularly maintained. These facilities will be carefully planned to ensure that they would be installed at appropriate locations to capture all surface water generated on site.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Water Quality	Adverse	Temporary	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.6.1.5 Solid Waste (Construction and Municipal)

Due to construction activities, municipal, construction and hazardous waste will be generated from construction activities and contractors' camps.

Insecure and unhygienic disposal of municipal solid waste particularly garbage and trash may cause degradation of soil and land. Insecurely disposed of heaps of waste containing kitchen garbage and food waste from construction camps can serve as breeding grounds for the disease spreading vectors and rodents.

Empty containers containing the toxic, flammable and corrosive materials may pose hazard to the workers. This may result in health risk to work force and public, if disposal site is improperly selected.

Construction waste includes insulation, nails, electrical wiring, rebar, wood, plaster, scrap metal, paper bags, cement, and bricks. Improper dumping of waste may generate odor, soil and water pollution, and disease vectors.

Mitigations

- The waste generated from the camp site will be disposed of at TMA approved sites;
- Burning of waste shall be prohibited;
- Proper labeling of waste containers, including the identification and quantity of the contents, hazard contact information will be carried out;
- Method of storage at the construction site that may be applied for toxic or hazardous waste is presented below:

Type of Waste	Method of Storage
Paints (containing organic solvents and heavy metals)	Designated concreted area
Cables, PVC Pipes, and Plastic films	Separate storage
Waste solvents (used acids or alkalis), thinners and paints	Labeled drums or containers; designated concreted area
Empty containers and drums (used to contain chemicals, paint, solvents, thinners, pesticide, insecticide, anti-mosquito oil, and diesel)	Labeled drums or containers; designated concreted area
Oil and Chemical Sludge	Designated concreted area

- Training of employees involved in the transportation of hazardous material regarding emergency procedures will be ensured;
- Waste pile will be controlled so that it does not spread and start to impede other activities, and stays at a height that it does not become a safety hazard. Barricades may also be placed around the pile to delineate the safe distance for other workers;
- Residual and hazardous wastes such as oils, fuels, and lubricants will be disposed of via licensed third parties;
- Liquid waste, such as grey water, sewage, slurry and other wastewater will be collected from source by a designated tanker, and taken off-site for disposal at safe disposal facility;
- If the waste pile contains plastic, paper and other light-weight material it will be covered with a net, and tarpaulin or similar to stop waste from blowing around;
- If disposal is required, the site will be selected preferably from barren and infertile lands, and sites will be located away from residential areas, water bodies and any other sensitive land uses;
- Construction workers and supervisory staff will be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste;
- Waste disposal plan must be reviewed during the entire construction phase in the light of changing weather conditions;
- Construction waste such as waste wood can be recovered and recycled into wood for new building Projects, and cement, bricks, and plaster can be crushed and reused in other construction and building Projects.
- Waste containers with proper color coding will be provided on site to store different type of waste i.e.:

- White: Gypsum – gypsum and plasterboard products
- Grey: Inert – clean concrete, rubble, hardcore, brick and block that will not decompose or create a hazard when buried.
- Black: Mixed general waste – any waste except contaminated waste that cannot be recycled in other skips on the site.
- Blue: Metal – all types of clean metal, including rebar offcuts, and scrap metal.
- Green: Wood – all types of clean, untreated timber and wood products.
- Brown: Packaging – paper products.
- Orange: Hazardous – only for contaminated waste such as asbestos, paint tins, mastic tubes, and tarmac; and
- The contractor will ensure implementation of waste management plan, attached as **Annex-III** and it must be reviewed during the entire construction phase in the light of changing weather conditions.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Solid Waste	Adverse	Temporary	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.6.1.6 Greenhouse Gases Emissions

Greenhouse gases (GHG) may generate at site due to anthropogenic activities that will be carried out at the construction site. The concentration of GHG in the atmosphere beyond the level of naturally occurring concentrations could result in more heat being held within the atmosphere. The main source of greenhouse gases will be:

- Direct emissions mainly from construction material;
- Direct emissions mainly from construction site equipment and site vehicles; and
- Indirect emissions from other construction activities.

Mitigations

- Use construction machinery designed with suitable pollution abatement technology;
- In order to control NO₂ emission at site, diesel engine equipment and machinery will be installed with catalytic converter, as it allows diesel engine to take advantage of the trade-off between NO₂, PM₁₀ and fuel consumption, and calibrate the engine in a lower area of fuel consumption;
- Used and old electrical equipment will be banned that can also help to reduce urban emissions;
- Environmentally friendly fuel such as Liquefied Petroleum Gas (LPG) may be used instead of diesel;
- Burning of waste will be strictly prohibited at site;
- Awareness programs of causes and effects of climate change will be conducted for mitigating GHG emissions; and
- Use of solar panels at construction camp sites (where possible) instead of diesel generators.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Greenhouse Gases Emissions and Carbon Footprint	Adverse	Temporary	Local	Reversible	Minor (2)	High (3)	Moderate	Minor

7.6.1.7 Resource Conservation

The materials used in construction of proposed Project would include coarse aggregates (crush), fine aggregates (sand), steel, water, reinforcement and cement. 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.

Fuel will be used to operate construction machinery and asphalt and batching plants. Sustainable use of energy resources is very important not only to continue future use but also to help to reduce air emissions. For conservation of energy, efficiency of the engines and burning processes is very important.

Mitigations

- Diesel and fuels with low sulphur content will be used to operate construction machinery and equipment's;
- The efficient and well-maintained equipment's and machinery will be used;
- The equipment's and machinery will be turned off when not in use;
- Regular maintenance of machinery to avoid fuel leakages;
- Reduction of wastage of water through training of workers involved in water use will be planned;
- Plan for reuse of construction waste materials may be formulated;
- A good camp design and an efficient worksite management plan will be prepared that may help the contractor to reduce the water demand, and wastewater and solid waste volumes to the lowest levels; and
- Use of solar panels at camp sites to conserve energy.

The Resources Conservation Plan is attached as **Annex-IV**.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Resource Conservation	Adverse	Permanent	Regional	Irreversible	Moderate (3)	High (3)	Major	Minor

7.6.1.8 Impacts of Heavy Vehicles on the Existing Road Network

The plying and movement of heavy vehicles in and around the Project site may result in air pollution, noise pollution, damage to road surface and traffic congestion. During construction

phase, the movement of heavy vehicles may cause traffic congestion issues on the Airport road and other access roads.

Mitigations

- Any vehicle with an open load carrying area used for transport of potentially dust producing materials will have properly fitted side and tailboards;
- Materials having potential to produce dust shall not be loaded to a level higher than the side and tail boards and will be covered with clean tarpaulin in good condition;
- The Contractor will not use any vehicles either on or off road with grossly excessive noise pollution;
- Construction activities that might substantially disrupt traffic e.g. delivery of materials will not be performed during peak travel periods to the maximum extent practicable;
- Warning signs will be used as appropriate to provide notice of road hazards and other pertinent information to motorists and the general public;
- Schedule hauling of construction materials during off-peak hours;
- Establish speed limits especially in proximity to sensitive receptors and sensitize the truck drivers on speed limit;
- Vehicular access to and from hospital buildings and fire stations will be maintained through the use of steel road plates over open trenches;
- The Contractor will ensure that the diversion and detour is always maintained in running condition, particularly during the intense rainfall events to avoid disruption to traffic flow;
- At work site, public information and caution boards will be provided including contact for public complaints; and
- It is strongly recommended that the contractor will be responsible for the submission of a final Traffic Management Plan, liaise with Faisal Cantonment. It is recommended that the TMP must comprise the following:
 - Define scope of area that will be affected by construction activities;
 - Provide sequence of construction operations;
 - Describe when each phase will commence and finish;
 - Provide duration of work; and
 - Note proposed hours of work activity on the site.

However, a guideline Traffic Management Plan is attached as **Annex-V**.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Impacts of Heavy Vehicles on the Existing Road Network	Adverse	Temporary	Local	Reversible	Minor (3)	High (3)	Moderate	Minor

7.6.1.9 Visual Impacts & Aesthetics

Possible visual impacts during construction phase activities are likely to arise from fugitive dust generated from site preparation, on-site storage of construction material, storage of construction debris, physical presence and operation of labor camp etc. which may affect visual and aesthetic aspects of the proposed Project site.

Mitigations

- The area demarcated for proposed Project will be fenced and all the construction activities will be restricted within the demarcated site;
- Site approach road will be kept free of dust and mud through implementation of dust suppression measures; and
- All temporary structures, surplus materials and wastes will be completely removed on completion of works.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Visual Impacts & Aesthetics	Adverse	Temporary	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.6.2 Impact on Ecological Aspects

7.6.2.1 Flora

Following impacts are expected on the floral species in the surrounding of the Project area:

- During the construction dust laden polluted air will form a dust film on leaves thus blocking sunshine and stomata consequently hindering photosynthesis processes causing detrimental effect on the plant health;
- Exhaust of noxious gases from movement of heavy machinery will further pollute air, which will adversely affect the health and vigor of plants;
- Establishment of contractors camps and warehouses for storage of equipment and material will involve clearing of shrubs and grasses from the area, causing a negative impact; and
- During construction activities the contractor's workers may damage the ornamental plants and trees, for use as fire-wood to fulfill the camps requirements.
- 11 trees are observed in the project area which might require cutting.

Mitigations

- Incorporate technical design measures to minimize removal of trees, if possible;
- Cutting of trees and disturbance shall be avoided, as far as possible so, that negative effects on the process of natural regeneration of species are minimized;
- A Tree Plantation Plan of **110 trees** to be planted within the premises or around the project area. The plantation plan has been formulated (**Annex-VI**), which shall be implemented by the PSEB in close coordination with respective Forest Department;
- Due consideration shall be given to invasive/non-invasive species factor while plantation of trees;
- Client shall involve the communities for carrying out plantation;
- To minimize the dust emissions, regular water sprinkling will be strictly followed;
- Open fires will be banned in the study area to avoid fire hazards;
- Clearing of vegetation cannot be avoided at the areas specified for Project structures, but damage to the natural vegetation shall be minimized by establishing camp sites, workshops and batching plants on waste/barren land rather than on productive land;

- Construction vehicles, machinery and equipment will remain confined within their designated areas of movement;
- The Contractor's staff and labor shall be strictly directed not to damage any vegetation such as trees or bushes; and
- Contractor shall provide gas cylinders at the camps for cooking purposes and cutting of trees / bushes for fuel shall not be allowed.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Flora	Adverse	Permanent	Site	Reversible	Moderate (3)	High (3)	Major	Moderate

7.6.2.2 Fauna

During construction phase the existing population of mammals and reptiles of the construction areas will be affected due to disturbance arising from construction activities involving excavation, movement of machinery and vehicular traffic, movement of labor, camping, etc. The existing livestock of the study area in quest of fodder will leave the directly affected areas due to construction activities and human intervention. Some reptiles particularly species of snakes and lizards may get killed during the earthworks operations. Moreover, the movements of the mammals and reptiles will be restricted during the construction phase. It is also worth mentioning that reptiles are almost absent in the area due to habitat conditions.

Birds will also tend to move away from the construction areas and find shelter and food elsewhere due to the activities mentioned above for fear of being hunted / trapped. Cutting of trees may adversely affect their habitat as trees provide nesting and resting sites to them. Noise generated from construction machinery particularly during the night hours will even scare the wildlife residing in habitats located at some distance from the construction areas. Food and refuse at the Contractor's camps will attract animals that might in turn be hunted by the workers.

Mitigations

- Hunting, poaching and harassing of animals shall be strictly prohibited, and Contractor shall be required to instruct and supervise its labor force accordingly and clear orders shall be given in this regard;
- The camps will be properly fenced and gated, to check the entry of birds and mammals in search of eatable goods. Similarly, wastes generated from camps will be properly disposed of, to prevent the chances of eating by animals, which may become hazardous to them;
- The contractor will make arrangements / measures to minimize vibration and noise pollution through good engineering practices;
- Noise control measures will be enforced during the construction phase such as provision of silencers on heavy construction vehicles especially near nesting areas and avoiding noise generating activities during the critical period of breeding;
- Efforts will be made to keep noise levels at acceptable levels (as per SEQS) produced by the construction activities;
- Over speeding of construction vehicles will be prohibited in the Project area, to avoid and minimize any accidental killing of birds, reptiles and mammals;
- Plantation of large number of trees along the proposed Project to regain the ecological habitat;
- Noisy work will not be carried out in night time so that there should be no disturbance to local birds and animals;

- Borrow pits will be fenced so that no animal can fall into these;
- If found any wild species during construction, it will be dealt carefully and local wildlife department officials will be called; and
- The Project will be completed timely to reduce the impacts.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Fauna	Adverse	Temporary	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.6.3 Impact on Socioeconomic Aspect

7.6.3.1 Employment Opportunity

Due to the construction of the proposed Project, economic and commercial activities will be generated in the Study Area as the laborers and semi-skilled staff from nearby communities will have an opportunity to work for the construction of the proposed Project. Establishment of food shops/canteens, construction related equipment shops and raw material market may also improve their income due to the execution of the proposed Project.

Impact	Nature	Duration	Extent	Reversibility
Employment	Beneficial	Temporary	Local	Reversible

7.6.3.2 Discovery of Heritage Sites/ Structures during Excavation

There is no notified heritage site exist in proposed study area. However, during excavation, there is a chance of finding such artifacts. In case of finding any artifact, the contractor shall immediately report through Supervision Consultant to Tourism, Archaeology and Museum Department, Karachi to take further suitable action to preserve those antiques or sensitive remains. Chance find procedure (as given in **Annex-VII**) shall be adopted in case of any accidental discover of cultural heritage.

Impact	Nature	Duration	Extent	Reversibility
Discovery of Heritage Sites	Beneficial	Temporary	Local	Reversible

7.6.3.3 Social/ Cultural Conflicts

During the construction phase of the Project, conflicts may arise between labor force and local community. Use of local resources and products by the construction workers can generate stress on the local resources. Furthermore, difference in cultural values may also cause discomfort to local residents.

Mitigations

- Local labor especially from nearby communities will be given preference for the construction works; and
- Careful planning and training of work force to minimize disturbance to the local people.
- Public notification through print or electronic media during the entire construction phase to avoid any inconvenience in accessibility to the locals;
- Code of Conduct (CoC) will be prepared and adopted for the project. All project personnel will be required to sign and follow the CoC; and
- Liaison will be maintained with the local communities and they will be educated about the GRM established for the proposed project

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Social/Cultural Conflicts	Adverse	Temporary	Local	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.6.3.4 Health Impacts (Diseases)

The health impacts that are envisaged to take place among employees and workers of the proposed Project are discussed below:

Communicable Diseases

For the implementation of Project activities, skilled and unskilled labor is required by the contractor. Mostly, skilled and unskilled workers have been hired by the contractor on permanent and contract basics, belonging to different cultural backgrounds, which they utilize for different developmental Projects. In this case, occurrence of communicable diseases like HIV/AIDs, COVID-19, respiratory diseases, and skin and eye infections are communal to take place during the execution of the proposed Project.

Mitigations

- Proper checkup of skilled and unskilled workers before their hiring;
- Labour camp will be away from the buildings and workers' management plan will be formulated by Contractor to minimize the adverse impacts on local communities and workers;
- Trainings, awareness and campaigns will be conducted for workers and surrounding communities on awareness and prevention of HIV/AIDs and COVID-19;
- Workers will be educated for personal hygiene and the sanitation concerns, leading to communicable and non-communicable diseases;
- Water will not be allowed to stagnate even if clean, and measures will be taken to cover the area; and
- Insecticides will be periodically sprayed.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Health Impacts (Diseases)	Adverse	Temporary	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.6.3.5 Health and Safety

A. Occupational Health and Safety

Workers may be exposed to unsafe and unfavorable working environment due to improper storage, handling and transport of hazardous construction material. The health and safety issues are also associated with the malfunctioning in operation of construction machinery and equipment which may cause minor to severe injuries to workers.

Mitigations

Workers will be provided with safe and healthy working environment taking into account the following mitigation measures:

- Compliance with Sindh Occupational Safety and Health Act, 2017;
- The construction contractor must depute a safety officer with specified responsibilities to supervise all the construction activities at the proposed Project site;
- Providing basic medical training to specified work staff, and basic medical service and supplies to workers;
- Obligatory insurance against accidents for laborers and employees;
- 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;
- Work safety measures and good workmanship practices will be followed by the contractor to ensure no health risks for laborers;
- Protection devices (ear muffs) will be provided to the workers, doing job in the vicinity of high noise generating machines;
- Disallow worker exposure to noise level greater than 85 dBA for duration of more than eight hours per day without hearing protection. The use of hearing protection will be enforced actively;
- Provision of adequate sanitation, washing, cooking and dormitory facilities including light up to satisfaction (Sanitation Plan attached as **Annex VIII**);
- Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles and gloves;
- Ensure strict use of wearing these protective clothing during work activities;
- Elaboration of a contingency planning in case of major accidents;
- All trenches deeper than two meter will be protected with wooden bracing to avoid safety risks to workers, public and nearby buildings and structures;
- Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- Ensure moving equipment will be outfitted with audible back-up alarms;
- Ensure that the site will be restricted for the entry of irrelevant people particularly children, disabled and elderly peoples;

- COVID -19 SOPs issued by Government of Pakistan will be followed by workers during construction phase;
- Adequate lightning devices, barriers, yellow tape and safety signage will be posted; and
- Use of safety signs at the construction site, as shown in below.



Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Occupational Health and Safety	Adverse	Temporary	Site	Reversible	High (4)	High (3)	High	Moderate

B. Community Health and Safety

The construction activities and vehicular movement at construction sites, and access service roads may also result in road side accidents particularly inflicting students, teachers and patients visiting project area who are not familiar with presence of heavy equipment and machinery.

This is a medium negative impact. Quality of ground water and surface water resources available in the nearby local communities may get contaminated due to the construction activities, oil spillage and leakage and roadside accidents.

Mitigations

- There will be proper control on construction activities and oil spillage of vehicles;
- The laborers with different transmittable diseases will be restricted within the construction site;
- Efforts will be made to create awareness about road safety among the drivers operating construction vehicles;
- Provide wooden bracing for all deep excavations that may require especially for sewer lines (less than two meters); identify buildings at risk prior to start of excavation work and take necessary precautions for safe conduct of work;
- Confine work areas; prevent public access to all areas where construction works are on-going through the use of barricading and security personnel;
- Attach warning signs, blinkers to the barricading to caution the public about the hazards associated with the works, and presence of deep excavation;
- Enforce strict speed limit (20 kilometer per hour) for plying on unpaved roads, construction tracks;
- Regular water sprinkling will be done on all construction active areas present close to sensitive receptors in order to reduce dust exposure;
- Ramps will be placed in front of schools and houses gates so that accidents due to slips may be avoided;
- Provision of proper safety signage, particularly at sensitive and accident-prone spots;

- If identified, consider guard rails at accident-prone stretches and sensitive locations;
- The communicable disease of most concern during construction phase, like sexually-transmitted disease (STDs) such as human immunodeficiency virus (HIV)/ Acquired Immunodeficiency Syndrome (AIDS), will be prevented by successful initiative typically involving health awareness; education initiatives; training health workers in disease treatment; immunization program and providing health service;
- Reducing the impacts of vector borne diseases on long-term health effect of workers will be accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease, which includes: Prevention of larval and adult propagation of vectors through sanitary improvements and elimination of breeding habitat close to human settlements and by eliminating any unusable impounding of water;
- During construction work, pedestrian and vehicular passages will be provided for crossing near settlement; and
- Fencing around the camps will be strong enough so that it cannot be broken easily by local people for making passages.
- A guideline HSE Plan is provided as **Annex-IX** for preparation of site specific HSE Plan by Contractor to mitigate these impacts.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Community Health and Safety	Adverse	Temporary	Local	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

C. Natural and Man-Made Disasters

Natural disasters (earthquakes) and accidents may result in injuries, financial losses and may even lead to deaths. The workers shall be trained and facilitated to cope with such disasters.

Mitigations

- An Emergency Response Plan for earthquakes and manmade disasters will be developed by contractor in coordination with Client and will be implemented in close consultation with the concerned departments;
- Training of the contractor staff and employees regarding the emergency procedures and plans will be regularly conducted;
- Emergency numbers will be clearly posted at all construction locations; and
- Minor incidents and near misses will be reported, and preventive measures will be formulated accordingly by the Client and Contractor.

The Emergency Response Plan is attached as **Annex- X**.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Natural and Man-Made Disasters	Adverse	Temporary	Local	Reversible	High (4)	Low (1)	Moderate	Minor

7.6.3.6 Influx of labor

For the implementation of Project activities, skilled and unskilled labor is required by the contractor. Mostly, skilled and unskilled workers have been associated with the contractor since long which they utilize, where they are required for the projects, and while other workers are hired from the different areas that belong to different cultural backgrounds. Social problems and conflicts that are associated with Labor Influx are as follows:

- Risk of social conflict: Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources. Ethnic and regional conflicts may be aggravated if workers from one group are moving into the territory of the other;
- Increased risk of illegitimate behavior and crime: The influx of workers and service providers into communities may increase the rate of crimes and a perception of insecurity by the local community. Such illegitimate behavior and crimes can include theft, physical assaults, substance abuse, sexual assault and human trafficking;
- Impacts on community dynamics: Depending on the number of incoming workers and their engagement with the host community, the composition of the local community, and with it the community dynamics, may change significantly. Pre-existing social conflict may intensify as a result of such changes;
- Increased burden on and competition for public service provision: The presence of construction workers and service providers (and in some cases family members of either or both) can generate additional demand for the provision of public services, such as water, electricity, medical services, transport, education and social services. This is particularly the case when the influx of workers is not accommodated by additional and separate supply systems;
- Increased risk of communicable diseases and burden on local health services: The influx of people may bring communicable diseases to the Project Area, including sexually transmitted diseases (STDs), or the incoming workers may be exposed to diseases to which they have low resistance. Workers with health concerns relating to substance abuse, mental issues or STDs may not wish to visit the Project's medical facility and instead go anonymously to local medical providers, this can result in an additional burden on local health resources;
- Local inflation of prices, accommodations and rents: A significant increase in demand for goods and services due to labor influx may lead to local price hikes and crowding out of community consumers. Depending on Project worker income and form of accommodation provided, there may be increased demand for accommodations, which again may lead to price hikes and crowding out of local residents; and

- Increase in traffic and related accidents: Delivery of supplies for construction workers and the transportation of workers can lead to an increase in traffic, rise in accidents, as well as additional burden on the transportation infrastructure.

Mitigation

Suggested mitigation measures for smooth execution of construction activities include:

- Labor camp(s) will be established away from residential population;
- Preference will be given to the local people to work with contractor, and contractor should hire maximum labor force from the Project Area because this will reduce the labor influx;
- Awareness will be created among the work force to ensure respect for local customs;
- Construction work should be completed within the stipulated time to move workers to next location;
- Labor force will be shuffled with the time;
- An effective GRM will be established for the Project to resolve all issues related to the community. Thus, progress regarding resolving the issues should be monitored closely;
- Create awareness among workers on proper sanitation and hygiene practices to endorse proper health and maintain good housekeeping practices at all Project sites;
- Provide adequate personal hygiene facilities in good condition with adequate supply of clean water;
- Make arrangements to treat the affected workers on time to control the movement of vector borne diseases;
- Sensitize workers and surrounding communities on awareness and prevention of COVID-19, HIV/AIDS and sexually transmitted infections (STI) through training, awareness campaigns and workshops during community meetings;
- Provide proper and free COVID-19, HIV/AIDS and STI health screening and counseling for site workers and community members;
- Develop and enforce a strict code of conduct for workers to regulate behavior in the local communities;
- Taking all sensible precautions to avert illicit, vicious conduct by or amongst the Contractor's personnel, and to preserve unity and harmony, and protection of people and property on and near the sites;
- Prohibiting drugs, alcohol, weapons, and ammunition on the worksite among personnel;
- Site security preparations must be contained within the Bills of Quantities (BoQs) to avoid any delays which might be caused due to insecurity;
- Appropriate fencing, security check points, gates and security guards should be provided at the construction sites to ensure the security of all plant, equipment, machinery and materials, as well as to secure the safety of site staff; and
- The Contractor must guarantee that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Labor Influx	Adverse	Temporary	Local	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.6.3.7 Gender Based Violence and Child Labor

Construction workers are predominantly younger males. Those who are away from home on the construction job are typically separated from their family and act outside their normal sphere of social control. This can lead to inappropriate and criminal behavior, such as sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors from the local community. A large influx of male labor may also lead to an increase in human trafficking whereby women and girls are forced into sex work.

Child labor and school dropout: Increased opportunities for the host community to sell goods and services to the incoming workers can lead to child labor to produce and deliver these goods and services, which in turn can lead to enhanced school dropout.

There are two basic conventions on child labor adopted by the ILO, and one adopted by the United Nations. The ILO Minimum Age Convention, 1973 (No. 138) and its accompanying Recommendation (No. 146) set the goal of elimination of child labor, and the basic minimum age for employment or work (in developing countries at 14 years of age or the end of compulsory schooling, whichever is higher; and 15 or the end of compulsory schooling for developed countries). The Convention sets a minimum age of 2 years younger for “light work,” i.e., 12 and 13 years, respectively; and a higher minimum age for dangerous or hazardous work (basically 18 years of age, but 16 in certain circumstances). The Convention also has various other flexibility clauses.

Inhabitants of the project area have mix economic background and different sources of income. Children of low income groups mostly involve in different earning activities, as their parents prefer to get their children hired in small shops as helpers, and waiters in hotels for earning money, and supporting household livelihoods. However, The Sindh Prohibition of Employment of Child Act, 2017 prohibits the employment of child and restrict the employment of adolescents in certain occupations and processes such as construction industry, and whoever employs or permits a child (person under the age of 15 years) to work in an establishment shall be liable to punishment with imprisonment.

The child labor impact might arise during construction stage, as large number of skilled and unskilled labor will be required by the contractor for the construction activities of the proposed Project.

Mitigation

- The Contractor will be required to provide qualified key personnel to address the specific risks identified in the project. Contractors will specify key staff with the technical skill and experience to implement the mitigation measures;
- The bidding documents will include specific requirements that minimize the use of expatriate workers and encourage hiring of local workers, thereby minimizing labor influx;
- The bidders will be required to submit Codes of Conduct (CoCs) with their bids. The CoCs will set clear boundaries for acceptable and unacceptable behaviours of all individuals and companies and will be signed by companies, managers and individuals;
- All project consulting firms will also be required to submit Codes of Conduct with their proposals;
- The contractor will be required to establish anti-sexual harassment policies that governs conduct in the workplace;

- The contractor will be required to provide mandatory and repeated training to workers on sexual exploitation and abuse and HIV/AIDS prevention and on the content and obligations derived from the code of conduct; and
- Provisions will be set in contracts for dedicated payments to contractors for SEA prevention activities (e.g. training) against evidence of completion. The portion of the contract price will be guaranteed by a performance security linked to environmental and social contractor performance.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Gender Based Violence	Adverse	Temporary	Local	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.7 ANTICIPATED ADVERSE IMPACTS DURING OPERATION PHASE

Anticipated impacts during operation phase are briefly discussed in subsequent sub-sections.

7.7.1 Impact on Physical Aspect

7.7.1.1 Topography & Landscape Changes

After the completion of the proposed Project, the overall environmental conditions of the Project area will greatly improve due to plantation of trees and ornamental plants around the proposed Project building. This will be a major positive impact of the proposed Project.

Impact	Nature	Duration	Extent	Reversibility
Topography and Landscape changes	Beneficial	Temporary	Local	Irreversible

7.7.1.2 Ambient Air Quality

During operation phase, operation of stand-by generator and un-necessary idling of diesel run engine of vehicular traffic will result in the emission of pollutants (CO, Smoke, NO_x, SO_x CO₂, PM_{2.5} & PM₁₀) into the air, thus deteriorating air quality. These emissions may adversely affect the health of staff and visitors working/residing in the proposed building.

Mitigations

- To mitigate the pollutants emissions, use of low sulfur fuel will be ensured;
- Strict prohibition on re-used fuel;
- Location of generators will be carefully selected;
- Plantation of trees along the generators to create a buffer zone that will help in absorbing the emissions;

- Use of gas generators (if possible) will be preferred for low emissions;
- Use of solar panels (renewable energy source) will be used as alternate source instead of deasil generators, as it will save the energy;
- The height of the generator stacks will be high enough to disperse the emissions in the air;
- Provision of budget for regular monitoring of ambient air quality in accordance with SEQS , 2016;
- Ensure cleaning of ducts, filters, and other components of HVAC, replacing filters, and measuring energy use and comfort. Performance measurements will be done monthly or at least quarterly, to provide operators with enough data to tell when systems are beginning to perform poorly;
- HVAC control systems are often run by programmable thermostats that schedule heating and cooling for different times of day and days of the week. Such schedules will be set to match the occupancy and activity schedules of different spaces. Sensors for HVAC controls, such as temperature and humidity sensors, or occupancy sensors, will be regularly checked for proper operation;
- A boiler of HVAC system must be adequately maintained to operate properly. However, it is particularly important that combustion equipment operate properly to avoid hazardous conditions such as explosions or carbon monoxide leaks, as well as to provide good energy efficiency;
- Un-necessary running of vehicle engines inside the Project site will be banned and strictly monitored; and
- Provision of budget for regular monitoring of ambient air quality as specified in EMMP of Section 8 in accordance with SEQS, 2016.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Ambient Air Quality	Adverse	Permanent	Regional	Irreversible	Moderate (3)	Medium (2)	Moderate	Minor

7.7.1.3 Indoor Air Quality (IAQ)

Good IAQ in buildings is an important component of a healthy indoor environment. It contributes to a favorable and productive environment for building occupants, giving them a sense of comfort, health, and well-being.

IAQ Sources:

Each building has its own set of circumstances. Air quality may be determined by the site of the building, its original design, and renovations, whether air handling systems have been maintained, occupant densities, activities conducted within the building, and the occupants' satisfaction with their environment. IAQ problems can arise from a single source or any combination of factors. Inadequate IAQ may begin with poor building design or failure of the building enclosure or envelope (roof, facade, foundation, etc.). Other issues may be associated with the location of the building and mixed uses of the building. Improper temperature and relative humidity conditions may also present problems for staff and patients.

Health Effects:

The specific pollutant, the concentration of exposure, and the frequency and duration of exposure are all important factors in the type and severity of health effects resulting from poor IAQ. Symptoms related to poor IAQ are varied depending on the type of contaminant. Failure of university management to respond quickly and effectively to IAQ problems can lead to

numerous adverse health consequences. Symptoms may include irritation of the eyes, nose, and throat; headaches, dizziness, rashes, muscle pain and fatigue.

Building dampness is associated with significant health effects. Numerous species of bacteria and fungi, in particular filamentous fungi (mold), can contribute significantly to indoor air pollution. Whenever sufficient moisture is present within building, these microbes can grow and affect the health of occupants in several ways. Occupants may develop respiratory symptoms, allergies, asthma, cough, wheezing, shortness of breath, sinus congestion, sneezing, nasal congestion, and sinusitis have all been associated with indoor dampness.

Mitigations

It is recommended that proponent develops and implement an IAQ management plan to address, prevent, and resolve IAQ problems in their building. To prevent IAQ problems effectively and efficiently, proponent will know and understand the history of the building (construction, uses, maintenance, etc.).

Following are some important practices / mitigations that can be adopted to manage the IAQ:

- Inspect and assess the building envelope, including the roof, walls and foundation and promptly respond to identified problems. Routinely check the building for water leaks, seals around doors and windows, and any visible damp or moist parts of the building. Clean and dry any damp or wet building materials and furnishings within 24 to 48 hours after detection to prevent the growth of mold;
- Ensure and validate that the building is maintained under a slight positive pressure (i.e., air comes out of the building when exterior doors are opened);
- IAQ will be monitored on regular basis for parameters like CO, CO₂, NO₂, VOCs, etc.;
- Ensure that good housekeeping practices are being applied in the building; and
- Ensure that routine preventive maintenance and upkeep of building is being performed. A preventive maintenance program provides the care to all building systems and components that keeps them operating at peak performance according to manufacturer's specifications, and also allows for early detection of problems.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Indoor Air Quality	Adverse	Permanent	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.7.1.4 Noise and Vibration

The operation of generators and movement of vehicles (staff and visitor vehicles) on access road and main road near the Project site may create noise issues in the proposed building. However, there is no vibrational impact during the operation stage of the proposed building.

Mitigations

- Use of horn will not be allowed in premises;
- Trees will be planted along the boundary of the building as a noise barrier;
- Employees working close to generators for extended periods will be encouraged to wear ear protection;

- To reduce the noise produced from loose vibrating parts all the noisy equipment will be maintained and tuned periodically;
- In the building, proper insulation will be provided to absorb the ambient noise;
- Traffic Signs/Rules will be installed /placed in and around the building regarding parking of vehicles and honking of horns;
- Strict enforcement of speed limits in or near the project area;
- According to SEQS, 2016 “an area comprising not less than 100 meters around hospitals, educational institution and courts must be declared as Silence Zone where noise level must not be higher than 50 dB(A) during the day time and 45 dB(A) during the night time. Hence, the area surrounding the proposed Project site i.e. not less than 100 meters must be declared as ‘**Silence Zone**’ and the penalties/fine must be allocated by SEPA for the violation of SEQS 2016; and
- Traffic Management Plan will be devised with traffic police to avoid heavy traffic jams, and honking on roads near the proposed building.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Noise and Vibration	Adverse	Permanent	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.7.1.5 Drinking Water Contamination

Water pollution can originate at the internal water network. If the pipes and the underground water storage tanks are not cleaned properly, they may lead to bacteriological contamination of the potable/drinking water and thus will lead to infectious diseases/health problems to the staff, and visitors.

Pollution from adjoining wastewater network takes two forms: bacterial and chemical. Bacterial pollution, although a direct health hazard, is usually quickly rendered harmless by natural processes in the soil and eventually in the ground water. Chemical pollution is predominantly nitrogenous, and increases the level of nitrates in the ground water. It is more potential harmful than bacterial pollution because it lasts longer, travels further and is more difficult to remove.

Mitigations:

- Water storage tanks will be cleaned and disinfected on regular basis;
- The water taps will be regularly checked for any leakage;
- It will be made sure that all faucets and circulating pumps etc. do not leak and are regularly maintained;
- If possible, water dispensers will be used in the proposed building;
- Leakage or dripping faucet, pump or toilet will be immediately reported;
- Utility bills will be kept in track for the consumption of water;
- Water-saving equipment such as low-flow shower heads, sinks with auto-shutoff mechanisms, and water-saving toilets and urinals may be used;
- An effective training program about water conservation will be established for the concerned personnel's; and
- Water quality monitoring will be conducted on quarterly basis and the quality will be maintained according to SEQS, 2016 for Drinking Water as specified in Section 8.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Drinking Water Contamination	Adverse	Permanent	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.7.1.6 Wastewater Generation

The estimated Wastewater that would be generated during the operational phase of the building will be 93,545 gallons/day. Uncontrolled sewage discharge from the proposed building may create water contamination and associated health risks in the surrounding area. Any bursting or choking of internal sewer may cause adverse impact such as foul smell, unhygienic waterlogged condition and health related impact on the live-in population.

Mitigations

- The wastewater will be treated in septic tanks before disposal into the existing sewerage network of CAA. There are four (04) septic tanks proposed in the project design (as shown in **Figure 7.1** below);
- Regular maintenance checks shall be carried out to check any bursting or choking of internal sewer; and
- The drainage and sanitation system shall be maintained in a sanitary and safe operating condition and all the drains and septic tanks should be cleaned periodically by the management.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Water Quality	Adverse	Permanent	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

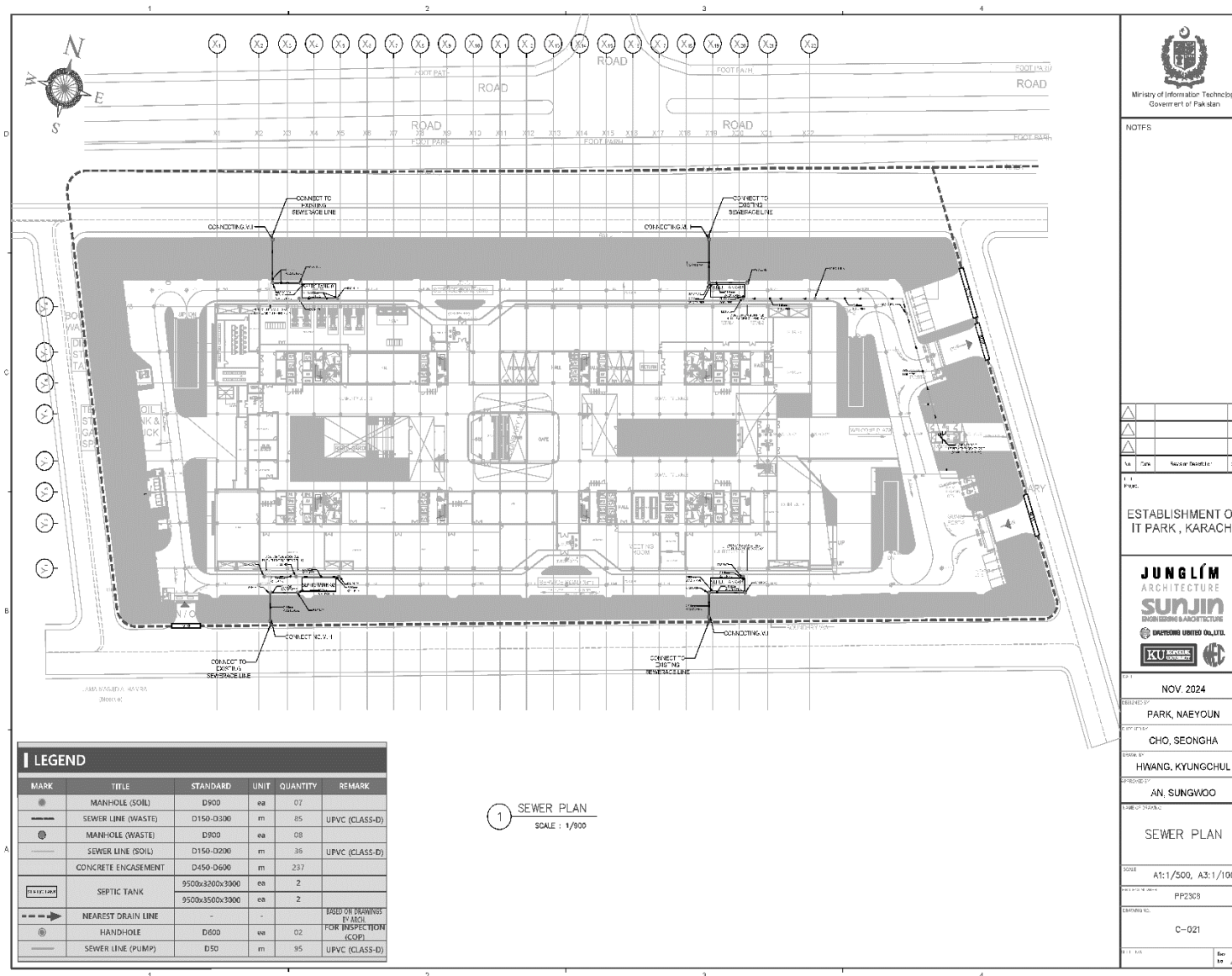


Figure 7.1: Sewer Plan for the disposal of Wastewater

7.7.1.7 Solid Waste

Municipal waste including papers, tissue papers, packaging papers, kitchen waste and bottles etc. will be generated during operation phase of the proposed Project. The solid waste generation during the operation phase of the proposed project is estimated to be 4,240¹⁴kg/day. Improper storage and dumping of waste may pollute soil, sewerage pipes and groundwater. It may also affect the aesthetics and can cause health problems to the staff and workers handling waste.

Mitigations Measures

- Waste collection bins will be provided inside and outside the buildings at suitable locations for collection of daily generated municipal waste;
- Assign color to collection bins according to the international standards;
- Recyclable wastes such as newspaper, cardboard, plastics, glass and metals could be separated for individual collection. Single stream collections may be more cost effective as the recyclables can be cheaper to collect and will reduce the volume of a costlier co-mingled dry recyclable collection;
- Waste minimization will be encouraged and regular training be provided to solid waste management staff in correct identification and disposal of waste;
- Storage areas will be cleaned regularly to minimize odor, pests and nuisances and preserve visual amenity;
- Housekeeping procedures, (including spillage control) will be implemented to minimize the generation of waste;
- Waste bins will be emptied by sanitary workers on daily basis;
- Waste will be transferred to the properly covered purpose-built vehicle (truck / pick-up van) and then be carried out of the building to nearby municipal disposal points;
- All empty containers not suitable for reuse to be rinsed and punctured prior to disposal;
- Transfer routes from the bin storage area to the collection zone will be free of obstructions and steps; and
- A proper waste management plan will be prepared for onsite storage, collection and disposal of waste.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Solid Waste	Adverse	Permanent	Site	Reversible	Moderate (3)	High (3)	Major	Minor

7.7.1.8 Fire and Explosions Hazard

Improper handling and storage of chemicals, and constructed electric installations can lead to fire and explosion that may in turn cause injury and possible death of a worker. Welding or cutting torch on or near drum (even empty) will never be used because product (even just residue) can ignite explosively. Fuel or oil spills around the generator and presence of combustible materials may pose a risk of a fire explosion.

¹⁴ Pakistan – Waste Management Report, 2018 (0.616 kg/capita/day)

Mitigations

- Routine inspection will be carried out to check that the area around the generator is free of clutter and no flammable material is present;
- Standard fire and smoke detection and protection devices such as fire alarms, fire hoses and hydrants will be provided in all critical areas of the proposed Project building;
- Appropriate fire safety equipment will be installed at convenient locations within the building;
- Equipment will be regularly examined and maintained by a reputable fire safety and security company;
- Fire drills will be conducted at least biannually to ensure that workers are familiar with the action to take in the event of fire or explosions;
- Fire awareness materials will be placed in strategic locations within the plant to educate the staff and visitors on what to do in the event of fire;
- “No smoking signs and policy” will be displayed, as appropriate and actions to be taken against those not adhering to this order; and
- Fire safety management will be prepared and implemented by management.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Fire and Explosions Hazard	Adverse	Temporary	Site	Irreversible	High (4)	Low (1)	Moderate	Minor

7.7.1.9 Traffic Management

During operation phase, the proposed Project will experience an upsurge in visitors and staff. This means number of vehicles accessing the facility will be increased. This in turn may have undesirable effect on traffic flow.

Mitigations

- The management of the project will prepare, implement and monitor traffic management plan to avoid traffic congestions in and around the project buildings; and
- Liaison with the local traffic police department on the roads, surrounding the project for continuous flow of traffic.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Traffic Management	Adverse	Permanent	Local	Reversible	Moderate (3)	Medium (3)	Moderate	Minor

7.7.2 Impact on Ecological Aspects

7.7.2.1 Flora and Fauna

No adverse impacts are envisaged on flora and fauna of the study area during the operation phase.

There is no protected area, game reserve, game sanctuary and national park in and around the Project area so no major impact on wildlife and livestock is expected through noise, vibration and any type of normal activity in the Project area.

Flora comprising 110 trees and ornamental plants will be planted in and around the project area during the construction phase to enhance the aesthetics value, and to control noise and air pollution. It will provide the following benefits during operation phase:

- Creates a visual barrier and enhances the appearance of the area;
- Providing nesting place for the birds;
- Captures and reduces odor concentrations by absorbing gases, if any emits from nearby nullah;
- Trees will act as wind speeds barrier to protect building structures during intense wind storms and intense rainfall.

However, mismanagement of green areas will result in clogging of drains, nuisance due to stagnant water and chemical pollution.

Mitigations

- The implementation of plantation plan recommended in compensation for cutting of trees will start working during operational phase, to ensure the ecological balance and to avoid any impact on local environment;
- Large scale planting with suitable indigenous fruit and forest trees, shrubs and ornamental plants in the form of Trees. Linear plantation will be carried out in accordance with the Tree Plantation Plan to improve aesthetic value and offset the effect of removal of vegetation. It will help in absorbing flue gases, emitting from a large number of vehicles and public transport passing through the project area, which shall improve the air quality;
- The saplings planted in the Project Area against the trees affected should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients by relevant department;
- Maintenance of the green areas and the protection of saplings for at least five (04) years to ensure better growth and environmental / aesthetics conditions;
- Keep green areas weed free. Weeds will be monitored weekly and removed no less than every two weeks. Use of chemicals for weed control and suppression needs to be approved by the concerned authorities;
- Plantations raised must be maintained according to the silvicultural practices which includes proper irrigation, cleaning, pruning, thinning at prescribed intensity, silt clearance and trench-opening; and
- Use of fertilizers will be strictly monitored in order to avoid any incident. Natural nutrients will be preferred.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Flora and Fauna	Adverse	Permanent	Local	Reversible	Negligible (1)	Low (1)	Minor	Minor

7.7.3 Impact on Socio-economic Aspect

7.7.3.1 Employment

The Project implementation will create employment opportunities for 120 people comprising skilled and unskilled labour's which will improve the economic growth of the area. This impact will be positive in nature.

Impact	Nature	Duration	Extent	Reversibility
Employment	Beneficial	Permanent	Local	Irreversible

7.7.3.2 Occupational Health and Safety (OHS) Considerations

During the operation phase, health and safety issues may arise. Operation and maintenance of the building may cause safety risks to staff (electrical and mechanical staff, solid waste management staff and maintenance staff), that may include injuries due to electric shocks, arc flash and arc blast, slipping and falling, poor handling and storage of hazardous substances and during handling of the solid waste. The impact will be considered as moderate negative, in nature.

Mitigations

- Operation and maintenance of machinery and equipment shall be controlled and handled by efficient management, staff training, and other preventive measures;
- Provide fall protection for all maintenance personnel especially for roof-mounted equipment such as HVAC equipment and cooling towers;
- Proper storage and handling of generator fuel, laboratory chemical and solvents;
- Emergency Response Plan will be implemented;
- Emergency numbers will be clearly posted and communicated to the staff;
- Fire extinguishing equipment will be installed in the building;
- Provision of PPE's to the skilled and unskilled labors including masks, gloves, safety jackets and ear muffs;
- Necessary health and safety rules will be enforced by the concerned authority for management;
- Proper training will be given to workers on health and safety measures;
- Fumigation will be done in building periodically;
- Hazardous materials will be well labeled and stored in their original containers;
- Material Safety Data Sheets (MSDS) will be available and readily accessible to lab attendants;
- Clear signage will be posted alerting of possible danger at locations where dangerous and hazardous materials are present;

- Workers will also be inoculated against infectious diseases and kept under regular medical checkup; and
- During maintenance of power supply, ensure that the live wire work is conducted by trained workers with strict adherence to specific safety and insulation standards (Pakistan Electric and telecommunication Safety Code-PETSAC-2014).
- COVID-19 SOPs must be fully adopted by the in accordance with the WHO and GoP guidelines.

Impact	Nature	Duration	Extent	Reversibility	Magnitude	Likelihood	Significance Before Mitigation	Residual Impact After Mitigation
Occupational Health and Safety	Adverse	Temporary	Site	Reversible	Moderate (3)	Medium (2)	Moderate	Minor

7.7.3.3 Environmental Enhancement Measures

- Provision of roof garden to reduce the heat island effect and improve the rainwater management.
- Use of renewable energy resources (solar energy) such as installation of solar panels at the roof top may be planned to supplement the supply of electricity which in result may reduce the electricity bills and load on electricity demand from grid station;
- The use of auto switch lighting system may be explored;
- Use of energy conserving electric lights (LED light) for general lighting during the operation phase may be planned;
- Illumination/ lightning system may be designed in such a way so as to maximize the use of natural day light and minimize the use of electric lighting;
- Water-saving equipment such as sinks with auto-shutoff mechanisms and water-saving toilets and urinals may be installed;
- Reuse of rain water in the green areas through water harvesting techniques may be considered; and
- An option of treated water from STP/ Septic Tanks may also be studied for irrigation purpose in green areas of IT Park, landscaping, dust control and toilet flushing.
- The provision of an artesian well may be considered at the suitable green areas of IT Park for ground water recharge.
- Thousand (1000) plants may also be planted to improve the landscape of the project area.

Impact	Nature	Duration	Extent	Reversibility
Environmental Enhancement Measures	Beneficial	Permanent	Local and Regional	Irreversible

8 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

8.1 GENERAL

This section provides brief description of environmental issues, mitigation measures to eliminate or reduce environmental and social impacts to an acceptable level, institutional framework for the implementation of the mitigation measures and environmental monitoring plan of air quality, water quality, and noise pollution parameters during construction and operational phase. A budgetary plan is also developed, indicating estimated costs to be incurred to mitigate potential adverse impacts of the proposed Project.

8.2 OBJECTIVES

The main objectives of this section are to:

- Provide the details of the Project impacts along with the proposed mitigation measures and the corresponding implementation activities;
- Define the role and responsibilities of the Project Proponent, Contractor, Supervisory Consultants and other key 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 EMMP and outline the corresponding financing arrangements.

8.3 INSTITUTIONAL SETUP FOR IMPLEMENTATION AND MANAGEMENT OF EMMP

The key players involved during construction phase of the proposed Project are the PMU as employer / proponent, SEPA, the Supervisory Consultant (SC) and the Contractor(s). The roles and responsibilities of these organizations are outlined below.

The following staff will be involved in the implementation of EMMP:

- PMU (PD) / Proponent / Employer;
- PMU E&S Specialists;
- SC; and
- Contractor's Staff.

The PMU PSEB will make Contractor bound through contract documents to implement the EIA including EMMP and other terms and conditions of the Environmental Permit of SEPA. The whole EMMP will be included as a clause of the contract documents. Construction camps will be established after necessary approvals. Site-Specific EMP to be developed by Contractor in the light of the relevant agencies' requirements, before commencement of new works. The organizational setup for implementation of EMMP during construction phase is provided in **Figure 8.1**

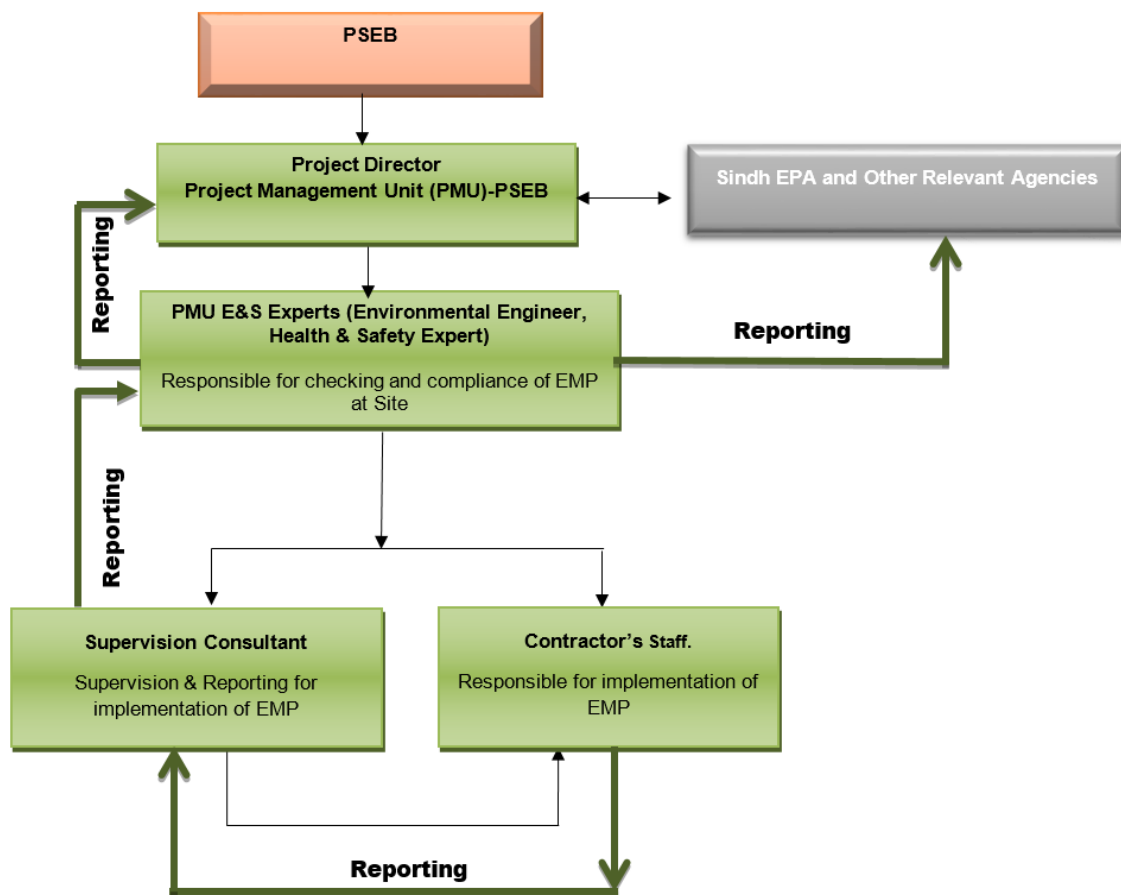


Figure 8.1: Organizational Setup for the Implementation of EMMP

8.4 ROLES AND RESPONSIBILITIES

a) 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 and IEE of all the developmental projects under their jurisdictions. SEPA will undertake audits (as and when required) of the proposed Project activities with respect to the protocols as defined in EMMP and environmental approval.

b) PMU (Project Director)

The PD of PMU is the executive head of the IT Park Karachi Project. He is responsible for necessary policy, administrative and financial decisions and actions for effective and timely implementation of the project as per the approved framework and implementation schedules. He will be responsible for overall implementation of the Project including environmental and social management aspects and hiring of contractors and consultants.

c) PMU E&S Experts

E&S Experts will be responsible for ensuring the EMMP and BoQ is included in the contract documents, and supervision of EMMP implementation. The E&S Experts will take care of environmental, social and health and safety aspects of the project activities. The E&S Experts will arrange environmental and social monitoring and prepare compliance reports and submit to PD-PMU for further submitting to the SEPA, to fulfill their monitoring, reporting and compliance requirements of environmental and social aspects of the project. The compliance will require measurements of environmental, social and health and safety parameters and observations at the construction sites to evaluate compliance.

Furthermore, they shall be responsible for:

- Ensuring that the required environmental, social and health and safety training is provided to the concerned staff;
- Make sure that all the contractual obligations related to the environmental, social and health and safety compliance are met;
- To carry out regular site visits to the construction sites to review the environmental, social and health and safety performance of the Contractor(s);
- Check regularly of the EMMP implementation status of the Project during construction phase is being properly carried out;
- Review monitoring reports for the progress of environmental, social and health and safety related activities;
- Make sure that the Contractor is implementing the additional measures suggested by the SC in environmental, social and health and safety monitoring reports;
- 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;
- Assist Contractor for obtaining necessary approvals from the concerned departments;
- Oversee the compliance of all the monitoring programs as given in EMMP;
- Maintaining interface with the other lined departments/stakeholders; and
- Reporting to the SEPA on status of EMMP implementation.

d) Supervision Consultant (SC)

The supervision will be carried out through independent E&S consultancy firm. The consultant firm will prepare monthly monitoring and evaluation report for site and submit to PMU E&S Experts. The PMU E&S Experts will review the report, discuss with the consultant firm and finalize the findings. In case of noncompliance from the contractors, the PMU E&S Experts will have the authority to halt the construction activities or impose penalties as per the contract conditions. The PMU E&S Experts will submit the final version of monitoring and evaluation reports to PMU as per periodic reporting mechanism (defined in upcoming section). PMU E&S Experts will submit these reports to SEPA as per the frequency to be mentioned in the construction phase 'Environmental Approval' requirements. Roles and responsibilities of SC will be:

- Review and approve the contractor's management plans;
- Oversee the performance of the Contractor to make sure that the Contractor(s) is complying with EMMP;
- Ensuring that the day-to-day construction activities are carried out in an environmentally and socially sound and sustainable manner;
- Close coordination with the Contractor and PMU E&S Experts;
- Preparing training materials and implementing training programs;
- Ensure the implementation of the mitigation measures suggested in EMMP;
- To supervise and monitor environmental and social activities being performed at site;
- To organize periodic environmental and social training programs and workshops for the consultant's and contractor's staff;
- Periodic reporting as mentioned in EMMP; and
- Suggest any additional mitigation measures (if required).

E&S Experts of supervision consultant will consist of following personnel

- Environmental Engineer (One specialist – BSc in Environmental Engineering, At least Five (05) years of relevant professional experience)
- HSE Expert (One specialist – BSc in Environmental Engineering, science, Occupational health and safety and relevant field, At least Five (05) years of relevant professional experience)

e) Construction Contractor

Contractors will be bond to appoint site based Environmental and Social Experts with relevant educational background and experience for each site. The contractors will be responsible for implementation of measures to avoid or minimize adverse environmental impacts during construction. Contractors' Environmental and Social Experts will carry out following activities:

- Implementation of the mitigation measures at each construction site;
- Contractors will be bond through contract to take actions against all the special and general provisions of the contract document;
- Contractors will make sure the compliance of EMMP recommendations and will also be responsible for effective liaison;
- Provision of proper PPEs to the workers and train them for their proper use;
- Prepare and submit the monthly, quarterly, biannually, annually and final progress reports to SC;
- Report immediately to SC and PMU E&S Experts when environmental and social incidents are occurred;
- To conduct the environmental and health & safety trainings to the workers / labor; and
- Coordinate with Environmental and Social Experts of SC.

E&S Experts of Construction Contractor will consist of following personnel

- Environmental Engineer (One specialist – BSc in Environmental Engineering, At least Five (05) years of relevant professional experience)

- HSE Expert (One specialist – BSc in Environmental Engineering, science, Occupational health and safety and relevant field, At least Five (05) years of relevant professional experience)

8.5 BIDDING AND CONTRACT DOCUMENTS

This EIA including EMMP is to be included in bidding and contract documents. The PMU shall ensure that bidding and contract documents include specific provisions requiring contractors to submit a site-specific management plan prior to start of work. The selected contractor will be audited and monitored on the clauses mentioned in the EIA. A copy of the approved EIA with NOC will be kept all the time on site during the construction period of the Project. Non-compliance with, or any deviation from, the conditions set out in the EIA may lead to failure in compliance and shall require corrective actions.

8.6 TRAINING AND CAPACITY BUILDING

To enhance the capacity of the Proponent as well as the contractor, training will be imparted related to the environmental and social issues of the project, implementation of mitigation measures and the monitoring protocols and reporting mechanism will also be carried out.

Project will ensure in-house training for the project staff, contractor and the supervisory staff of the proponent and the consultants through the provision of one-day basic training and one-day advanced training, covering environmental and social aspects of the development projects in general and implementation requirements with emphasis on the roles and responsibilities of the Proponent and the contractor staff while executing the environmental monitoring plan in particular. The training protocols will include the following aspects:

- Procedures for monitoring the air quality parameters and measures to be adopted for avoiding or minimizing air pollution, particularly from the concrete batching plant, haul-trucks, etc.;
- Procedures for monitoring water quality parameters and measures to be adopted for avoiding or minimizing water pollution, particularly from the wastewater effluent generated from the workshops, machinery washing yards and other obnoxious chemicals;
- Safe waste management and disposal practices;
- Safe noise levels from the construction machinery, etc.;
- General housekeeping and cleanliness;
- Communicable diseases;
- Safety measures against hazards for workforce and the local communities arising from the construction activities; and
- Use of safety gadgets by the workforce.

8.7 COMMUNICATION & DOCUMENTATION

8.7.1 Meetings and Reports

Monthly meetings will be held at site during the construction phase. The purpose of these meetings will be to discuss the routine activities, non-compliances as pointed out by SC and their remedial measures. Various reports will also be produced at periodic time intervals, as provided in **Table 8.1** along with information regarding persons responsible for report preparation and review process.

Table 8.1: Periodic Reporting Mechanism

Report Category	Prepared by	Reviewed by	Submitted to
Monthly	Contractors' E&S Experts	SC E&S Experts	Proponent
Quarterly	E&S Experts of the SC	Proponent	SEPA
Project Completion Report	E&S Experts of the SC	Proponent	SEPA

8.7.2 Photographic Record and Data Base

Contractor and SC will maintain photographic records of all activities during the implementation of the proposed Project. Data base of persons involved in monitoring, compliance and effects, HSE database, compliance and non-compliance record according to HSE Plan will also be maintained.

8.7.3 Non-compliance of EMMP

Contractors' failure to comply with EMMP will result in deduction of payments under different sub heads of EMMP by SC.

8.8 ENVIRONMENTAL MITIGATION AND MANAGEMENT MATRIX

Environmental Mitigation and Management Matrix (EMMM) is considered as one of the main elements of EMMP. It will be used as the management tool for the implementation of mitigation measures. The plan includes following:

- The envisaged impacts as identified in EIA and their recommended mitigation measures; and
- The person/organization directly responsible for adhering to or executing the required mitigation measures.

Table 8.2 provides information about all impacts to be raised due to project activities during different phases of the Project i.e. pre-construction, construction and operation phases

Table 8.2: Environmental Mitigation and Management Matrix

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
Preconstruction / Design Phase					
1.	Topography The topography in the project area will change due to the construction of Project Building. Construction of proposed Project will result in considerable earthworks and excavation.	The project design would consider aesthetic concerns such as the Tree Plantation which is already recommended in the EIA Report; Best engineering design measures will be adopted keeping in view the aesthetics of the project area; and Ground disturbances will be limited to only the areas necessary for project related construction activities.	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent
2.	Technical Design and Layout Planning Incompatible layout plan and engineering design of the project's structures can create undermine the overall aesthetic beauty and ambience of the project area. Similarly, inadequate design of building facilities may also pose several issues for occupants as well nearby residents.	All structural, layout and engineering designing of Project will be in strict accordance with the applicable national and international bylaws and engineering parameters including Cantonment bylaws	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent
3.	Seismicity The Study Area is located in Seismic Design Category D as per Building Code of Pakistan 2021. A low to moderate intensity earthquake affecting the Project site can affect the development. These factors should be kept in mind by the designer so	The proposed structure will be designed and constructed to withstand high earthquakes. For seismic hazard analysis, updated structural, hydrogeological, hydrological, flood, geotechnical and seismic studies will be conducted; and To mitigate the seismic hazard, Seismic Building Code of Pakistan 2021 (BCP-21) will be adopted. This code specifies minimum	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	that there will be no damage to the building during earthquake	requirements for seismic safety of buildings and has to be applied and used by engineers in conjunction with the necessary understanding of the concepts of structural, geotechnical and earthquake engineering. works.			
4.	Building Illumination / Lighting Design of a good illumination is necessary for the building as if a building is designed without taking into consideration for illumination, it may affect safety of the people who are using the building; adversely affect the performance of the workers and other activities within the building. Light can also have an adverse impact upon our local environment, typically through the unwanted effects of exterior lighting at night, often referred to as Light Pollution or Obtrusive Light.	Illumination/ lightning system will be designed for the project building in such a way so as to maximize the use of natural day light and minimize the use of electric lighting; Special consideration will be given to control obtrusive light (light pollution) to safeguard the night time environment which can affect surroundings of the building.	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent
5.	Resource Conservation Resources involved in the construction of proposed Project would include construction materials, water and fuel. Construction material to be used for construction activities includes coarse aggregates, fine aggregates, Cementous	Plan for reuse of construction waste materials may be formulated; Plan for use of solar panels at operation phase will be considered; and A good camp design and an efficient worksite management plan will be prepared during design stage that may help the contractor to	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	materials, reinforced and structural steel etc. Excessive water consumption for drinking and washing purposes by the construction staff may pressurize water resources in the project area. Fuel (diesel, petrol) will be used to operate construction machinery, Sustainable use of energy resources is very important not only to continue future use but also to reduce air emissions.	reduce the water demand, wastewater and solid waste volumes to the lowest levels. Green building characteristics will be considered during design phase.			
6.	Traffic Congestion At present; the Project site is primarily accessible through include Airport road and Shah Faisal Avenue road. During construction phase, the congestion on the road may increase due to the movement of heavy vehicles for the materials transfer and other activities.	A traffic study will be carried out during the design phase to calculate the existing and future capacity of Airport road and Shah Faisal Avenue road to evaluate the possible solutions to overcome these future traffic problems	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent
7.	Flora During the pre-construction phase, activities such as installation of construction camps, construction of temporary roads and mobility of construction staff may damage the local vegetation/trees. As the heavy machinery and camps will be moved and installed,	The camps, mobility of machinery and construction of temporary road shall be properly planned and well designed to avoid any loss to local green cover. It is recommended to establish the construction camps where minimum or no vegetation exists;	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	which require significant space due to which available vegetation in nearby areas may get impacted.	Similarly, the alternate routes for roads and points for camps are recommended where no loss of vegetation is expected; and The location of construction camp will be selected so, as to have limited environmental effect during construction phase and to reduce the cost and land requirement.			
8.	Fauna No threatened faunal species were recorded in the study area during the field survey. The habitat values for fauna in the study area are generally limited. However, movement and installations of machinery and vehicles during the construction phase will generate noise that will create nuisance for avi-fauna and domestic mammals. The habitats of avi-fauna and domestic mammals may also be affected due to construction camps set-up and due to cutting of trees.	▪ The engineering design to integrate the principles of green infrastructure including habitat conservation, animal trespasses etc.; ▪ The sites for the construction camps will be carefully selected keeping in mind the available faunal habitats along the study area. Moreover, the layout of camps need to be designed while considering the faunal habitat of the area; ▪ Prior to commencing any construction work, any works required outside the construction footprint verified will be referred to the Project Director for advice on further assessment and approval requirements so that damage to any available habitat over there could be avoided at maximum; ▪ Proponent will take NOC from the relevant department prior to construction phase if any ecological sensitivity reported on later or mature stage of the Project;	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		- The construction camp management plan during the planning stage will consider fencing and gating to check the entry of animals in search of eatable goods; and - Similarly, waste management plan of the camps will be considered at the planning stage to prevent wild animals and birds.			
9.	Public Utilities No public utility is present in the project area, hence no impact on the public utilities due to the proposed project design and execution. However, due to the proposed Project construction activities, utilities (electricity and sewerage line) may be affected and create disruption to the nearby households.	- The design engineer will consider the adjustments of the proposed plans, where feasible and within acceptable design standards to avoid relocation or adjustment of major or costly utilities without changing the scope of the Project; and - Relocation of the utilities will be planned and approved before Project commencement by the Client if any, to avoid inconvenience to the other nearby buildings.	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent
10.	Flora During the pre-construction phase, activities such as installation of construction camps, construction of temporary roads and mobility of construction staff may damage the local vegetation/trees. As the heavy machinery and camps will be moved and installed, which require significant space due to	- The camps, mobility of machinery and construction of temporary road shall be properly planned and well designed to avoid any loss to local green cover. It is recommended to establish the construction camps where minimum or no vegetation exists; - Similarly, the alternate routes for roads and points for camps are recommended	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	which available vegetation in nearby areas may get impacted.	where no loss of vegetation is expected; and The location of construction camp will be selected so, as to have limited environmental effect during construction phase and to reduce the cost and land requirement.			
11.	Fauna No threatened faunal species were recorded in the study area during the field survey. The habitat values for fauna in the study area are generally limited. However, movement and installations of machinery and vehicles during the construction phase will generate noise that will create nuisance for avi-fauna and domestic mammals. The habitats of avi-fauna and domestic mammals may also be affected due to construction camps set-up and due to cutting of trees.	- The engineering design to integrate the principles of green infrastructure including habitat conservation, animal trespasses etc.; - The sites for the construction camps will be carefully selected keeping in mind the available faunal habitats along the study area. Moreover, the layout of camps need to be designed while considering the faunal habitat of the area; - Prior to commencing any construction work, any works required outside the construction footprint verified will be referred to the Project Director for advice on further assessment and approval requirements so that damage to any available habitat over there could be avoided at maximum; and - Proponent will take NOC from the relevant department prior to construction phase if any ecological sensitivity reported on later or mature stage of the Project.	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
12.	Temporary Acquisition of Land The Contractors will require temporary land acquisition for: - The development of Contractor camps and facilities i.e. storage, workshops, equipment parking and washing areas; - Aggregate quarries; and - Access roads and transportation etc. The approximate area required for the establishment of one Contractor's camp facilities will be 1500m². Land utilization for Project activities and subsequent operation of Project may induce temporary as well as permanent changes in the existing land use pattern. Moreover, the contractor will provide the estimated quantity of excavation material during the construction phase.	It is the foremost option to establish the construction camps at the acquired land to eliminate the issues of land leased etc. however, if this option is not feasible than the land for above mentioned facilities should be selected and leased prior to the start of construction phase. Land for above mentioned facilities will be directly rented from the CAA by the Contractors. The provisions of the Land Acquisition Act (LAA), 1894 will not be involved as the acquisition of the land will be temporary and will be covered by short-term lease agreements between the CAA and Contractor. Rental terms should be negotiated to the satisfaction of the concerned and the agreement should be in local language to make the process clear. In addition, these project facilities should be located at a minimum distance of 500 meter from the existing settlements, built-up areas, archaeological and cultural monuments (if any) as the case may be. Prior to the commencement of the construction activities, the Contractor should submit a construction camp development/management plan to the Engineer-in-charge and the SEPA (if required)	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		for its scrutiny and approval. As far as possible, barren land i.e. areas not under agricultural or residential use and natural areas located at high elevation should be used for setting up the contractor camps.			
13.	Public Utilities Although at project site, no public utilities exist. However, during provision of these facilities for the proposed project, public utilities in the nearby areas may be affected that may cause inconvenience to the local residents and general public.	- All public utilities (e.g. electric lines, water pipes, power/ telephone lines, etc.) likely to be affected by the proposed project will be relocated well ahead of time before the actual commencement of the construction work. - Timely notification of disruption and minimizing time to relocate the utilities. - The provision in the design and budget for the relocation of the existing utility infrastructures wherever required shall be finalized in consultation with the concerned department; and - All public utilities (e.g. electric lines, water pipes, power/ telephone lines, etc.) likely to be affected by the proposed project will be relocated well ahead of time before the actual commencement of the construction work.	Confirmation of design incorporation. Audits and Checks	Design Consultant	Proponent
Construction Phase					
1.	Soil Erosion and Contamination Due to the proposed construction activities, soil erosion and contamination may occur.	The base of foundation excavation will be properly proof rolled before pouring lean concrete;	Visual observation and photographic record	Construction Contractor	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	Soil erosion may occur on Project site and at contractors' camps as a result of excavation of earth/cutting operations whereas contamination of soil may be caused by oil and chemical spills at asphalt plant sites, camp sites and temporary construction site office.	Stored excavated material will be covered and preferably reused; Prepare a plan for use and movement of construction vehicles within the area based on the nature of soil; Vehicles and equipment movement will be confined to dry areas with hardened soil; no vehicle and equipment will enter the damp areas and areas with soft soil; Do not drive or park machinery or vehicles within 10 feet of the edge of the excavation unless the banks are frequently inspected and confirmed to be stable; Sprinkling of water may help in reducing the erosion of soil; Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the guidelines for dump sites, and must be covered; If excavations have to be made very close to the existing foundation or roads/Structures, suitable excavation support system will be provided to stop any untoward incident. The Contractor will submit method statement for dewatering, excavations, their supporting etc. to Engineer for approval before taking up these works; During construction of foundation, the excavation will be inspected by an	Site restoration and rehabilitation plan implementation		



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		experienced Geotechnical Engineer before of pouring lean concrete; Confining excavations to the specified spots as per the approved engineering drawings and unnecessary excavations will be avoided; Excess spoil will be reused where possible and residual spoil can be disposed of at designated site to prevent erosion; Loss of topsoil can be avoided by stripping and storing topsoil prior to construction, then re-using it for green areas of the building; Mat / pile foundation will be used for transferring the loads of the proposed multi story building safely to the underlying soil stratum. However, spread foundation will be used for lightly loaded structures; Assure that proper sloping, benching, or shoring techniques are utilized in excavations of five feet or greater in depth; Use trench shields during trenching operations, when required; Review the impact loading near the trench to ensure that adequate bracing is in place; Oil separators will be installed at equipment or machinery washing yards to prevent soil contamination from oily water; Septic tanks of adequate capacities will be constructed for receiving and treating wastewater from all temporary worksite toilets			

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		and construction camps to avoid soil contamination; Regular inspection of the wastewater disposal from construction camps; Construction work will be scheduled to be completed before monsoon season to avoid the soil erosion through surface run-off; and Jute erosion protection mats can be applied in areas where erosion is noticed during inspections.			
2.	Deterioration of Ambient Air Quality Air quality will be affected by fugitive dust emissions from construction machinery. Construction activities and increased vehicular traffic (construction vehicles) would also contribute to the localized airborne dust. Exhausts from fossil fuel burning in the construction machinery will also deteriorate local air quality. Similarly, exhausts from generators can also have impacts on air quality in the vicinity.	All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions; Construction materials (sand, gravel, and rocks) and spoil materials will be transported through trucks covered with tarpaulins and all vehicles (e.g., trucks, equipment, and other vehicles that support construction works) will comply with the SEQS for carbon emissions and noise.	Visual observation Regular environmental monitoring, sampling and testing reports Vehicle maintenance records Water sprinkling records. Audit and Checks	Construction Contractor	Proponent
3.	Noise and Vibration The noise and vibration will be produced due to the operation of construction machinery and equipment. Sources of	Educational Institutions and government organizations in and around the area of influence of the proposed Project site will be notified earlier, before commencement of construction activities;	Physical observation Regular environmental monitoring, sampling and testing reports	Construction Contractor	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	noise and vibration during construction are heavy machinery such as bulldozers, excavators, concrete mixing plant, asphalt plants and other equipment's. The above machineries are expected to generate noise levels and vibration that may be severe in the Study Area. The likely impacts due to noise are: - Psychological effects of distraction of attention, irritation and short temperedness in the exposed persons due to persistently higher noise levels; and - Noisy settings and higher background levels can cause temporary threshold shift and the consequent habit of speaking loud, which may cause damage to vocal cords in the persons exposed.	Horns will not be used unless it is necessary to warn other road users or animals of the vehicle's approach; Earth retaining walls will be constructed to contain the vibrations; Contractors will comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures; Sensitize truck drivers to avoid hooting, especially when passing through sensitive areas such as mosques, churches, residential areas educational institutions and hospital buildings; Planting of buffer trees and shrubs in the proposed Project site, if possible; Heavy machinery like percussion hammers and pneumatic drills will not be used during the night without prior approval of the Client; and The plants and equipment used for construction will strictly conform to noise standards specified in the SEQS, 2016.	Vehicle maintenance records Audit and Checks		
4.	Water Quality Construction Site Runoff Runoff from the construction works area may contain increased loads of sediments,	Protection of water reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality; Water required for construction may be obtained in a sustainable way that the water	Visual observation and photographic record Audit and Checks	Construction Contractor	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	suspended solids and other contaminants. Potential sources of pollution from the site include: Runoff and erosion from exposed soil surfaces, earth work areas and stockpiles e.g. grouting and cement material with the rain; Wash water from dust suppression sprays; Fuel and lubricants from maintenance of construction vehicles and mechanical equipment; Spillage of liquids stored on-site such as oil, diesel, and solvents etc. are likely to result in water pollution; and Uncontrolled discharge of debris and rubbish such as packaging, construction material and refuse. Wastewater produced by On-Site Work Force The estimated Wastewater that would be generated from the workforce during the construction phase will be 19,200 gallons/day. However, wastewater can be adequately treated by septic tanks, which can be installed within the construction site.	availability and supply to nearby communities remain unaffected; Stockpiles of cement and other construction materials will be kept covered when not being used; Avoid stockpiling of earth fill especially during the intense rainfall events unless covered by tarpaulins or plastic sheets; Avoid fuel and other chemicals being stored at numerous locations around the site; Maintenance of vehicles and plant will be carried out only on impermeable areas where any oil spillages can be contained; Oils, fuel and chemicals must be stored at bonded fuel stores and mobile bonded stores; Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; Careful planning of the works to avoid soil excavation works during intense rainfall events; All kinds of waste will be stored in covered containers and disposed of safely as soon as possible; Regular water quality monitoring will be carried out as per SEQS, 2016 according to determined sampling schedule; Open washing of machinery and vehicles will be prohibited, sealed washing basins will be			



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	Construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating groundwater. There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater and channels carrying water.	provided and wastewater will be collected in sedimentation/retention pond; A licensed contractor will be responsible for appropriate disposal and maintenance of the septic tanks; No refueling, storage, servicing, or maintenance of equipment will be allowed within 150 feet of drainages or other sensitive environmental resources; and Sand and silt removal facilities such as sand traps, silt traps and sediment basins must be provided to remove the sand and silt particles from run-off. These facilities will be properly and regularly maintained. These facilities will be carefully planned to ensure that they would be installed at appropriate locations to capture all surface water generated on site.			
5.	Solid Waste Generation at Construction Camps Due to construction activities, municipal, construction and hazardous waste will be generated from construction activities and contractors' camps. Insecure and unhygienic disposal of municipal solid waste particularly garbage and trash may cause degradation of soil and land. Insecurely disposed of heaps of	The waste generated from the camp site will be disposed of at SSWMB approved sites; Burning of waste shall be prohibited; Proper labeling of waste containers, including the identification and quantity of the contents, hazard contact information will be carried out; Training of employees involved in the transportation of hazardous material regarding emergency procedures will be ensured; Waste pile will be controlled so that it does not spread and start to impede other activities,	Visual observation and photographic record. Waste Management plan implementation Audits and Checks	Construction Contractor	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	waste containing kitchen garbage and food waste from construction camps can serve as breeding grounds for the disease spreading vectors and rodents. Empty containers containing the toxic, flammable and corrosive materials may pose hazard to the workers. This may result in health risk to work force and public, if disposal site is improperly selected. Construction waste includes insulation, nails, electrical wiring, rebar, wood, plaster, scrap metal, paper bags, cement, and bricks. Improper dumping of waste may generate odor, soil and water pollution, and disease vectors.	and stays at a height that it does not become a safety hazard. Barricades may also be placed around the pile to delineate the safe distance for other workers; Residual and hazardous wastes such as oils, fuels, and lubricants will be disposed of via licensed third parties; Liquid waste, such as grey water, sewage, slurry and other wastewater will be collected from source by a designated tanker, and taken off-site for disposal at safe disposal facility; If the waste pile contains plastic, paper and other light-weight material it will be covered with a net, and tarpaulin or similar to stop waste from blowing around; If disposal is required, the site will be selected preferably from barren and infertile lands, and sites will be located away from residential areas, water bodies and any other sensitive land uses; Construction workers and supervisory staff will be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste; Waste disposal plan must be reviewed during the entire construction phase in the light of changing weather conditions;			

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		Construction waste such as waste wood can be recovered and recycled into wood for new building Projects, and cement, bricks, and plaster can be crushed and reused in other construction and building Projects.			
6.	Green House Gases and Climate Change The main sources of greenhouse gases (CO ₂ , CH ₄ , NO _x etc.) during the construction activities of the proposed project will include both mobile and stationary sources. The mobile source will be the construction and transportation vehicles while the stationary source will be the batching and asphalt plants.	Use construction machinery designed with suitable pollution abatement technology; In order to control NO ₂ emission at site, diesel engine equipment and machinery will be installed with catalytic converter, as it allows diesel engine to take advantage of the trade-off between NO ₂ , PM ₁₀ and fuel consumption, and calibrate the engine in a lower area of fuel consumption; Used and old electrical equipment will be banned that can also help to reduce urban emissions; Environmentally friendly fuel such as Liquefied Petroleum Gas (LPG) may be used instead of diesel; Burning of waste will be strictly prohibited at site; Awareness programs of causes and effects of climate change will be conducted for mitigating GHG emissions; and Use of solar panels at construction camp sites instead of diesel generators.	Regular environmental monitoring, sampling and testing reports Vehicle inspection record Plantation record Audits and Checks	Construction Contractor	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
7.	Resource Conservation The materials used in construction of proposed Project would include coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt, reinforcement and cement. 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. Fuel will be used to operate construction machinery and asphalt and batching plants. Sustainable use of energy resources is very important not only to continue future use but also to help to reduce air emissions. For conservation of energy, efficiency of the engines and burning processes is very important. The impact is moderate negative in nature.	Diesel and fuels with low sulphur content will be used to operate construction machinery and equipment's; The efficient and well-maintained equipment's and machinery will be used; The equipment's and machinery will be turned off when not in use; Regular maintenance of machinery to avoid fuel leakages; Reduction of wastage of water through training of workers involved in water use will be planned; Plan for reuse of construction waste materials may be formulated; A good camp design and an efficient worksite management plan will be prepared that may help the contractor to reduce the water demand, and wastewater and solid waste volumes to the lowest levels; and Use of solar panels at camp sites to conserve energy. The Resources Conservation Plan is attached as Annex-IV.	Visual observation and photographic record. Resource Conservation plan implementation Audits and Checks	Construction Contractor	Proponent
8.	Impact of Vehicles on Existing Road Network The plying and movement of heavy vehicles in and around the Project site may	Any vehicle with an open load carrying area used for transport of potentially dust producing materials will have properly fitted side and tailboards;	Vehicle maintenance record Training record Implementation of TMP	Construction Contractor	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	result in air pollution, noise pollution, damage to road surface and traffic congestion. During construction phase, the movement of heavy vehicles may cause traffic congestion issues on the Airport road and other access roads.	Materials having potential to produce dust shall not be loaded to a level higher than the side and tail boards and will be covered with clean tarpaulin in good condition; The Contractor will not use any vehicles either on or off road with grossly excessive noise pollution; Construction activities that might substantially disrupt traffic e.g. delivery of materials will not be performed during peak travel periods to the maximum extent practicable; Warning signs will be used as appropriate to provide notice of road hazards and other pertinent information to motorists and the general public; Schedule hauling of construction materials during off-peak hours; Establish speed limits especially in proximity to sensitive receptors and sensitize the truck drivers on speed limit; Vehicular access to and from hospital buildings and fire stations will be maintained through the use of steel road plates over open trenches; The Contractor will ensure that the diversion and detour is always maintained in running condition, particularly during the intense rainfall events to avoid disruption to traffic flow;	Regular visual observations		



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		At work site, public information and caution boards will be provided including contact for public complaints; and It is strongly recommended that the contractor will be responsible for the submission of a final Traffic Management Plan.			
9.	Flora Following impacts are also expected on the floral species in the surrounding of the Project area: - During the construction dust laden polluted air will form a dust film on leaves thus blocking sunshine and stomata consequently hindering photosynthesis processes causing detrimental effect on the plant health; - Exhaust of noxious gases from movement of heavy machinery will further pollute air, which will adversely affect the health and vigor of plants; - Establishment of contractors camps and warehouses for storage of equipment and material will involve clearing of shrubs and grasses from the area, causing a negative impact; and - During construction activities the contractor's workers may damage the	- Trees that will be cut down during construction of buildings should be replanted / transplanted wherever possible; - Incorporate technical design measures to minimize removal of trees, if possible; - Incorporate technical design measures to minimize removal of trees, if possible; - Cutting of trees and disturbance shall be avoided, as far as possible so, that negative effects on the process of natural regeneration of species are minimized; - A Tree Plantation Plan of 110 trees to be planted within the premises or around the project area. The plantation plan has been formulated (Annex-VI), which shall be implemented by the PSEB; - Due consideration shall be given to invasive/non-invasive species factor while plantation of trees; - Client shall involve the communities for carrying out plantation;	Tree compensation record Visual observations Regular monitoring, audit and checks	Construction Contractor	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	ornamental plants and trees, for use as fire-wood to fulfill the camps requirements. 11 trees are observed in the project area which might require cutting.	- To minimize the dust emissions, regular water sprinkling will be strictly followed; - Open fires will be banned in the study area to avoid fire hazards; - Clearing of vegetation cannot be avoided at the areas specified for Project structures, but damage to the natural vegetation shall be minimized by establishing camp sites, workshops and batching plants on waste/barren land rather than on productive land; - Construction vehicles, machinery and equipment will remain confined within their designated areas of movement; - The Contractor's staff and labor shall be strictly directed not to damage any vegetation such as trees or bushes; and - Contractor shall provide gas cylinders at the camps for cooking purposes and cutting of trees / bushes for fuel shall not be allowed.			
10.	Fauna During construction phase the existing population of mammals and reptiles of the construction areas will be affected due to disturbance arising from construction activities involving excavation, blasting, movement of machinery and vehicular	- Hunting, poaching and harassing of animals shall be strictly prohibited, and Contractor shall be required to instruct and supervise its labor force accordingly and clear orders shall be given in this regard; - The camps will be properly fenced and gated, to check the entry of birds and	Departmental consultation record Visual observations Regular monitoring, audit and checks	Construction Contractor	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	traffic, movement of labor, camping, etc. The existing livestock of the study area in quest of fodder will leave the directly affected areas due to construction activities and human intervention. Some reptiles particularly species of snakes and lizards may get killed during the earthworks operations. Moreover, the movements of the mammals and reptiles will be restricted during the construction phase. It is also worth mentioning that reptiles are almost absent in the area due to habitat conditions. Birds will also tend to move away from the construction areas and find shelter and food elsewhere due to the activities mentioned above for fear of being hunted / trapped. Cutting of trees may adversely affect their habitat as trees provide nesting and resting sites to them. Noise generated from construction machinery particularly during the night hours will even scare the wildlife residing in habitats located at some distance from the construction areas. Food and refuse at the Contractor's camps will attract animals that might in turn be hunted by the workers.	mammals in search of eatable goods. Similarly, wastes generated from camps will be properly disposed of, to prevent the chances of eating by animals, which may become hazardous to them; ▪ The contractor will make arrangements / measures to minimize vibration and noise pollution through good engineering practices; ▪ Noise control measures will be enforced during the construction phase such as provision of silencers on heavy construction vehicles especially near nesting areas and avoiding noise generating activities during the critical period of breeding; ▪ Efforts will be made to keep noise levels at acceptable levels (as per SEQS) produced by the construction activities; ▪ Over speeding of construction vehicles will be prohibited in the Project area, to avoid and minimize any accidental killing of birds, reptiles and mammals; ▪ Plantation of large number of trees along the proposed Project to regain the ecological habitat; ▪ Noisy work will not be carried out in night time so that there should be no disturbance to local birds and animals;			

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		- Borrow pits will be fenced so that no animal can fall into these; - If found any wild species during construction, it will be dealt carefully and local wildlife department officials will be called; and - The Project will be completed timely to reduce the impacts.			
11.	Discovery of Heritage Sites/ Structures during Excavation During excavation, there is a chance of finding artifacts. In case of finding any artifact, the contractor shall immediately report through Supervision Consultant to Directorate General (DG) of Archeological Department, Government of Sindh (GoS) to take further suitable action to preserve those antiques or sensitive remains.	Chance finds procedure (given in Annex-VII) shall be adopted in case of any accidental discover of cultural heritage.	Implementation of chance find procedure	Construction Contractor	Proponent
12.	Social/ Cultural Conflicts During the construction phase of the Project, conflicts may arise between labor force and local community. Use of local resources and products by the construction workers can generate stress on the local resources. Furthermore, difference in cultural values may also cause discomfort to local residents.	Local labor especially from nearby communities will be given preference for the construction works; and Careful planning and training of work force to minimize disturbance to the local people.	Visual observation and photographic record. Waste Management plan implementation Audits and Checks	Construction Contractor	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
13.	Health Impacts (Diseases) For the implementation of Project activities, skilled and unskilled labor is required by the contractor. Mostly, skilled and unskilled workers have been hired by the contractor on permanent and contract basics, belonging to different cultural backgrounds, which they utilize for different developmental Projects. In this case, occurrence of communicable diseases like HIV/AIDs, COVID-19, respiratory diseases, and skin and eye infections are communal to take place during the execution of the proposed Project. This impact is negative and medium in nature.	Proper checkup of skilled and unskilled workers before their hiring; Labour camp will be away from the hospital buildings and workers' management plan will be formulated by Contractor to minimize the adverse impacts on local communities and workers; Trainings, awareness and campaigns will be conducted for workers and surrounding communities on awareness and prevention of HIV/AIDs and COVID-19; Workers will be educated for personal hygiene and the sanitation concerns, leading to communicable and non-communicable diseases; Water will not be allowed to stagnate even if clean, and measures will be taken to cover the area; and Insecticides will be periodically sprayed.	Visual observation and photographic record. Waste Management plan implementation Audits and Checks	Construction Contractor	Proponent
14.	Occupational Health and Safety Occupational Health and Safety (OHS) related impacts will arise during construction phase activities including clearing of earth, levelling, compaction, carpeting, pavement finishing and testing & commissioning. Eye injury can be caused by stone or metal particles. Hazard of being hit by falling objects, major hand-arm and	Training of workers in construction safety procedures, environmental awareness, equipping all construction workers with safety boots, helmets, gloves and protective masks, goggles, shields and monitoring their proper and sustained usage; Contractor will ensure the provision of medicines, first aid kits, ambulance etc. at the camp site;	Implementation of HSE Plan Use of PPEs Training Records Work permits Implementation of Emergency response plan and disaster management plan in	Construction Contractor	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	whole body vibration hazards, skin and respiratory tract irritation from exposure to cement dust, overexertion and awkward postures etc. will be another impact.	Work areas will be cordoned off where necessary; Contractors will instruct their staff to use Personnel Protective Equipment (PPE) (e.g., wire containment, displaying warning signs along the work site, communicating advance warnings to mats) to enhance the safety.	case of natural disaster occurrence		
15.	Community Health and Safety The construction activities and vehicular movement at construction sites may result in roadside accidents particularly inflicting local communities who are not familiar with presence of heavy equipment. The proposed project will also have potential of air (dust pollution), noise and vibrational impacts on nearby community	Providing basic medical training to specified work staff and basic medical service and supplies to workers; There will be proper control on construction activities and oil spillage leakage of vehicles; Seeking cooperation with local educational facilities (school teachers) at each village along the route for road safety campaigns; and Provision of proper safety and diversion signage, particularly at urban areas and at sensitive/accident-prone spots.	Implementation of HSE Plan Use of PPEs Community concerns record Medical reports of worker	Construction Contractor	Proponent
16.	Natural and Man-Made Disasters Natural disasters (earthquakes) and accidents such as fire, falls, slips and trips may result in injuries, financial losses and may even lead to deaths.	An Emergency Response Plan (ERP) for earthquakes and manmade disasters will be developed by contractor in coordination with SC and IT Park will be implemented in close consultation with the RESCUE Services and other concerned departments; Minor incidents and near misses will be reported, and preventive measures will be formulated accordingly by the IT Park.	Trainings, drills, record keeping ERP implementation Visual observation and photographic record. Audits and Checks	Construction Contractor	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
17.	Labor Influx For the implementation of Project activities, skilled and unskilled labor is required by the contractor. Mostly, skilled and unskilled workers have been associated with the contractor since long which they utilize, where they are required for the projects, and while other workers are hired from the different areas that belong to different cultural backgrounds. Social problems and conflicts that are associated with Labor Influx are as follows: Risk of social conflict: Increased risk of illegitimate behavior and crime: Impacts on community dynamics: Increased burden on and competition for public service provision: Increased risk of communicable diseases and burden on local health services: Local inflation of prices, accommodations and rents: Increase in traffic and related accidents:	Suggested mitigation measures for smooth execution of construction activities include: Labor camp(s) will be established away from residential population; Preference will be given to the local people to work with contractor, and contractor should hire maximum labor force from the Project Area because this will reduce the labor influx; Awareness will be created among the work force to ensure respect for local customs; Construction work should be completed within the stipulated time to move workers to next location; Labor force will be shuffled with the time; An effective GRM will be established for the Project to resolve all issues related to the community. Thus, progress regarding resolving the issues should be monitored closely; Create awareness among workers on proper sanitation and hygiene practices to endorse proper health and maintain good housekeeping practices at all Project sites; Provide adequate personal hygiene facilities in good condition with adequate supply of clean water;	Trainings, Consultations and Grievance Record Audits and Checks	Construction Contractor	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		Make arrangements to treat the affected workers on time to control the movement of vector borne diseases; Sensitize workers and surrounding communities on awareness and prevention of COVID-19, HIV/AIDS and sexually transmitted infections (STI) through training, awareness campaigns and workshops during community meetings; Provide proper and free COVID-19, HIV/AIDS and STI health screening and counseling for site workers and community members; Develop and enforce a strict code of conduct for workers to regulate behavior in the local communities; Taking all sensible precautions to avert illicit, vicious conduct by or amongst the Contractor's personnel, and to preserve unity and harmony, and protection of people and property on and near the sites; Prohibiting drugs, alcohol, weapons, and ammunition on the worksite among personnel; Site security preparations must be contained within the Bills of Quantities (BoQs) to avoid any delays which might be caused due to insecurity; Appropriate fencing, security check points, gates and security guards should be provided			



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				Implementation	Monitoring
		at the construction sites to ensure the security of all plant, equipment, machinery and materials, as well as to secure the safety of site staff; and The Contractor must guarantee that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft.			
18.	Gender Based Violence and Child Labor Construction workers are predominantly younger males. Those who are away from home on the construction job are typically separated from their family and act outside their normal sphere of social control. This can lead to inappropriate and criminal behavior, such as sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors from the local community. A large influx of male labor may also lead to an increase in human trafficking whereby women and girls are forced into sex work. Child labor and school dropout: Increased opportunities for the host community to sell goods and services to the incoming workers can lead to child labor to produce and deliver these goods and services,	The Contractor will be required to provide qualified key personnel to address the specific risks identified in the project. Contractors will specify key staff with the technical skill and experience to implement the mitigation measures; The bidding documents will include specific requirements that minimize the use of expatriate workers and encourage hiring of local workers, thereby minimizing labor influx; The bidders will be required to submit Codes of Conduct (CoCs) with their bids. The CoCs will set clear boundaries for acceptable and unacceptable behaviours of all individuals and companies and will be signed by companies, managers and individuals; All project consulting firms will also be required to submit Codes of Conduct with their proposals;	Trainings, Consultations and Grievance Record Audits and Checks	Construction Contractor	Proponent

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	which in turn can lead to enhanced school dropout. There are two basic conventions on child labor adopted by the ILO, and one adopted by the United Nations. The ILO Minimum Age Convention, 1973 (No. 138) and its accompanying Recommendation (No. 146) set the goal of elimination of child labor, and the basic minimum age for employment or work (in developing countries at 14 years of age or the end of compulsory schooling, whichever is higher; and 15 or the end of compulsory schooling for developed countries). The Convention sets a minimum age of 2 years younger for "light work," i.e., 12 and 13 years, respectively; and a higher minimum age for dangerous or hazardous work (basically 18 years of age, but 16 in certain circumstances). The Convention also has various other flexibility clauses. Inhabitants of the project area have mix economic background and different sources of income. Children of low income groups mostly involve in different earning activities, as their parents prefer to get their children hired in small shops as helpers, and waiters in hotels for earning money,	The contractor will be required to establish anti-sexual harassment policies that governs conduct in the workplace; The contractor will be required to provide mandatory and repeated training to workers on sexual exploitation and abuse and HIV/AIDS prevention and on the content and obligations derived from the code of conduct; and Provisions will be set in contracts for dedicated payments to contractors for SEA prevention activities (e.g. training) against evidence of completion. The portion of the contract price will be guaranteed by a performance security linked to environmental and social contractor performance.			



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				Implementation	Monitoring
	and supporting household livelihoods. However, The Sindh Prohibition of Employment of Child Act, 2017 prohibits the employment of child and restrict the employment of adolescents in certain occupations and processes such as construction industry, and whoever employs or permits a child (person under the age of 15 years) to work in an establishment shall be liable to punishment with imprisonment. The child labor impact might arise during construction stage, as large number of skilled and unskilled labor will be required by the contractor for the construction activities of the proposed Project.				
O&M Phase					
1.	Topography and Landscape changes After the completion of the proposed Project, the overall environmental conditions of the Project area will greatly improve due to elimination of stagnant waste water, plantation of trees and ornamental plants around the proposed Project building and excess road, and exclusion of construction camps.	Proper implementation of the tree plantation plan will improve landscape of the project area.	Monitoring of plant maintenance activities records	Proponent	



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
2.	Ambient Air Quality During operation phase, operation of stand-by generator and un-necessary idling of diesel run engine of vehicular traffic will result in the emission of pollutants (CO, Smoke, NOx, SOx CO2 & PM2.5, PM10) into the air, thus deteriorating air quality. These emissions may adversely affect the health of staff working/residing in the proposed building.	To mitigate the pollutants emissions, use of low sulfur fuel will be ensured; Strict prohibition on re-used fuel; Location of generators will be carefully selected; Plantation of trees along the generators to create a buffer zone that will help in absorbing the emissions; Use of gas generators (if possible) will be preferred for low emissions; Use of solar panels (renewable energy source) for running generators, as it will save the energy; The height of the generator stacks will be high enough to disperse the emissions in the air; Provision of budget for regular monitoring of ambient air quality in accordance with SEQS, 2016; Ensure cleaning of ducts, filters, and other components of HVAC, replacing filters, and measuring energy use and comfort. Performance measurements will be done monthly or at least quarterly, to provide operators with enough data to tell when systems are beginning to perform poorly; HVAC control systems are often run by programmable thermostats that schedule heating and cooling for different times of day and days of the week. Such schedules will be	Visual observation Regular environmental monitoring, sampling and testing reports Vehicle maintenance records	Proponent	



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		set to match the occupancy and activity schedules of different spaces. Sensors for HVAC controls, such as temperature and humidity sensors, or occupancy sensors, will be regularly checked for proper operation; A boiler of HVAC system must be adequately maintained to operate properly. However, it is particularly important that combustion equipment operate properly to avoid hazardous conditions such as explosions or carbon monoxide leaks, as well as to provide good energy efficiency; Un-necessary running of vehicle engines inside the Project site will be banned and strictly monitored; and Provision of budget for regular monitoring of ambient air quality in accordance with SEQS, 2016.			
3.	Indoor Air Quality (IAQ) Good IAQ in buildings is an important component of a healthy indoor environment. It contributes to a favorable and productive environment for building occupants, giving them a sense of comfort, health, and well-being.	Inspect and assess the building envelope, including the roof, walls and foundation and promptly respond to identified problems. Routinely check the building for water leaks, seals around doors and windows, and any visible damp or moist parts of the building. Clean and dry any damp or wet building materials and furnishings within 24 to 48 hours after detection to prevent the growth of mold;	Visual observation Regular environmental monitoring, sampling and testing reports Record keeping	Proponent	



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		Ensure and validate that the building is maintained under a slight positive pressure (i.e., air comes out of the building when exterior doors are opened); IAQ will be monitored on regular basis for parameters like CO, CO ₂ , NO ₂ , VOCs, etc.; and Ensure that good housekeeping practices are being applied in the proposed university.			
4.	Noise and Vibration The operation of generators and movement of vehicles (staff and visitor vehicles) on main road near the Project site may create noise and vibration issues in the proposed building.	Use of horn will not be allowed around the premises; Trees will be planted along the boundary of proposed Project as a noise barrier; Employees working close to generators for extended periods will be encouraged to wear ear protection; To reduce the noise produced from loose vibrating parts all the noisy equipment's will be maintained and tuned periodically; and In the building, proper insulation will be provided to absorb the ambient noise.	Physical observation Regular environmental monitoring, sampling and testing reports Vehicle maintenance records	Proponent	
5.	Drinking water contamination Water pollution can originate at the internal water network. If the pipes and the underground water storage tanks are not cleaned properly, they may lead to bacteriological contamination of the potable/drinking water and thus will lead to	Water storage tanks will be cleaned and disinfected on regular basis; The water taps will be regularly checked for any leakage; It will be made sure that all faucets and circulating pumps etc. do not leak and are regularly maintained;	Regular monitoring, sampling and testing Regular monitoring, audit and checks	Proponent	



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
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	infectious diseases/health problems to the staff and visitors. Pollution from adjoining wastewater network takes two forms: bacterial and chemical. Bacterial pollution, although a direct health hazard, is usually quickly rendered harmless by natural processes in the soil and eventually in the ground water. Chemical pollution is predominantly nitrogenous, and increases the level of nitrates in the ground water. It is more potential harmful than bacterial pollution because it lasts longer, travels further and is more difficult to remove.	If possible, water dispensers will be used in the proposed building; Leakage or dripping faucet, pump or toilet will be immediately reported; Utility bills will be kept in track for the consumption of water; Water-saving equipment such as low-flow shower heads, sinks with auto-shutoff mechanisms, and water-saving toilets and urinals may be used; An effective training program about water conservation will be established for the concerned personnel's of PSEB; and Water quality monitoring will be conducted on quarterly basis and the quality will be maintained according to SEQs, 2016 for Drinking Water.			
6.	Wastewater Generation The estimated Wastewater that would be generated during the operational phase of the building will be 93,545 gallons/day. Uncontrolled sewage discharge from the proposed building may create water contamination and associated health risks in the surrounding area. Any bursting or choking of internal sewer may cause adverse impact such as foul smell, unhygienic waterlogged condition and	The wastewater will be treated in septic tanks before disposal into the existing sewerage network of CAA. There are four (04) septic tanks proposed in the project design (as shown in Figure 7.1); Regular maintenance checks shall be carried out to check any bursting or choking of internal sewer; and The drainage and sanitation system shall be maintained in a sanitary and safe operating condition and all the drains and septic tanks	Implementation of WMP Regular monitoring, sampling and testing Regular monitoring, audit and checks	Proponent	



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	health related impact on the live-in population.	should be cleaned periodically by the management.			
7.	Solid Waste Generation Municipal waste including papers, tissue papers, packaging papers, kitchen waste and bottles etc. will be generated during operation phase of the proposed Project. The solid waste generation during the operation phase of the proposed project is estimated to be 616 kg/day. Improper storage and dumping of waste may pollute soil, sewerage pipes and groundwater. It may also affect the aesthetics and can cause health problems to the staff and workers handling waste.	Waste collection bins will be provided inside and outside the buildings at suitable locations for collection of daily generated municipal waste; Assign color to collection bins according to the international standards; Recyclable wastes such as newspaper, cardboard, plastics, glass and metals could be separated for individual collection. Single stream collections may be more cost effective as the recyclables can be cheaper to collect and will reduce the volume of a costlier co-mingled dry recyclable collection; Waste minimization will be encouraged and regular training be provided to solid waste management staff in correct identification and disposal of waste; Storage areas will be cleaned regularly to minimize odor, pests and nuisances and preserve visual amenity.	Implementation of WMP Regular monitoring, sampling and testing Regular monitoring, audit and checks	Proponent	
8.	Fire and Explosions Hazard Improper handling and storage of chemicals, and constructed electric installations can lead to fire and explosion that may in turn cause injury and possible death of a worker. Welding or cutting torch	Routine inspection will be carried out to check that the area around the generator is free of clutter and no flammable material is present; Standard fire and smoke detection and protection devices such as fire alarms, fire hoses and hydrants will be provided in all critical areas of the proposed Project building;	Regular monitoring, sampling and testing Regular monitoring, audit and checks	Proponent	

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	on or near drum (even empty) will never be used because product (even just residue) can ignite explosively. Fuel or oil spills around the generator and presence of combustible materials may pose a risk of a fire explosion.	Appropriate fire safety equipment will be installed at convenient locations within the building; Equipment will be regularly examined and maintained by a reputable fire safety and security company; Fire drills will be conducted at least biannually to ensure that workers are familiar with the action to take in the event of fire or explosions; Fire awareness materials will be placed in strategic locations within the plant to educate the staff and visitors on what to do in the event of fire; “No smoking signs and policy” will be displayed, as appropriate and actions to be taken against those not adhering to this order; and Fire safety management will be prepared and implemented by PSEB.			
9.	Traffic Management During operation phase, the project will experience an upsurge in visitors and staff. This means an increased number of vehicles accessing the facility. This in turn may have undesirable effect on traffic flow within the area.	The management of the project will prepare, implement and monitor traffic management plan to avoid traffic congestions in and around the project buildings; and Liaison with the local traffic police department on the roads, surrounding the project for continuous flow of traffic.	Vehicle maintenance record Training record Implementation of TMP Regular visual observations	Proponent	
10.	Occupational Health and Safety (OHS) Considerations	Operation and maintenance of machinery and equipment shall be controlled and handled by	Visual observation Record keeping	Proponent	



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	During the operation phase, health and safety issues may arise. Operation and maintenance of the building may cause safety risks to staff (electrical and mechanical staff, solid waste management staff and maintenance staff), that may include injuries due to electric shocks, arc flash and arc blast, slipping and falling, poor handling and storage of hazardous substances and during handling of the solid waste	efficient management, staff training, and other preventive measures; Provide fall protection for all maintenance personnel especially for roof-mounted equipment such as HVAC equipment and cooling towers; Proper storage and handling of generator fuel, laboratory chemical and solvents; Emergency Response Plan will be implemented; Emergency numbers will be clearly posted and communicated to the staff; Fire extinguishing equipment will be installed in the building; Provision of PPE's to the skilled and unskilled labors including masks, gloves, safety jackets and ear muffs; Necessary health and safety rules will be enforced by the PSEB; Proper training will be given to workers on health and safety measures; Fumigation will be done in building periodically; Hazardous materials will be well labeled and stored in their original containers; Material Safety Data Sheets (MSDS) will be available and readily accessible to lab attendants;			



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		Clear signage will be posted alerting of possible danger at locations where dangerous and hazardous materials are present; Workers will also be inoculated against infectious diseases and kept under regular medical checkup; and During maintenance of power supply, ensure that the live wire work is conducted by trained workers with strict adherence to specific safety and insulation standards (Pakistan Electric and telecommunication Safety Code-PETSAC-2014). COVID-19 SOPs must be fully adopted by the PSEB in accordance with the WHO and GoP guidelines.			
11.	Flora and Fauna No adverse impacts are envisaged on flora and fauna of the study area during the operation phase. There is no protected area, game reserve, game sanctuary and national park in and around the Project area so no major impact on wildlife and livestock is expected through noise, vibration and any type of normal activity in the Project area.	• The implementation of plantation plan recommended in compensation for cutting of trees will start working during operational phase, to ensure the ecological balance and to avoid any impact on local environment; • Large scale planting with suitable indigenous fruit and forest trees, shrubs and ornamental plants in the form of Trees. Linear plantation will be carried out in accordance with the Tree Plantation Plan to improve aesthetic value and offset the effect of removal of vegetation. It will help in absorbing			

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
	Flora comprising 130 trees and ornamental plants will be planted in and around the project area during the construction phase to enhance the aesthetics value, and to control noise and air pollution. It will provide the following benefits during operation phase: - Creates a visual barrier and enhances the appearance of the area; - Providing nesting place for the birds; - Captures and reduces odor concentrations by absorbing gases, if any emits from nearby nullah; - Trees will act as wind speeds barrier to protect building structures during intense wind storms and intense rainfall. However, mismanagement of green areas will result in clogging of drains, nuisance due to stagnant water and chemical pollution.	flue gases, emitting from a large number of vehicles and public transport passing through the project area, which shall improve the air quality; - The saplings planted in the Project Area against the trees affected should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients by relevant department; - Maintenance of the green areas and the protection of saplings for at least five (04) years to ensure better growth and environmental / aesthetics conditions; - Keep green areas weed free. Weeds will be monitored weekly and removed no less than every two weeks. Use of chemicals for weed control and suppression needs to be approved by the concerned authorities; - Plantations raised must be maintained according to the silvicultural practices which includes proper irrigation, cleaning, pruning, thinning at prescribed intensity, silt clearance and trench-opening; and - Use of fertilizers will be strictly			



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Methods	Responsibility	
				Implementation	Monitoring
		monitored in order to avoid any incident. Natural nutrients will be preferred.			

8.9 ENVIRONMENTAL MONITORING PLAN

Environmental monitoring provides timely and useful information to the project management and implementation agencies. Conceptually, “monitoring” means to check and balance, on a regular basis, the status of the project activities and realization of various developmental targets during construction, operation and maintenance. It helps in timely identification/analysis and removal of the bottlenecks and expedites actions. Certain environmental parameters (physical, ecological and social) are selected and quantitative analysis is carried out. The results of analysis are compared with the guidelines; standards and pre-project condition to investigate whether the EMMP and its implementation are effective for the mitigation of impacts or not. The objectives of environmental monitoring plan during the construction and O&M phases will be as follows:

- Monitor the actual project impacts on physical, ecological and socio-economic receptors;
- Recommend mitigation measures for any unforeseen impact or where the impact level exceeds the anticipated level in the EIA;
- Ensure compliance with legal and community obligations including safety during construction and O&M phases;
- Ensure the safe disposal of excess construction materials, solid waste, water and wastewater and gaseous emissions;
- Appraise the adequacy of the EIA with respect to the project’s predicted long-term impacts on the area’s physical, ecological and socio-economic environment;
- Evaluate the effectiveness of the mitigation measures proposed in the EMMP and recommend improvements in EMMP, if required; and
- Compile periodic incidents/accidents data to support analyses that will help to minimize future risks.

8.9.1 Monitoring Strategy

Under the proposed monitoring strategy, it is recommended that contractor will be responsible for all the monitoring activities. All the findings and results in the form of monitoring report will be finally shared with SEPA. The monitoring program has been designed carefully considering the identified impacts mentioned in **Section-7** and some additions or deletions probably in frequency may be taken up in this program after learning lessons from one-year operation of the Project through Change Record Register. **Table 8.3** provides environmental monitoring schedule for construction and operations stages of the proposed Project.

Table 8.3: Environmental Monitoring Plan

Sr. No.	Receptor	Monitoring Parameters / Performance Indicator	Locations	Monitoring Mechanism	Monitoring and Reporting Frequency
1	Water Resources/ Water Quality	Compliance with all parameters as per SEQS.	Proposed Project. – Water Source. Other proposed effluent discharge points are: – Contractors camps – Concrete preparation plants – Fuel (Petrol. Oil and Grease) products storages. – Vehicle and machines repairing and servicing yards.	Visual checks of laboratory activities Discrete grab sampling and laboratory testing of water samples by SEPA approved Laboratory for monitoring.	Once before the start of construction activity On monthly / quarterly basis as per NOC requirements during the construction Bi-annually for at least one year during O&M.
2	Soil Contamination	Soil contamination, uncontrolled solid waste disposal activities at sites.	Proposed Project. – Sites with severe contamination. Other proposed sampling sites are: – Construction Camp. – Equipment washing yards. – Spillage points of fuel, chemicals and lubricants.	Visual observations and checks of laboratory activities Sampling and laboratory testing for soil samples.	Once before the start of construction activity On monthly / quarterly basis as per NOC requirements during the construction Bi-annually for at least one year during O&M.
4	Dust Emissions	Compliance with PM ₁₀ PM _{2.5} per SEQS	Proposed Project. – Sensitive receptors within the AOI. About two sampling points are recommended which will be verified during construction stage.	Visual checks of laboratory activities Onsite Ambient Air Monitoring equipment	Once before the start of construction activity On monthly / quarterly basis as per NOC requirements during the construction Bi-annually for at least one year during O&M.
5	Noise Pollution	Compliance with dBA Leq. as per SEQS	Proposed Project. – Sensitive receptors within the AOI. About two sampling points are recommended which will be verified during construction stage. Other proposed sampling sites are: – Construction camps.	Visual checks of laboratory activities Monitoring of noise level at site.	Once before the start of construction activity On monthly / quarterly basis as per NOC requirements during the construction Bi-annually for at least one year during O&M.

Sr. No.	Receptor	Monitoring Parameters / Performance Indicator	Locations	Monitoring Mechanism	Monitoring and Reporting Frequency
			– Equipment yards.		
6	Fumes and Gases	Monitoring of CO, CO ₂ , SO _x , NO _x , HC and PM _{2.5} PM ₁₀ and compliance with SEQS Vehicular emissions as per SEQS	Proposed Project. – Major receptors within the AOI. About two sampling points are recommended which will be verified during construction stage. – Emissions from the silencers of heavy machinery, trucks and other vehicles.	Visual checks of laboratory activities Onsite monitoring of ambient air quality will be preferred.	Once before the start of construction activity On monthly / quarterly basis as per NOC requirements during the construction Bi-annually for at least one year during O&M.
7	Ecological Resources	Disturbance to natural habitat, uncontrolled floral cutting which can be avoidable. Implementation of Plantation Plan Fauna and avifauna rehabilitation program	Proposed Project. – Within the AOI.	Visual checks to ensure that only marked trees are cut within the Project corridor. Monitoring of animals / birds hunting.	Once prior to the start of construction Monitoring and reporting on monthly basis during the construction stage. Bi-annual monitoring and reporting during the operation stage.

8.10 MANAGEMENT PLANS

Various management plans have been prepared as a part of EMMP for the better management and implementation of EMMP during all phases of the proposed Project. However, these plans will be updated by Contractor and approval from SC will be sought before start of construction activities. These plans are listed below:

- Tree Plantation Plan;
- HSE Management Plan;
- Emergency Preparedness and Response Framework;
- Waste Management Plan;
- Traffic Management Plan;
- Change Management Plan;
- Sanitation Plan; and
- Resource Conservation Plan

8.10.1 Tree Plantation Plan

As an Environmental enhancement measure, 110 trees will be planted. These plants can be raised within or nearby the project vicinity under the supervision of PSEB at later stage, to improve the ecology and aesthetic beauty of the area. These plants can be raised in area at an average 10'x10' rate of spacing while technically observing site quality and capacity in the light of plantation objectives. Total cost on this particular plantation in the project area is approximately **212,520/- PKR**. A comprehensive tree plantation plan for proposed Project is provided as **Annex-VI**.

8.10.2 HSE Management Plan

Health risks and work safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment due to storage, handling and transport of hazardous construction material. Workers will be provided with safe and healthy working environment taking into account risks inherent to the particular sector and specific classes of hazards in Project Area. During construction phase, Contractor will be responsible for all HSE related issues and to comply with national laws and international standards for occupational health and safety. The ultimate goal of the plan is to eliminate any injury to human and damage to facilities, materials and the environment. The Guideline HSE Plan is attached as **Annex-IX**.

The following measures are identified for health, safety, and environment protection during all activities of the proposed Project to minimize risk of accidents, which could endanger the life of personnel, cause damage to properties and environment:

- All contractor staff shall be well informed and trained on the HSE policies and guidelines;
- Contractor shall provide adequate health services as well as site first aid services for its workforce;
- The main priority of the contractor shall be to prevent accidents during mobilization, construction phase of the proposed Project. Prevention of workplace accidents during the construction activities will be achieved using approved work plan/instructions by the supervisors;

- Work safety measures and good workmanship practices shall be followed by the contractor to ensure no health risks for workers;
- Provision of adequate sanitation, washing, cooking and dormitory facilities;
- Proper maintenance of facilities for workers shall be monitored;
- Provision of protective clothing for labour handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, etc. and contractor will ensure strict use of wearing these protective clothing during work activities;
- Elaboration of a contingency planning by the contractor at work site in case of major accidents shall be carried out. A comprehensive emergency preparedness and response plan will be developed and implemented at site;
- A site-specific fire-fighting plan also needs to be developed and implemented by Contractor during construction phase;
- Accidents shall be reported to and investigated by the Contractor. All personnel shall be encouraged to report all accidents/incidents and to cooperate in the investigation of such occurrence. A comprehensive accident/incident report will be produced for review and necessary action;
- Adequate signage, lightning devices, barriers, and persons with flags during construction to manage traffic at haulage and access roads shall be conducted;
- The communicable disease of most concern during construction phase, like sexually-transmitted diseases such as HIV/AIDS, will be prevented by successful initiative typically involving health awareness, education initiatives, training health workers in disease treatment, immunization program and providing health service;
- Reducing the impacts of vector borne diseases on long-term health effect of workers will be accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease;
- All construction activities shall be properly managed through careful planning and the applicable and relevant HSE policies; and
- Prior approval from supervision consultant will be sought before starting any construction related activity.

8.10.3 Emergency Preparedness and Response Framework

The framework provides an overview of the procedures to mitigate and control the impacts on community, on occupational health and safety, on the environment and on the Project in the event of emergency situations and to respond in life threatening situations usually occurring suddenly and unexpectedly during the construction and operational phases of the proposed project. This framework applies to all the processes of emergency responses to accidental calamities that can occur in an office, construction area and living area as well as first aids and emergency responses as per actual environmental situations during construction. This framework also provides a general reference and a basis for a detailed sub-plans and procedures that have to be developed by the Contractor before the initiation of the construction of the project and will be approved by the proponent. The Guideline Emergency Preparedness and Response Plan is attached as **Annex-X**. The framework needs to be developed with following objectives:

- Outline the applicable standards with regards to emergency preparedness and response;

- Define the emergency preparedness and response procedures utilized during the construction phase;
- Define persons and departments involved in emergency preparedness and their roles and responsibilities; and
- Define training requirements.

Various categories of risks can be envisaged in a working or construction environment. The response to each hazard will be different. A few types of emergencies/accidents will include the following:

- Natural risk: earthquake, flood, and other natural disaster;
- Political risk: civil strife, upheaval, riot, kidnap, and terrorist attack;
- Construction: fire, traffic accident, falling, hit and electric shock;
- Public health: dengue fever, malaria, food sanitation, high-temperature operation, insect sting, and
- Security: injury and property loss resulted from theft, robbery, and law case.

To minimize human suffering and financial losses, all personnel must know their responsibilities under the emergency preparedness and response plan. The plan will be used to set emergency procedures, implement and communicate the procedures and ensure that any required training has been completed. Planning for emergencies will include the following points:

- Hazard identification/assessment;
- Emergency resources;
- Communication systems;
- Administration of the plan;
- Emergency response procedure;
- Communication of the procedure; and
- Debriefing and post-traumatic stress procedure.

8.10.4 Waste Management Plan

Management of solid and hazardous waste is one of the most important issues during construction phase of the Project. It is estimated that around 250 workers will be accommodated in the construction camp during construction phase, who will utilize water for washing, cooking and bathing purposes. That will generate sewage at the construction camps. In addition to that construction camp will generate solid waste at site. Similarly, a considerable amount of solid waste will be generated during the operation phase of the proposed Project.

The major components of the workers' camp waste are garbage, putrescible waste, rubbish and small portion of ashes and residues, wastewater from camps toilets and washing yards, etc. The construction waste will include wastewater, oil spillage from machinery and solid waste (damaged or spoiled materials, temporary and expendable construction materials, etc.). Insecure and unhygienic disposal of the wastes may cause degradation of soil, land and water resources. However, a criterion has been developed for the solid and hazardous waste management at site. The criterion is as follows:

- All the anticipated solid wastes will be collected through a properly designed solid waste management system. Enough number of containers will be placed inside the camps and within the construction area for the collection of various types of waste;
- These containers will help the component separation of various types of waste at source. Classification will be based on organic waste, recyclable waste, reusable waste (for resource and recovery) and waste for disposal site. Based on the conditions of the region, organic waste will be frequently collected to avoid odor problems;
- Recyclable, reusable and waste for disposal site will be collected twice a week and on alternate days and will be transferred to a properly designed disposal site;
- The sewage system for camps shall be properly designed (with provisions of septic tanks) to receive all sanitary wastewaters;
- Lined wash areas shall be constructed within the camp site or at site, for the receipt of wash waters from construction machinery;
- Medical waste and construction waste will be handled with care.;
- Construction waste i.e. waste concrete, bricks, cement, etc. will be disposed of at the designated areas; and
- Construction workers and supervisory staff will be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste for disposal.

8.10.5 Traffic Management Plan

A comprehensive traffic management plan will be developed by Contractor mentioning routes to be followed for transportation of construction machinery and materials e.g. cement, steel, gravels, sand, etc. Traffic management plan will comprise following contents necessarily:

- Goals and objectives of plan;
- Purpose & Scope;
- Project specific traffic;
- Roles & responsibilities of contractors' environmental personnel;
- Routes to be followed along with necessary maps;
- Transportation timing; and
- Mechanism to address road accidents (if occurs).

The Guideline Traffic Management Plan is attached as **Annex-V**.

8.10.6 Change Management Plan

The EIA and EMMP have been prepared at feasibility phase of the proposed Project. Both are living documents and it has been foreseen that during the detailed design phase the documents may be updated and the EMMP has to be refined. The EMMP will be refined in the light of updated results of ambient air quality, noise, drinking water and surface water/wastewater. It will further be updated in the light of possible adverse environmental impacts and if necessary then any additional mitigation and enhancement measures will also be added to the EMMP. Any sort of change in EMMP has to be informed to all concerned personnel/departments.

8.11 CHANCE FIND PROCEDURE

In case of any chance find, the Contractor will immediately report through SC to Archaeology Department, Karachi and take further suitable action to preserve those antiques or sensitive remains. Representative of the Director will visit the site and observe the significance of the antique, artifact and cultural (religious) properties and significance of the Project. The report will be prepared by representative and will be given to the Director. 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 will be adopted by construction 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 Archaeological Department, Karachi;
- The suggestion of the local communities and the concerned authorities will be incorporated during taking the preventive measures to conserve the antique, artefact 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; and
- After stopping work, the Contractor must immediately report the discovery to the SC.

8.12 GRIEVANCE REDRESSAL MECHANISM

In order to receive and facilitate the resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance, an Environmental Grievance Redressal Mechanism (GRM) will be established for the proposed Project. The GRM will address affected people's concerns and complaints proactively and promptly, using an understandable and transparent process that is gender responsive, culturally appropriate and readily accessible to all segments of the affected people at no costs and without retribution.

The SC will facilitate the PMU for the establishment of a Grievance Redress Committee (GRC) at project location prior to the Contractor's mobilization to site. The functions of the GRC are to address the concerns and grievances of the local communities and affected parties as necessary. A complaint register will be maintained at workers' camp on routine basis. The complaint register will contain minimum of the following information:

- Name and address of complainant;
- Complaint description;
- Action taken/recommended;
- Name of responsible person;
- Status of resolution of complaints; and
- Other necessary information/record and reasons in case issue not resolved.

8.13 EMP COST

Implementation of the recommendations of the EIA during the construction phase is the sole responsibility of the Contractor and the monitoring activities will be carried out by the SC. Cost for environmental management and monitoring will be the part of the contract document with the



Contractor. It must be noted that environmental cost will not be a separate entity because all of its components will be addressed in the bidding document under various heads of account. Detailed cost for HSE and environment management is provided in **Table 8.4** below. However, overall estimated cost for the implementation of environmental monitoring for the proposed Project is given in **Table 8.5** along with sampling parameters and frequency during construction and operational phases. The contractor(s) shall be paid for these items after providing the implementation and cost incurred evidences duly approved by SC and PMU.

Table 8.4: Itemized HSE BOQ

Sr. No.	Items	Quantity	Cost / Item (Rs.)	Total Cost	Rationale
				(Rs.)	
(A) Personal Protective Equipment PPEs					
1	Dust masks	30,000	20	600,000	One dust mask to be used in a week by each labourer for 30 months and for 120 weeks the quantity for 250 workers will be 30,000 dust masks excluding visitors.
2	Safety Shoes	750	5,000	3,750,000	One pair of safety shoes are supposed to be used for 10 months by each labourer and for 250 labourers for 30 months construction period it is estimated to be 750.
3	Gloves	5,250	400	2,100,000	One pair of gloves is to be used by each labourer every month and 5,250 pair of gloves are estimated to be used by 175 labourers (Gloves will be used by only labours who work at specific hard areas).
4	First Aid Box	10	10,000	100,000	One First Aid Box is proposed for 25 labourers and for 250 labourers 10 first aid boxes are estimated including refill over the time.
5	Ear Plugs	7,500	100	750,000	One set of ear plug to be used for a month by a labourer in noisy areas (250 labourers)
6	Safety Helmets	750	1,500	1,125,000	One safety helmet is to be used by each labourer for 10 months and for 250 labourers for 30 months 750 safety helmets are estimated excluding visitors.
7	Safety Jackets (Hi Vis)	750	1,000	750,000	One Safety Jackets (Hi Vis) is to be used by each labourer for 10 months and for 250 labourers for 30 months 750 Safety Jackets (Hi Vis) are estimated excluding visitors.
8	Safety Goggles	1,500	500	750,000	One Safety Goggle is to be used by each labourer for 5 months and for 250 labourers for 30 months 1500 Safety Goggles are estimated excluding visitors.
	Sub-Total (A)			9,925,000	
(B) Others					

Sr. No.	Items	Quantity	Cost / Item (Rs.)	Total Cost	Rationale
				(Rs.)	
1	Provision of Dust Bins	9	5,000	45,000	Nine dust bins are proposed to be placed at one construction camp/office for the whole construction period.
2	Warning Tape	50	1,500	75,000	50 warning tapes are estimated to be used to cordon off the working areas.
3	Safety Cones	50	2,500	125,000	50 safety cones are estimated to be placed at active construction sites.
4	Safety Sign Boards	100	2,000	200,000	100 safety sign boards are proposed to be placed at active construction sites.
5	Safety Harness	50	10,000	500,000	50 safety harness for whole project
6	Emergency Stretcher	2	20,000	40,000	2 emergency stretchers for whole project
7	Fire Extinguishers	25	7,000	175,000	20 DCP type fire extinguishers and 05 CO ₂ type fire extinguishers for whole project including refill over the time.
8	Fire Alarm System	2	5,000	10,000	2 systems for whole project
9	Monthly Cost for Emergency Ambulance	30	75,000	2,250,000	One ambulance for 30 months including fuel and driver.
Sub-Total (B)				3,420,000	
Grand Total (A + B)				13,345,000	

Table 8.5: Environmental Cost Estimate

Table 6.1: Environmental Cost Estimate					
Parameters	Monitoring Mechanism	Frequency	Unit Rate	Quantity (No.)	Annual Cost
					(PKRs.)
PRE-CONSTRUCTION PHASE					
Ambient Air	Visual checks and monitoring of SO ₂ , NO, NO ₂ , CO, Suspended Particulate Matter, PM ₁₀ , PM _{2.5} according to SEQS	Once	35,000	2	70,000
Noise Levels	Noise level monitoring (Day and Night) according to SEQS	Once	5,000	2	10,000
Drinking Water	Sampling and laboratory testing of drinking /	Once	30,000	1	30,000

Parameters	Monitoring Mechanism	Frequency	Unit Rate	Quantity (No.)	Annual Cost
					(PKRs.)
	surface water according to SEQS				
Surface Water	Sampling and laboratory testing of drinking / surface water according to SEQS.	Once	25,000	1	25,000
Sub-Total (A)					135,000
CONSTRUCTION PHASE					
Ambient Air	Visual checks and monitoring of SO ₂ , NO, NO ₂ , CO, Suspended Particulate Matter, PM ₁₀ , PM _{2.5} according to SEQS	Quarterly	35,000	03x10	1,050,000
Noise Levels	Noise level monitoring (Day and Night) according to SEQS	Quarterly	5,000	05x10	250,000
Drinking Water	Sampling and laboratory testing of groundwater according to SEQS	Quarterly	30,000	02x10	600,000
Surface Water	Sampling and laboratory testing of drinking / surface water according to SEQS	Quarterly	25,000	02x10	500,000
Environmental Engineer	Environmental Engineer will monitor/conduct/comply all EMMP provisions.	On routine basis monthly	200,000	01x30	6,000,000
HSE Expert	HSE Expert will monitor and comply HSE related activities e.g. PPEs, housekeeping, safety signage, trainings, etc.	On routine basis monthly	200,000	01x30	6,000,000
HSE Management	HSE PPEs, solid waste management and other safety requirements	Table 8.4	13,345,000	Lump sum	13,345,000
Tree Plantation Cost	As per detailed plantation plan of EIA	Once	Refer Section 7.6.2.1	Lump sum	212,520
Handling of Solid waste, and material storage	As per detailed plantation plan of EIA	On routine basis	1,000,000	Lump sum	1,000,000
Trainings	As per EMMP	On routine basis	500,000 (lump sum bi-annual cost)	02x03	3,000,000
	As per EMMP	Bi-annually	500,000	02x03	3,000,000



Parameters	Monitoring Mechanism	Frequency	Unit Rate	Quantity (No.)	Annual Cost (PKRs.)
			(lump sum bi-annual cost)		
Communicable Diseases (Screening of Workers)					
Environmental Audit	As per EMMP	Annually	500,000	01x03	1500,000
Sub-Total (B) for Thirty (30) months					36,457,520
POST CONSTRUCTION PHASE (one-year)					
Ambient Air	Visual checks and monitoring of SO ₂ , NO, NO ₂ , CO, Suspended Particulate Matter, PM ₁₀ , PM _{2.5} according to SEQS	Bi-annually	35,000	01x02	70,000
Noise Levels	Noise level monitoring (Day and Night) according to SEQS	Bi-annually	5,000	01x02	10,000
Drinking Water	Sampling and laboratory testing of groundwater according to SEQS	Bi-annually	30,000	01x02	60,000
Surface Water	Sampling and laboratory testing of drinking / surface water according to SEQS	Bi-annually	25,000	01x02	50,000
Environmental Engineer	Environmental Engineer will monitor/conduct/comply all EMMP provisions.	On routine basis	As per PSEB administration and management		
HSE Expert	HSE Expert will monitor/conduct all HSE related activities e.g. TBTs, PPEs, housekeeping, safety signage, trainings, etc.	On routine basis	As per PSEB administration and management		
Solid Waste Management	As per EMMP	Frequency as mentioned in EMMP	As per PSEB administration and management		
Sub-Total (C) for One Year of Post Construction Phase					190,000
Total (A+B+C)					36,782,520
Contingency Charges (10 % of Total)					3,678,252
Grand Total					40,460,772

9 CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSION

- This report has been prepared in accordance with the requirements of the Sindh Environmental Protection Act, 2014, Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021; Pakistan EIA procedures; and sectoral guidelines for environmental reports.
- The proposed Project involves construction of multi-story building which consists of maximum seven (07) floors including ground floor and three (03) basement with total land area of six (06) acres. The project area is located in Faisal Cantonment with access from Airport road.
- Two site alternatives were considered. Site alternative-II was selected for the proposed project. This site was found in line with the Airport business district master plan and it also involved less number of trees cutting.
- The proposed Project is expected to be completed within Thirty (30) months with a total cost of USD 124.39 Million.
- Stakeholder consultations were carried out in order to record the concerns and observations of the stakeholders, especially the affected people.
- The major positive impacts of the Project include the following:
 - Enhance the local IT industry, encouraging innovation and entrepreneurship;
 - Create new jobs, reducing unemployment in the area and providing employment opportunities in various tech-related fields;
 - Attract foreign companies and investors looking for opportunities in Pakistan's growing tech sector;
 - Development of better infrastructure in the area, including roads, utilities, and telecommunications;
 - Enhancing learning opportunities and providing a skilled workforce trained in the latest technologies;
 - Adoption of new technologies and innovations within the local market, which can lead to more efficient business practices and modernized approaches across industries;
 - Boost the country's exports by developing software products and services that are competitive on a global scale;
 - Revitalization of the surrounding areas, potentially increasing property values and improving the local economy; and
 - Creating an environment where businesses and professionals can network and collaborate, leading to synergies and partnerships that can enhance productivity and innovation.
- The major negative impacts of the Project include the following:

- The topography in the Project area will change due to the construction of Project building. Visual changes to the topography will be of permanent nature and need no mitigation measures except that the Project design would consider aesthetic concerns such as the Tree Plantation which is already recommended in the EIA Report.
- Soil erosion and soil contamination may result during construction activities.
- During construction stage operating construction equipment, movement of vehicles will result in gaseous/fugitive dust emissions deteriorating air quality, generation of noise and vibration.
- Generation of solid waste including construction and demolition waste during construction and operational phase.
- Traffic congestion during the construction activities and the mobilization of construction vehicles

9.2 RECOMMENDATIONS

- Soil contamination can be controlled by proper storage of chemicals.
- To reduce the impact on ambient air quality, minimize the formation of dioxins and furans.
- Surface runoff and wastewater shall be controlled and collected in septic tanks.
- Dust, fugitive emissions shall be controlled by maintenance of equipment, fine tuning of the vehicles, regular sprinkling of water on soil.
- Noise and vibration can be controlled by equipment maintenance and providing noise barrier and by scheduling the construction activities to avoid peak activity hours in the area.
- Solid waste including construction and hazardous waste will be managed by adopting a solid waste management plan for the collection and disposal of all types of wastes and site shall be restored back.
- Construction activities to be planned considering the summer vacations, assembly and break time of the students of beacon house school.

An Environmental Management and Monitoring Plan (EMMP) and Institutional Requirements for both the phases (construction and operation) has been developed as part of the report which provides a detailed mitigation matrix that covers impacts, mitigation measures roles and responsibilities and timings to avoid, minimize or mitigate the adverse impacts of the Project.

During the construction phase, the Monitoring plan shall be implemented by the Construction Contractor through the Proponent. Environmental monitoring will be conducted by construction contractor during construction whereas during operation phase monitoring will be conducted by the PSEB.

ANNEXURES

ANNEX I: LAND OWNERSHIP RECORD

OFFICE OF THE CHIEF OPERATING OFFICER/APM
PAKISTAN AIRPORTS AUTHORITY

پاکستان ایئرپورٹس اتھارٹی
JINNAH INTERNATIONAL AIRPORT
Karachi-75200, Pakistan
Tel# (92-21)99248690
Fax # (92-21)99248146
Ext. 1627-8

Ref:JIAP/1397-20/032/KCES/Vol-III

Dated: 29th August, 2024

CHANGE OF ORIENTATION OF THE PLOT LEASED OF TO M/S PSEB
FOR ESTABLISHMENT OF IT PARK AT JIAP KARACHI

HANDING / TAKING OVER OF 06 ACRES LAND TO M/S.PSEB

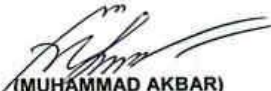
Consequent to the direction conveyed by HQPAA vide letter No. HQPAA/2833/86/Estates/VII dated 26th August, 2024 and in accordance with the map / demarcation plan provided by HQPAA vide letter No. HQPAA/1917/339/CMER/VII/464 dated 29th August, 2024, physical possession of the re-allocated site of land measuring 06 Acres has been handed over / taken over by PAA to M/s. PSEB for construction of IT Park at JIAP Karachi today on 29th August, 2024. Demarcation Map is attached herewith for ready reference.

HANDING OVER BY


(MUHAMMAD UMDER HANIF)
Deputy Director Estates
JIAP, Karachi


(ENGR. IRFAN KHAN)
Divisional Engineer (Civil-I)
JIAP, Karachi

TAKING OVER BY


(MUHAMMAD AKBAR)
Manager Infrastructure
M/s.PSEB


(MUHAMMAD ERFAN KHAN)
Chief Operating Officer / Airport Manager
JIAP, Karachi

Received by: R Si
Pakistan Software Export Board
NGT Dy. No. 1669, Date 30/8/2024

ANNEX II: ENVIRONMENTAL MONITORING, SAMPLING AND TESTING REPORT



PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.

ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +92-42-35441444

Karachi Office: Flat # 1, First Floor, Building # 67-C, 11th commercial Street DHA, Phase-2 Ext., Karachi
Ph: +92 21 35381251 Cell: 0303-4442334

EPA Certified

TEST REPORT

Ref #: SPGL/LAB/2025-017/AA

Issue date: 06-Mar-25

Name of Industry/Client:

NESPAK

Site Location:

IT Park, JIAP, Karachi

Monitoring Coordinates:

24.893496°N 67.162218°E

Nature of Monitoring:

Ambient Air

Monitoring By:

Pak Green Laboratories

Monitoring Instrument:

AQMS

Monitoring Date:

04-Mar-25 to 05 Mar-25

Results:

Sr. No.	Time	CO	NO	NO ₂	SO ₂	PM ₁₀	PM _{2.5}	SPM	O ₃	Lead (Pb)
		mg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
1.	9:00 AM	0.86	15.54	31.19	26.40					
2.	10:00 AM	1.21	15.15	28.55	19.99					
3.	11:00 AM	1.19	14.22	28.95	14.99					
4.	12:00 PM	0.94	14.62	30.17	26.49					
5.	1:00 PM	0.93	13.43	23.74	40.45					
6.	2:00 PM	1.64	13.03	23.33	39.55					
7.	3:00 PM	1.59	11.85	22.94	28.72					
8.	4:00 PM	1.33	10.53	28.95	23.66					
9.	5:00 PM	1.15	14.22	26.72	24.98					
10.	6:00 PM	1.56	14.98	26.52	24.98					
11.	7:00 PM	1.46	7.72	26.92	17.46					
12.	8:00 PM	1.33	13.93	27.94	30.07					
13.	9:00 PM	1.26	12.87	25.71	37.32	165.2*	80.2*	452.7	80.9	0.09
14.	10:00 PM	1.24	12.51	26.92	38.86					
15.	11:00 PM	1.44	14.49	28.55	39.97					
16.	12:00 AM	1.47	11.58	26.31	38.92					
17.	1:00 AM	2.02	12.37	28.14	37.81					
18.	2:00 AM	1.31	13.17	28.95	40.12					
19.	3:00 AM	0.95	12.64	25.30	38.14					
20.	4:00 AM	0.99	13.83	26.52	35.67					
21.	5:00 AM	1.05	13.43	36.46	39.88					
22.	6:00 AM	0.99	14.22	35.86	23.33					
23.	7:00 AM	0.88	15.67	37.07	38.71					
24.	8:00 AM	0.84	13.96	34.64	25.95					
Average (24 Hours)		1.23	13.33	28.60	31.35					
SEQS		5 8hours	40 24hours	80 24hours	120 24 hours	150 24hours	75 24hours	500 24hours	130 1hour	1.5 4Hour

End of Report

NEQS: National Environmental Quality Standards

NGVS: No Guideline Value Set

Remarks: All Parameters are in compliance with the SEQs Limit.



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Ref #: SPGL/LAB/2025-017/AA

Issue date: 06-Mar-25

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- Dually calibrated instrument was used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge
		 





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EPA Certified

TEST REPORT

Ref #: SPGL/LAB/2025-052/DW

Issue date: 13-Mar-25

Name of Industry/Client:
Site Location:
Monitoring Coordinates:
Nature of sample:
Sampling By:
Sample Source:
Sample Code:
Date of sampling:
Sample Receiving Date:
Testing Facility:
Testing Date:

NESPAK
IT Park, JIAP, Karachi
24.893496°N 67.162218°E
Drinking water
Pak Green Laboratories
DF Flats
S-DW-046
04-March-25
04-March-25
Pak Green Laboratories
04-March-25 to 13-Mar-25

Results:

Sr. No.	Parameters	Unit	WHO	SEQS	Method/Technique	Results
1.	E Coli	MPN/100ml	Must not be detected in any 100 ml sample	Must not be detected in any 100 ml sample	APHA-9221 F	Nil
2.	Total Coli-form	MPN/100ml	Must not be detected in any 100 ml sample	Must not be detected in any 100 ml sample	APHA-9221 D	Nil
3.	Fecal Coliform	MPN/100ml	-	-	APHA-9221 E	Nil
4.	Color	TCU	≤15	≤15	APHA-2120 C	0.000
5.	Taste	-	Non-Objectionable	Non-Objectionable	APHA-2160 C	Non-Objectionable
6.	Odor	-	Non-Objectionable	Non-Objectionable	APHA-2150 B	Non-Objectionable
7.	Turbidity	NTU	<5	<5	APHA-2130 B	0.25
8.	Total Hardness ^	mg/L	-	<500	APHA-2340 C	160
9.	Total Dissolved Solids ^	mg/L	<1000	<1000	APHA-2540 C	610
10.	pH ^	-	6.5-8.5	6.5-8.5	APHA-4500-H ⁺ B	8.231 at 22.8°C
11.	Aluminum (Al)	mg/L	0.2	≤ 0.2	APHA-3111 D	BDL
12.	Antimony (Sb)	mg/L	0.02	≤ 0.005	APHA-3111 B	BDL
13.	Arsenic (As)	mg/L	0.01	≤ 0.05	APHA-3114 B	BDL
14.	Barium (Ba)	mg/L	0.7	0.7	APHA-3111 D	BDL
15.	Boron (B)	mg/L	0.3	0.3	APHA-3111 D	BDL
16.	Cadmium (Cd)^	mg/L	0.003	0.01	APHA-3111 B	BDL
17.	Chloride (Cl ⁻) ^	mg/L	250	< 250	APHA-4500-Cl ⁻ B	65
18.	Chromium (Cr)^	mg/L	0.05	≤ 0.05	APHA-3111 B	BDL
19.	Copper (Cu)^	mg/L	2	2	APHA-3111 B	BDL
20.	Fluoride (F)	mg/L	1.5	≤ 1.5	APHA-4500-F-D	0.6
21.	Lead (Pb)^	mg/L	0.01	≤ 0.05	APHA-3111 B	BDL
22.	Manganese (Mn)^	mg/L	0.5	≤ 0.5	APHA-3111 B	0.0095



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Ph: +92 21 35381251 Cell: 0303-4442334

EPA Certified

Ref #: SPGL/LAB/2025-052/DW

Issue date: 13-Mar-25

Results:

Sr. No.	Parameters	Unit	WHO	SEQS	Method / Technique	Results
23.	Mercury (Hg)	mg/L	0.001	≤ 0.001	APHA-3112 B	BDL
24.	Nickel (Ni)	mg/L	0.02	≤ 0.02	APHA-3111 B	BDL
25.	Nitrate [^]	mg/L	50	≤ 50	APHA-4500-NO ₃ ⁻ -L-E	BDL
26.	Nitrite [^]	mg/L	3	≤ 3	APHA-4500-NO ₂ ⁻ -L-B	BDL
27.	Selenium (Se)	mg/L	0.01	0.01	APHA-3114 C	BDL
28.	Residual Chlorine (Cl ₂)	mg/L	-	0.2-0.5 at consumer end 0.5-1.5 at source	APHA-Cl-B	BDL
29.	Zinc (Zn) [^]	mg/L	3	5.0	APHA-3111 B	0.0108
30.	Phenolic Compound (As Phenol)	mg/L	<0.002	-	APHA-5530 D	BDL
31.	Sodium (Na) [^]	mg/L	-	-	APHA-3111 B	48.8207
32.	Potassium (K) [^]	mg/L	-	-	APHA-3111 B	9.7072
33.	EC [^]	μS/cm			APHA-2510 B	897

End of Report

NEQS: National Environmental Quality Standards

WHO: World Health Organization

[^]PNAC Accredited

BDL: Below Detection Limits

MPN: Most Probable Number

Remarks: All Parameters are in compliance with the SEQS Limits.

Term & Conditions

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- The Environmental Conditions while performing testing activities are (Temp=23.5-24.6°C) and (RH=50.8-54.6%)
- The Sampling was done as per the sampling and preservation protocol method APHA 1060-B&C
- The responsibility of the ethical use of the results reported in this report lies with the client.
- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring and testing activities.

Lab. Analyst	Chief Analyst	Laboratory Incharge



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Ph: +92 21 35381251 Cell: 0303-4442334

EPA Certified

TEST REPORT

Ref #: SPGL/LAB/2025-018/NL

Issue date: 06-Mar-25

Name of Industry/Client:

NESPAK

Site Location:

IT Park, JIAP, Karachi

Monitoring Coordinates:

24.893496°N 67.162218°E

Nature of Monitoring:

Noise Level

Monitoring By:

Pak Green Laboratories

Monitoring Time:

Real Time

Monitoring Instrument:

Noise Meter Landtek SL-5868P

Monitoring Date:

10-Jan-25 to 11-Jan-25

Results:

Sr. No.	Day Time	Equivalent Noise
		dB (A)
1.	6:00 AM	57.9
2.	7:00 AM	65.7
3.	8:00 AM	65.1
4.	9:00 AM	58.5
5.	10:00 AM	62.4
6.	11:00 AM	62.8
7.	12:00 PM	66.3
8.	1:00 PM	60.1
9.	2:00 PM	63.2
10.	3:00 PM	67.1
11.	4:00 PM	57.1
12.	5:00 PM	61.8
13.	6:00 PM	63.1
14.	7:00 PM	55.0
15.	8:00 PM	54.4
16.	9:00 PM	52.8
17.	10:00 PM	57.9
Average		60.6
Sr. No.	Night Time	Equivalent Noise
		dB (A)
18.	11:00 PM	54.6
19.	12:00 AM	53.5
20.	1:00 AM	52.8
21.	2:00 AM	53.3
22.	3:00 AM	55.6
23.	4:00 AM	53.8
24.	5:00 AM	51.4
Average		53.6

End of Report



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Ref #: SPGL/LAB/2025-018/NL

Issue date: 06-Mar-25

SEQS: Sindh Environmental Quality Standards

Sr. No.	Category of area/Zone	Units	Day Time	Night Time
1.	Residential Area (C)	dB (A) Leq	55	45
2.	Industrial Area (C)	dB (A) Leq	75	65
3.	Commercial Area (C)	dB (A) Leq	65	55

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- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge



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Ph: +92 21 35381251 Cell: 0303-4442334

EPA Certified

Ref #: SPGL/LAB/2025-053/WW

TEST REPORT

Issue Date: 13-Mar-25

Name of Industry/Client:

NESPAK

Site Location:

IT Park, JIAP, Karachi

Monitoring Coordinates:

24.893496°N 67.162218°E

Nature of sample:

Wastewater

Sampling By:

Pak Green Laboratories

Sample Code:

S-WW-045

Sampling type (Grab/Composite):

Grab

Date of sampling:

04-Mar-25

Sample Receiving Date

04-Mar-25

Testing Facility

Pak Green Laboratories

Testing Date:

04-Mar-25 to 13-Mar-25

Results:

Sr. No.	Parameters	Unit	Method / Technique	SEQS	Results
1.	Temperature	°C	APHA-2550 B	-	23.2
2.	pH ^	---	APHA-4500-H+ B	6-9	7.281 at 23.2°C
3.	Biological Oxygen Demand (BOD ₅ at 20 °C)	mg/L	APHA-5210 D	80	48
4.	Chemical Oxygen Demand (COD) ^	mg/L	APHA-5220 B	150	70
5.	Total Suspended Solids (TSS) ^	mg/L	APHA-2540 D	200	50
6.	Total Dissolved Solids (TDS) ^	mg/L	APHA-2540 C	3500	3910
7.	Greases & Oil	mg/L	APHA-5520 B	10	BDL
8.	Phenolic Compound (As Phenol)	mg/L	APHA-5530 D	0.1	BDL
9.	Chloride (as Cl ⁻) ^	mg/L	APHA-4500-Cl B	1000	410
10.	Fluoride (F ⁻)	mg/L	APHA-4500-FD	10	4.1
11.	An Ionic detergent as MBAs	mg/L	APHA 5540 C	20	0.246
12.	Sulphate (SO ₄ ²⁻) ^	mg/L	APHA-4500-SO ₄ C	600	280
13.	Sulphide (S ²⁻)	mg/L	APHA-4500-S ²⁻ F	1.0	BDL
14.	Ammonia (NH ₃) ^	mg/L	APHA-4500NH ₃ C	40	10.8
15.	Cadmium (Cd)^	mg/L	APHA-3111 B	0.1	BDL
16.	Chromium (Trivalent & Hexavalent)^	mg/L	APHA-3111 B	1.0	BDL
17.	Copper (Cu)^	mg/L	APHA-3111 B	1.0	BDL
18.	Lead (Pb)^	mg/L	APHA-3111 B	0.5	BDL
19.	Mercury (Hg)	mg/L	APHA-3112 B	0.01	BDL
20.	Selenium (Se)	mg/L	APHA-3114 C	0.5	BDL
21.	Nickel (Ni)	mg/L	APHA-3111 B	1.0	BDL



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Ph: +92 21 35381251 Cell: 0303-4442334

EPA Certified

Ref #: SPGL/LAB/2025-053/WW

Issue Date: 13-Mar-25

Results:

Sr. No.	Parameters	Unit	Method / Technique	SEQS	Results
22.	Silver (Ag)	mg/L	APHA-3111 B	1.0	0.0121
23.	Total Toxic Metals (Cd, Cr, Cu, Pb, Hg, Se, Ni, Ag, As, Ba, B)	mg/L	-	2.0	0.0121
24.	Zinc (Zn)^	mg/L	APHA-3111 B	5.0	1.2468
25.	Arsenic (As)	mg/L	APHA-3114 C	1.0	BDL
26.	Barium (Ba)	mg/L	APHA-3111 D	1.5	BDL
27.	Iron (Fe)^	mg/L	APHA-3111 B	8.0	0.1618
28.	Manganese (Mn)^	mg/L	APHA-3111 B	1.5	0.0245
29.	Boron (B)	mg/L	APHA-3111 D	6.0	BDL
30.	Chlorine (Cl ₂)	mg/L	APHA-4500 Cl B	1.0	BDL
31.	Sodium	mg/L	APHA-3111 B	-	345.2608
32.	Cyanide	mg/L	APHA-4500-CN E	1.0	BDL

End of Report

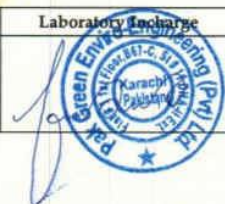
NEQS: National Environmental Quality Standards ^PNAC Accredited BDL: Below Detection Limit

Remarks: All parameters are in compliance with SEQS Limits.

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Lab. Analyst	Chief Analyst	Laboratory Incharge



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ANNEX III: WASTE MANAGEMENT PLAN

CONSTRUCTION WASTE MANAGEMENT PLAN FOR ESTABLISHMENT OF IT PARK KARACHI

1. GENERAL INTRODUCTION

Construction work refers to a wide range of materials depending on their origin; they are categorized as excavation material, demolition materials and worksite waste material. Construction waste material of the proposed Project consists mainly of concrete, brick work, masonry, limestone, sandstone, metal, and wood. In addition to this, significant amount of municipal waste will also generate from the construction camps. The solid waste generation estimated to be 135 kg/day for 300 construction workers during construction phase of the proposed Project.

2. ORIGINS AND CAUSES OF CONSTRUCTION WASTE

Origins of Waste	Causes of Waste
Contractual	▪ Errors in contract documents; and ▪ Contract documents incomplete at commencement of construction.
Design	▪ Design changes; ▪ Design and detailing complexity; ▪ Design and construction detail errors; ▪ Unclear and unsuitable specifications; and ▪ Poor coordination and communication (late information, last minute client requirements, slow drawing revision and distribution).
Procurement	▪ Ordering errors (i.e. ordering items not in compliance with specification); ▪ Over allowances (i.e. difficulties to order small quantities); and ▪ Supplier errors.
Transportation	▪ Damage during transportation; ▪ Difficulties for delivery vehicles accessing construction sites; ▪ Insufficient protection during unloading; and ▪ Inefficient methods of unloading
On-Site Management and Planning	▪ Lack of on-site waste management plans; ▪ Improper planning for required quantities; ▪ Delays in passing information on types and sizes of materials and components to be used; ▪ Lack of on-site material control; and ▪ Lack of supervision.
Material Storage	▪ Inappropriate site storage space leading to damage or deterioration; ▪ Improper storing methods; and ▪ Materials stored far away from point of application.
Material Handling	▪ Materials supplied in loose form; ▪ On-site transportation methods from storage to the point of application; and ▪ Inadequate material handling.
Site Operation	▪ Accidents due to negligence; ▪ Unused materials and products; ▪ Equipment malfunction; ▪ Poor craftsmanship; ▪ Use of wrong materials resulting in their disposal;

Origins of Waste	Causes of Waste
	▪ Time pressure; and ▪ Poor work ethics.
Residual	▪ Waste from application processes (i.e. over preparation of mortar); ▪ Off-cuts from cutting materials to length; ▪ Waste from cutting uneconomical shapes; and ▪ Packaging.
Other	▪ Weather ▪ Vandalism ▪ Theft

3. CONSTRUCTION WASTE MANAGEMENT PLAN

i) Waste Management Goals

The contractor established goal that this Project will generate at least 50 percent less waste into landfills and the processes shall be employed to ensure that this goal is met. These shall include prevention of damage to materials to be incorporated into the work due to mishandling, improper storage, contamination, inadequate protection, minimizing poor quantity estimation, and through design.

ii) Responsibility

- a) The Contractor shall be responsible for the implementation of the administrative portions of this program, including the notification of subcontractor management, the training of the site supervisor and the onsite posting of this plan.
- b) The site supervisor shall be responsible for the implementation of the onsite portions of this program including the training of subcontractor personnel.

iii) Waste Prevention Planning

- a) In addition to other requirements specified herein it is a requirement for the work of this Project that the contractor comply with the applicable city waste disposal requirements.
- b) Of the inevitable waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling where practical and possible. Waste disposal in landfills shall be minimized as much as possible.
- c) Project Construction Documents: The Contractor will contractually require all subcontractors to comply with the Construction Waste Management Plan (WMP)". A copy of the WMP will accompany all subcontractor agreements and require subcontractor participation.
- d) The "Construction Waste Management Plan" shall be implemented and executed as follows and as on the chart:
 - i) Salvageable materials will be diverted from disposal where feasible;
 - ii) There will be a designated area on the construction site reserved for materials that can be recycled;
 - iii) Areas shall be marked to designate what recycle materials are to be stored there; and
 - iv) Hazardous waste shall be managed by a licensed hazardous waste vendor.

iv) Communication and Education Plan

- a) This Waste Management Plan will be posted onsite;

- b) Each subcontractor will be made aware of the intent of this Project with respect to reduction of waste and recycling. Onsite recycling containers and/or areas will be plainly marked;
- c) The subcontractor will be expected to make sure all their crews comply with the Waste Management Plan;
- d) All recycling containers and areas will be clearly marked;
- e) Lists of acceptable and unacceptable materials will be posted at the site; and
- f) All subcontractors will be informed in writing of the importance of non-contamination with other materials or trash.

v) Motivation Plan

The Contractor will conduct a pre-award meeting for subcontractors. Subcontractors under consideration will be required to attend the meeting to review Project goals and requirements with the Project team. Attendance will be a prerequisite for award of subcontracts. This document will be an attachment to every subcontract. Copies of the attachment will be posted prominently at the job site.

vi) Expected Project Waste, Disposal, and Handling

The following chart identifies waste materials expected on the proposed Project, their expected disposal methods and handling procedures. New items may be added as needed.

Material	Disposal Method	Handling Procedure
Land Clearing Debris	Keep separate for reuse and or wood sale. Suitable materials may be delivered to a composting site. Separate topsoil and rock for future landscaping use.	Keep separated in designated areas onsite.
Clean Dimensional Wood and Palette Wood	Keep separate for reuse by on-site construction or by site employees for either heating stoves or reuse in home Projects. May be offered to public.	Keep separated in designated areas onsite.
Painted or Treated Wood	Reuse, off site recycle, and landfill.	Keep separated in designated areas onsite. Place in "Trash" container.
Concrete	Recycle when possible.	Keep separated in designated areas onsite.
Concrete Masonry Units	Keep separate for re-use by on-site construction or by site employees	Keep separated in designated areas onsite
Metals	Recycle off site when possible. Separate copper wire when possible.	Keep separated in designated areas onsite. Place in "Metals" container.
Gypsum drywall (unpainted)	Recycle with supplier when possible.	Keep scraps separate for recycling – stack on pallets in provided onsite. All scrap drywall should be taken back by contractor to drywall supplier
Paint	Reuse onsite; donate to Habitat for Humanity Restore.	Keep separated in designated areas onsite
Insulation	Reuse and landfill.	Keep separated in designated areas onsite.
Glass	Recycle locally.	Keep separated in designated areas onsite.
Plastics	Plastic Bottles: recycle locally; be aware of plastics that are acceptable to recycle facility.	Keep separated in designated areas onsite.

vii) Sindh Solid Waste Management Board:

viii) Recycle Hauler

- a) To be determined;
- b) Contact Address; and
- c) Some or all recycle may be hauled by the authorized representative.

ix) Possible Recycle Locations and Acceptable Materials

- a) Coordinate with companies in Karachi or which are registered with SSWMB that accept materials for recycle; and
- b) Using the above as a resource, a list will be kept indicating local opportunities for recycle of expected materials. New locations should be added as needed.

ANNEX IV: RESOURCES CONSERVATION PLAN

RESOURCE CONSERVATION PLAN FOR EXTENSION OF IT PARK KARACHI

1. INTRODUCTION

The most of the resources in this world are finite and non-renewable in nature. We are completely dependent on these resources to fulfill all our daily requirements. Therefore, sustainable development calls for the need to conserve resources in a way that meet our needs of present generation as well as future generation, 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 and 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:

- Estimation of construction material required for the Project;
- Estimation of fuel consumption for construction machinery, construction vehicles and generators;
- Estimations of the energy requirements during all the stages of the Project; and
- Estimations of water consumption for construction activities and construction camp sites.
- Strategies shall be planned to reduce loads on the identified resources to be consumed;
- Best management practices shall be devised to control or reduce pollution resulting from the activities during different stages of the Project; and
- 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 off safely to the designated disposal sites through approved contractors; and

- Reuse of the materials shall be appreciated.

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 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 use of heating and cooling systems during extreme weathers events;
- 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 and operation to conserve fossil fuel as it is non-renewable resource.

Water

- Avoid using potable water for sprinkling, curing and washing of equipment and 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
- Ensure protection of canal water from contamination resulting from construction activities.

Pollution

- Emissions shall be reduced and controlled as far as possible and direct discharges to air shall be avoided by strictly adhering to the mitigation measures outlined in EIA report;
- Waste water shall not be discharged directly into the canal and must be managed as per the recommendations presented in EIA; and
- Construction and demolition waste, and municipal solid waste shall not be dumped and burnt openly, and shall be handled according to the preventative measure given in EIA study.

5. CHECKING AND CORRECTIVE ACTIONS

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

ANNEX V: TRAFFIC MANAGEMENT PLAN

PRELIMINARY TRAFFIC MANAGEMENT PLAN (TMP) FOR IT PARK

1. OBJECTIVES OF TMP AROUND THE PROPOSED PROJECT BUILDING

One of the prime objectives of this TMP is to ensure the safety of all the road users along the work sites, and to address the following issues:

- Safety of pedestrians, bicyclists, and motorists travelling through the construction sites;
- Protection of workers from hazards associated with moving traffic;
- Mitigation of the adverse impact on road capacity and delays to the road users;
- Maintenance of access to adjoining properties; and
- Addressing issues and concerns that may delay the implementation of the proposed Project.

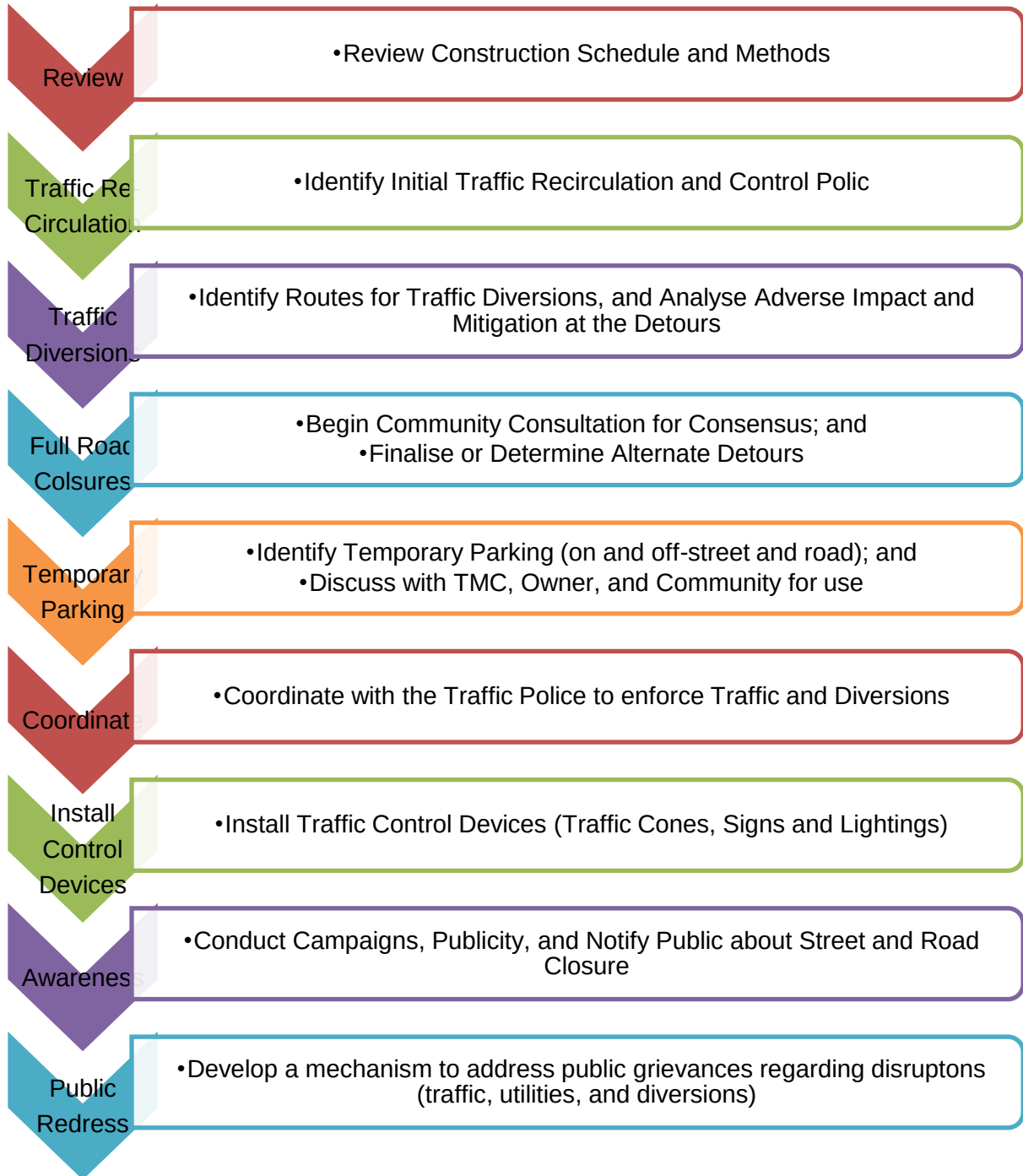
2. OPERATING POLICIES FOR TMP

The following policies will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around Project sites, while reasonably protecting workers and equipment.

- Make traffic safety and temporary traffic control an integral and high-priority element of Project from planning through design, construction, and maintenance;
- Inhibit traffic movement as little as possible;
- Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic routes;
- Inspect traffic control elements routinely, both day and night, and make modifications when necessary;
- Pay increased attention to roadside safety in the vicinity of temporary traffic routes;
- Train all persons that select, place, and maintain temporary traffic control devices;
- Keep the public well informed; and
- Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

Policy steps for the TMP are shown in **Figure 1**. However, operating policy for TMP for the construction of the proposed building along various types of roads is shown in **Figures 2**

Figure 1: Policy Steps for the TMP



3. ANALYZE THE IMPACT DUE TO STREET AND ROAD CLOSURE

Apart from the capacity analysis, final decisions to temporarily close a particular street and road and divert the traffic should involve the following steps:

- Approval from Pakistan airport authority to use the local streets and roads as detours; Consultation with businesses, community members, residents, road users and traffic police regarding the mitigation measures necessary at the detours where the road is diverted during the construction;

- Determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- Determining if additional traffic control or temporary improvements are needed along the detour route;
- Considering how access will be provided to the worksite;
- Contacting emergency service, and transit authorities to determine if there are impacts to their operations; and
- Publish a notice through print and electronic media about road closure to avoid hindrance to public. As part of this notice, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

If full road-closure of certain routes within the proposed Project area is not feasible due to inadequate capacity of the road or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

4. PUBLIC AWARENESS AND NOTIFICATIONS

As per discussions in the previous sections, there will be travel delays during the construction, as is the case with most construction Projects, although on a reduced scale if utilities and traffic management are properly coordinated.

The awareness campaign and the prior notification for the public will be a continuous activity which the Project will carry out to compensate for the traffic delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time, when the roadblocks or traffic diversions take place at the particular streets and roads. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The Project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings, and city level meeting with the elected representatives.

PSEB, staff members of Supervision Consultant and Contractor will also conduct an awareness campaign to educate the public about the following issues:

- Traffic control devices in place at the construction sites (signs, traffic cones, and barriers);
- Defensive driving behavior along the construction sites; and
- Reduced speeds enforced at the construction sites and traffic diversions.

It may be necessary to conduct the awareness programs and campaigns on road safety during construction.

The campaign will cater to all types of target groups i.e. children, adults, disabled and drivers. In addition, the Project will publish a brochure for public information. These brochures will be widely circulated around the proposed Project area and will also be available at the Client office, and the Contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

- Explain why the brochure was prepared, along with a brief description of the proposed Project;
- Advise the public to expect the unexpected delays or roadblocks;
- Educate the public about the various traffic control devices and safety measures adopted at the construction sites;
- Educate the public about the safe road user behavior to emulate at the construction sites;
- Inform the public how to stay informed or where to inquire about road safety issues at the construction sites (name, telephone and mobile number of the contact person); and
- Indicate the office hours of authorized representatives.

5. INSTALL TRAFFIC CONTROL DEVICES AT THE CONSTRUCTION SITES AND TRAFFIC DIVERSION ROUTES

The purpose of installing traffic control devices at the construction sites is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the construction sites. The following traffic control devices are used in construction sites:

- Signs;
- Pavement Markings;
- Channelizing Devices;
- Arrow Panels; and
- Warning Lights.

Procedures for installing traffic control devices at any construction sites vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads are narrow but carry traffic. However, regardless of where the construction takes place, all the construction sites should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).

ANNEX VI: TREE PLANTATION PLAN

TREE PLANTATION PLAN

The basic purpose of afforestation/plantation of suitable species in the project area is to reduce the risk made due to the cutting of trees for the proposed project. The risk made will be compensated (1:10) by planting 110 saplings to enhance green cover and improve the overall environment of the area. Afforestation will not only reduce the risk being made but will also increase the area's carrying capacity in many positive ways.

It is pertinent to mention that approximately **11 trees** may be impacted on site, which is recommended for compensation (**110 plants**) and cutting should be avoided up to the maximum. Plantation will be done after the construction work immediately. Plantation of indigenous tree species is highly important to maintain biodiversity and ecological balance. It is also important to prevent global warming, soil erosion, and pollution. Afforestation purifies the environment and helps in reducing the carbon dioxide level. Along with the importance of construction, the afforestation activity will further help in enhancing the socio-economic condition of the area and project sustainability.

IMPORTANCE OF TREE PLANTATION

- Trees contribute to their environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, and supporting wildlife.
- Trees control climate by moderating the effects of the sun, rain, and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer.
- Trees also preserve warmth by providing a screen from harsh wind.
- Trees also lower the air temperature and reduce the heat intensity of the greenhouse effect by maintaining low levels of carbon dioxide.
- Both above and below ground, trees are essential to the ecosystems in which they reside.
- Trees absorb and store rainwater which reduces runoff and sediment deposit after storms. This helps the groundwater supply recharge, prevents the transport of chemicals into streams, and prevents flooding.
- Trees, shrubs, and turf also filter air by removing dust and absorbing other pollutants like carbon monoxide, sulfur dioxide, and nitrogen dioxide.

OBJECTIVES

- To Restore native species
- To improve the quality of air and reduce its pollution
- To add colour to the landscape and enhance the beauty of the environment
- To uplift the quality of our living environment through active planting, proper maintenance, and preservation of trees together with other vegetation.
- To Protect and conserve flora and fauna of the project area.
- To attract rain which has a positive impact on the project area.
- To reduce sedimentation by plantation in the project area which will act as a protection wall against wind-born dust particles.

AREA ENHANCEMENT PLAN

The plants will be raised along the boundary walls or roads. The Total number of plants to be planted is **110** Number for this project.

**The Department/Authority may update the standards of planting and choice of species as per the actual requirements and site suitability.*

TREES RECOMMENDED

Table-1 shows the recommended trees for afforestation for the Project.

Table-1: Recommended Trees for Plantation

Sr. No.	Local/English Name	Scientific Name
1.	Neem	<i>Azadirachta indica</i>
2.	Sukh Chain	<i>Pongamia pinnata</i>
3.	Jaman	<i>Eugenia jambolina</i>
4.	Kachnar	<i>Bauhinia variegata</i>
5.	Gulmohar	<i>Delonix regia</i>

COST

Break-up of Expenditure per Avenue kilometer @ Rs. 1500/- per diem: Break-up of Expenditure per Avenue kilometer or 250 plants @ Rs. 1500/- per diem:

FIRST YEAR

Sr. No.	Item	Quantity	Rate	Amount (PKR)
1.	Layout	1 Av.km	2 MD/Av.km	3,000.00
2.	Digging of Pits 2.5 ft. each 2.5x250 = 625 cft.	625 cft.	5 MD/Av.km	7,500.00
3.	Cost of Plants including	250 No.	Rs100/- plant	25,000.00
4.	Cost of planting of plants	250 No.	Rs. 25/- plant	6,250.00
5.	Carriage of plants from private nursery to site including loading/unloading	250 No.	Rs. 10/- plant	2,500.00
6.	Cost of Manure and Bhall (silt) including carriage	1 Av. Km		20,000.00
7.	H/watering 50 times 250x50 with water bowser, one driver and one coolie	12500 no.	5MD/per %0	100,000.00
8.	Weeding twice 250x2	500 no.	2 MD/per %	15,000.00
9.	Reopening of Pits twice (250x2)/cft/pit	500 cft.	2 MD/per %	15,000.00
10.	Unforeseen			5750.00
Total				200,000.00

SECOND YEAR

Sr. No.	Item	Quantity	Rate	Amount (PKR)
1.	Cost of Plants 20% Restocking	50 No.	Rs.100/- plant	5,000.00
2.	Cost of planting	50 No.	Rs. 25/- plant	1,250.00
3.	Carriage of plants	50 No.	Rs. 10/- plant	500.00
4.	H/watering 50 times with water bowser, one driver and one coolie	12500 no.	5MD/per %0	100,000.00
5.	Reopening of Pits twice (250x2)	500 cft.	2 MD/per %	1,5000.00
6.	Weeding twice 250x2	500 no.	2 MD/per %	1,5000.00
7.	Unforeseen			1,250.00
Total				1,38,000.00

THIRD YEAR

Sr. No.	Item	Quantity	Rate	Amount (PKR)
1.	Cost of Plants 10% Restocking 25 No.	25 No.	Rs.100/- plant	2,500.00
2.	Cost of planting	25 No.	Rs. 25/- plant	625.00
3.	Carriage of plants	25 No.	Rs. 10/- plant	250.00
4.	H/watering 40 times x250 no.	10,000 no.	5MD/per %0	75,000.00
5.	Reopening of Pits twice (250x2)	500	5MD/per %0	3,750.00
6.	Unforeseen			2,875.00
Total				85,000.00

FOURTH YEAR

Sr. No.	Item	Quantity	Rate	Amount (PKR)
1.	H/watering 30 times	7500 no.	5MD/per %0	56,250.00
2.	Pruning and cleaning of plants	250 no.	5MD/per %0	1,875.00
3.	Unforeseen			1,875.00
Total				60,000.00

*Cost for raising 1 Av. Km and Maintenance or 250 plants in single row: = **PKR. 483,000/-**

For 4 years cost of 110 Plants = PKR 212,520 Total.

**The above calculations and standards are approximate and tentative provided based on available data which may be updated by the implementing agency as per actual, during implementation.*

ANNEX-VII: CHANCE FIND PROCEDURE

CHANCE FIND PROCEDURES FOR ESTABLISHMENT OF IT PARK KARACHI

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 PMU to Directorate General (DG) of Archeological Department, Sindh to take further suitable action to preserve those antique or sensitive remains. Representative of the DG will visit the site and observed the significance of the antique, artifact and cultural (religious) properties and significance of the Project. The report will be prepared by representative and will be given to the DG. 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; and
- After stopping work, the contractor must immediately report the discovery to the Supervision Engineer and PMU.

ANNEX VIII: SANITATION PLAN

SANITATION PLAN FOR ESTABLISHMENT OF IT PARK

1. INTRODUCTION

This plan outlines the measures that can improve conditions of sanitation at construction sites during construction and operation phase.

2. PURPOSE OF THE PLAN

The plan intends to ensure sanitation including the control of water supplies, excrete and wastewater disposal, refuse disposal, vectors of diseases, housing conditions, food supplies and handling, atmospheric conditions, and the safety of the working environment.

3. MANAGEMENT OF SANITATION DURING CONSTRUCTION PHASE

i. Responsibility

The Health and Safety Inspector designated by construction contractor shall also inspect sanitation conditions and ensure safe working environment for workers.

ii. Location of Camp Sites

The accommodation and ancillary facilities for labor shall be constructed and maintained to standards and scales approved by the Resident Engineer.

The camps must be located such that the drainage from and through the camps shall not endanger any domestic or public water supply.

All sites must be managed to avoid ditches and depressions to minimize nuisance due to stagnant water.

iii. Water Supply

An adequate and convenient water supply, approved by the appropriate health authority, must be provided in each camp for drinking, cooking, bathing and laundry purposes.

Potable water supply systems for labor camps occupants shall meet the drinking water quality standards of PEQS, 2016. In addition, the design of water system facilities shall be based on the suppliers Engineer's estimates of water demands. The drinking water must be monitored regularly for drinking water quality parameters.

At all construction camps and other workplaces, good and sufficient water supply shall be provided and maintained to eliminate chances of waterborne diseases to ensure the health and hygiene of the workers.

iv. Toilet Facilities and Hygiene

According to health and safety guidelines OR-OSHA number of toilets required at construction site is as one toilet for 20 workers. **Table 1** shows the number of toilets required in accordance with the number of employees at construction site. The total numbers of employees at construction site are estimated to be 100 persons.

Table 1: Number of Toilets Required for Employees at Construction Site

No. of Employees	No. of Toilets and Urinals by OSHA	Total No. Toilets and Urinals Required at Construction Site
Up to 20 Employees	1 Toilet	5 Toilets
Up to 40 Employees	1 Urinal	2 Urinals

Within the premises of every workplace, toilets and urinals shall be provided in an accessible place, and the accommodation, separately for each of these, as per standards prevailing in the province and country.

Toilet facilities adequate for the capacity of the camp must be provided. Each toilet room must be located, so as to be accessible.

A toilet room must be located within 200 feet of the camp. No toilet may be closer than 100 feet to kitchen and sleeping area.

These toilets must be distinctly marked by signs printed in native language of the persons occupying the camp, or marked with easily understood pictures or symbols.

Proper facility for hand washing and other cleaning activities to be provided as follows:

- Provide individual hand towels from a sanitary dispenser and receptacles for disposing of waste towels;
- Providing hand soap and industrial hand cleaner for removing paints and other contaminants;
- Prohibited use of gasoline or solvent for hand washing; and
- Keep the floor of facilities dry to prevent spills and falls.

v. Waste Disposal

The sewage system for the camp must be designed, built and operated in compliance with the relevant legislation so that no health hazard occurs and no pollution to the air, ground or adjacent watercourse takes place.

Garbage bins must be provided in the camps and regularly emptied and the garbage disposed of in a hygienic manner. Unless otherwise arranged for by the local sanitary authority, arrangement for disposal of excreta should be done in the already existing sewerage system in the area.

On completion of the works, all such temporary structures shall be cleared away, all rubbish properly disposed, septic tank trenches filled in and effectively sealed off and the outline site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the engineer.

vi. Maintenance of Sanitary Facility

Proper maintenance of toilets and other sanitary facilities should assure by health and safety inspector. Toilets and other sanitary facilities shall be cleaned at least four times daily and at least twice during working hours and kept in a strict sanitary condition. Receptacles shall be tarred inside and outside at least once a year.

All buildings, rooms and equipment and the grounds surrounding them shall be maintained in a clean and operable condition, and be protected from rubbish accumulation.

All necessary means shall be employed to eliminate and control any infestations of insects and rodents within all parts of any labor camp.

4. MANAGEMENT OF SANITATION DURING OPERATIONAL PHASE:

A proper sanitation plan is to be adopted for maintaining the hygienic conditions during the operational phase of the Project. These includes

- Site Clearance;
- Sewage Pipe Clearing, and
- Solid Waste Management.

i. Site Clearance

The construction contractor shall assure the clearance of construction machinery, vehicle and other equipment used during the construction period after the completion of the Project.

ii. Sewage Pipe Clearance

One of the main issue that may arise during construction and operational phase is the clogging of sewer pipelines as a result of construction material, oil spillage from vehicles, and throwing of solid waste by the patients, staff and visitors due to lack of bins, which will have negative impacts on the access road in form of deterioration of road surface as well as a source of water borne diseases in the area.

iii. Solid Waste Management

Municipal solid waste and medical waste produced from hospital building should be collected and managed properly by the concerned department. Waste bins should be placed in the hospital building; regular cleaning of the hospital floors should be carried out using mechanical sweepers twice a day and at least two to four sweepers should be deputed for the whole hospital building to assure regular cleaning.

iv. Awareness and Training

A training and awareness sessions shall be conducted for workers before commencement of the Project. The implementation of sanitation plan would be more effective if the importance of hygiene; sanitation and safety are known to the workers.

ANNEX-IX: HEALTH AND SAFETY PLAN

CONSTRUCTION HEALTH AND SAFETY CHECKLIST FOR ESTABLISHMENT OF IT PARK

GENERAL INTRODUCTION

This checklist identifies some of the hazards most commonly found on construction sites. The questions it asks are intended to help the safety supervisor decide whether the construction site is a safe and healthy place to work.

ACCESS ON SITE

- Can everyone get to their place of work safely?
- Are access routes free from obstructions and clearly signposted?
- Are holes protected with clearly marked and fixed covers to prevent falls?
- Are temporary structures stable, adequately braced and not overloaded?
- Will permanent structures remain stable during any refurbishment or demolition work?
- Is the site tidy, and are materials stored safely?
- Is lighting adequate, especially when work is being carried on after dark outside or inside tunnels?

WELFARE

- Are toilets readily available and are they kept clean and properly lit?
- Are there washbasins, hot and cold (or warm) running water, soap and towels?
- Are the washbasins large enough to wash up to the elbow and are they kept clean?
- Is there somewhere to change, dry and store clothing?
- Is there a place where workers can sit, make hot drinks and prepare food?
- Are drinking water and cups provided?
- Can everyone who needs to use them get to the welfare facilities easily and safely?

SCAFFOLDS

- Are scaffolds erected, altered and dismantled by competent people?
- Are all uprights provided with base plates (and where necessary, timber sole plates)?
- Are all uprights, ledgers, transoms and braces in position?
- Is the scaffold tied to the structure in enough places to prevent collapse?
- Are there double guard rails and toe boards or other suitable protection at every edge, to prevent falling?
- Are brick guards provided to prevent materials falling from scaffolds?
- Are the working platforms fully boarded and are the boards arranged to avoid tipping or tripping?
- Are there effective barriers or warning notices in place to stop people using an incomplete scaffold, e.g. where working platforms are not fully boarded?
- Is the scaffold strong enough to carry the weight of materials stored on it and are these evenly distributed?
- Does a competent person inspect the scaffold regularly, e.g. at least once a week if the working platform is two meter or above in height or at suitable intervals if less than two meter, and always after it has been altered or damaged and following extreme weather events?
- Are the results of inspections recorded and kept?
- Have proprietary scaffolds been inspected and are they being used in accordance with suppliers' instructions?

- Have the wheels of scaffolds been locked and outriggers deployed when in use and are the platforms empty when they are moved?

POWERED ACCESS EQUIPMENT

- Has the equipment been installed by a competent person?
- Are the operators trained and competent?
- Is the safe working load clearly marked?
- Is the equipment inspected by a competent person?
- Does the working platform of the powered access equipment have adequate, secure guard rails and toe boards or other barriers to prevent people and materials falling off?
- Have precautions been taken to prevent people being struck by the (i) moving platform; and (ii) falling materials?

TRAFFIC, VEHICLES AND PLANT

- Are vehicles and pedestrians kept apart? If not, do you:
 - Separate them as much as you can and use barriers?
 - Tell people about the problem, and what to do about it?
 - Display warning signs?
 - Can zero tail swing excavators be used or is there adequate clearance around slewing vehicles?
- Can reversing be avoided, e.g. by using a one-way system, or if not, are properly trained signallers used?
- Are vehicles and plant properly maintained?
- Have drivers received proper training and are they competent for the vehicles or plant they are operating?
- Are loads properly secured?
- Have you made sure that passengers are only carried on vehicles designed to carry them?
- Have you made sure that plant and vehicles are not used on dangerous slopes?

CRANES

- Is the crane suitable for the job?
- Has the lift been properly planned by an 'appointed person'?
- Is the crane on a firm, level base? Are the riggers properly set?
- Who is the appointed 'crane supervisor' responsible for controlling the lifting operation on site?
- Are the crane driver and signaller trained and competent?
- Is the load secure?
- Has the signaler and slinger been trained to give signals and to attach loads correctly?
- Have you made arrangements to make sure the driver can see the load or has a signaler been provided to help?
- Are people stopped from walking or working beneath a raised load?
- Does the crane have a current report of thorough examination and record of inspection?

EXCAVATIONS

- Is there adequate support for the excavation, or has it been sloped or battered back to a safe angle?
- Is there a safe method used for putting in the support, without people working in an unsupported trench?
- Is there safe access into the excavation, e.g. a sufficiently long and secured ladder?
- Are there barriers or other protection to stop people and vehicles falling in?
- Are properly secured stop blocks provided to prevent tipping vehicles falling in?
- Could the excavation affect the stability of neighboring structures or services?
- Are materials, spoil and plant stored away from the edge of the excavation to reduce the chance of a collapse?
- Is the excavation regularly inspected by a competent person?

MANUAL HANDLING

Are there heavy materials such as concrete lintels, curbstones or bagged products which could cause problems if they have to be moved by hand? If so, can you:

- choose lighter materials;
- use wheelbarrows, hoists, tail handlers and other plant or equipment so that – manual lifting of heavy objects is kept to a minimum;
- order materials such as cement and aggregates in 25 kilogram bags;
- Avoid the repetitive laying of heavy building blocks weighing more than 20 kilogram; and
- Have people been instructed and trained how to lift safely?

HAZARDOUS SUBSTANCES

- Have you identified all harmful substances and materials, such as asbestos, lead, solvents, paints, cement and dust?
- Have you checked whether a licensed contractor is needed to deal with asbestos on site?
- Have you identified and put into place precautions to prevent or control exposure to hazardous substances by:
 - Doing the work in a different way, to remove the risk entirely;
 - Using a less hazardous material; and
 - Using tools fitted with dust extraction?
- Have workers had information and training so they know what the risks are from the hazardous substances used and produced on site, and what they need to do to avoid the risks?
- Have you got procedures to prevent contact with wet cement (as this can cause both dermatitis and cement burns)?
- Have you arranged health surveillance for people using certain hazardous substances?

NOISE

- Have workers had information and training so they know what the risks are from noise on site, and what they need to do to avoid those risks?
- Have you identified and assessed workers' exposure to noise?
- Can the noise be reduced by using different working methods or selecting quieter plant, e.g. by fitting breakers and other plant or machinery with silencers?
- Are people not involved in the work kept away from the source of the noise?
- Is suitable hearing protection provided and worn in noisy areas?

- Have hearing protection zones been marked?
- Have you arranged health surveillance for people exposed to high levels of noise?

HAND-ARM VIBRATION

- Have workers had information and training so they know what the risks are from hand-arm vibration (HAV) on site, and what they need to do to avoid those risks?
- Have you identified and assessed risks to workers from prolonged use of vibrating tools such as concrete breakers, angle grinders or hammer drills?
- Has exposure to HAV been reduced as much as possible by selecting suitable work methods and plant?
- Are reduced-vibration tools used whenever possible?
- Have vibrating tools been properly maintained?
- Have you arranged health surveillance for people exposed to high levels of hand-arm vibration, especially when exposed for long periods?

ELECTRICITY AND OTHER SERVICES

- Have all necessary services been provided on site before work begins and have you also identified existing services present on site (e.g. electric cables or gas mains) and taken effective steps (if necessary) to prevent danger from them?
- Are you using low voltage for tools and equipment, e.g. battery-operated tools or low-voltage systems?
- Where mains voltage has to be used, are trip devices (e.g. residual current devices (RCDs)) provided for all equipment?
- Are RCDs checked daily by users and properly maintained?
- Are cables and leads protected from damage?
- Are all connections to the system properly made and are suitable plugs used?
- Are tools and equipment checked by users, visually examined on site and regularly inspected and tested by a competent person?
- Where there are overhead lines, has the electricity supply been turned off, or have other precautions been taken, such as providing goal posts or taped markers?
- Have hidden electricity cables and other services been located (e.g. with a locator and plans) and marked, and have you taken precautions for safe working?

CONFINED SPACES

- Do you work in confined spaces where there may be an inadequate supply of oxygen or the presence of poisonous or flammable gas? If so, have you taken all necessary precautions?
- Confined spaces include tanks, sewers and manholes; they do not have to look dirty to be dangerous?

TOOLS AND MACHINERY

- Are the right tools or machinery being used for the job?
- Are all dangerous parts guarded, e.g. gears, chains drives, Projecting generator shafts?
- Are guards secured and in good repair?
- Are tools and machinery maintained in good repair and are all safety devices operating correctly?
- Are all operators trained and competent?

FIRES AND EMERGENCIES

General

- Are there emergency procedures, e.g. for evacuating the site in case of fire or for rescue from a confined space?
- Do people on site know what the procedures are?
- Is there a means of raising the alarm, and does it work?
- Is there a way to contact the emergency services from site?
- Are there adequate escape routes and are these kept clear?
- Is there adequate first-aid provision?

Fire

- Is the quantity of flammable materials, liquids and gases on site kept to a minimum?
- Are they properly stored?
- Are suitable containers used for flammable liquids?
- Are flammable gas cylinders returned to a ventilated store at the end of the shift?
- Are smoking and other ignition sources banned in areas where gases or flammable liquids are stored or used?
- Are gas cylinders, associated hoses and equipment properly maintained and in good condition?
- When gas cylinders are not in use, are the valves fully closed?
- Is flammable and combustible waste removed regularly and stored in suitable bins or skips?
- Are suitable fire extinguishers provided?

PROTECTING THE PUBLIC

- Is the work fenced off from the public?
- Are the public protected from falling material?
- Have you provided a safe route through road works or pavement scaffolding for people with prams, wheelchair users and visually impaired people?
- When work has stopped for the day:
- Is the boundary secure and undamaged?
- Are all ladders removed or their rungs boarded so that they cannot be used?
- Are excavations and openings securely covered or fenced off?
- Is all plant immobilized to prevent unauthorized use?
- Are bricks and materials safely stacked?
- Are flammable or dangerous substances locked away in secure storage places?

ANNEX-X: EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN FOR ESTABLISHMENT OF IT PARK

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 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 team 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:

- Team Leader
- Safety Engineer
- Reporting Officer / Inspector

A) Team Leader

- Approve and 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; and
- Assure that the Emergency Response Plan is adequate, effective and can be implemented practically.

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 **Figure 1**.

ii. Hazard Identification

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

- Structural failure;
- Disruption of Utility (Power, Water, Telecommunications and Gas);
- Accidents;
- Vehicle accident;
- Fog and Smog;
- Power equipment failure or vandalism;
- Fire explosion;
- Earthquake;
- Terrorism including bombing; and
- Disease Outbreak.

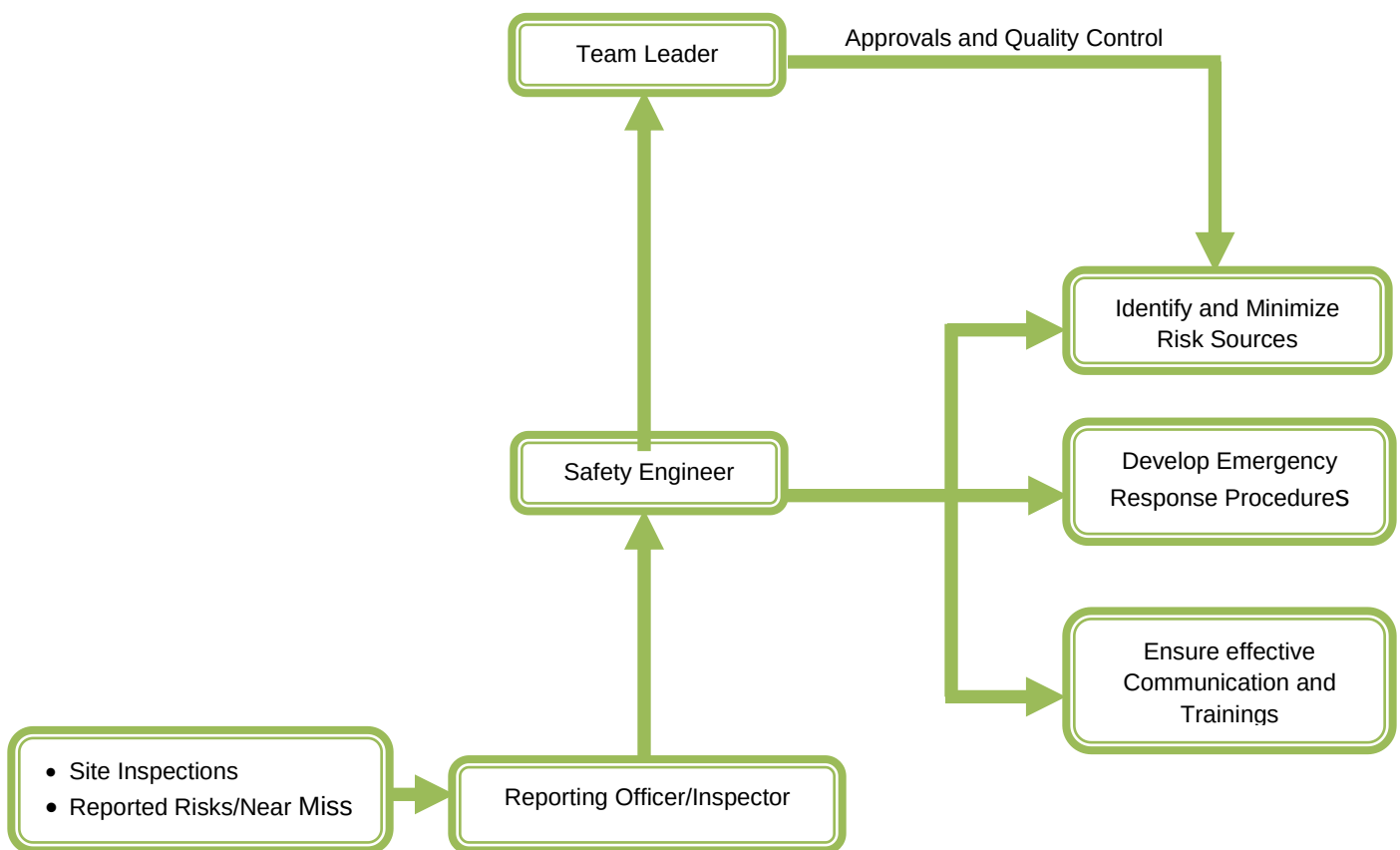


Figure 1: Framework of Responsibilities

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 and smog;
- 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's shall be trained regularly.

i. Resources

A) Finance and Administration

The financial resources shall be reserved for dealing with any emergencies arising on site during construction and operation. 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.

B) Equipment's

All the necessary equipment's needed in an event of emergencies shall be made available, as a minimum. The equipment's needed include:

- Personal protective equipment's (PPEs);
- Alarms;
- Fire extinguishers;
- Crowd control, flashlights, signs, and barricades;
- First aid facility;
- Detection instruments, e.g.; personal alarm kits and smoke detection instruments; and
- Tools to fix minor vandalism.

C) 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 and operation activities.

D) 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; and
- 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.

A) 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.

B) 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.

C) 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's, materials, environment and accident scene from continuing damage or further hazards to the area and people. For-example: 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;
- Designate people to emergency duties such as assign personnel to guide emergency services on arrival;
- Headcount personnel to identify any missing persons;
- Personnel shall be directed to safe locations;

- Arrange diversions for the traffic to reduce disturbance to the flow of traffic, if and as far as possible; and
- 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

A) 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.

B) Emergency Response Team and Management

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

C) 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.

D) 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 well being 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 and replacement of the assets and infrastructure;
- Reinstatement of disrupted services;
- Road and bridge repairs; and
- Updation of safety arrangements and emergency response procedures to ensure