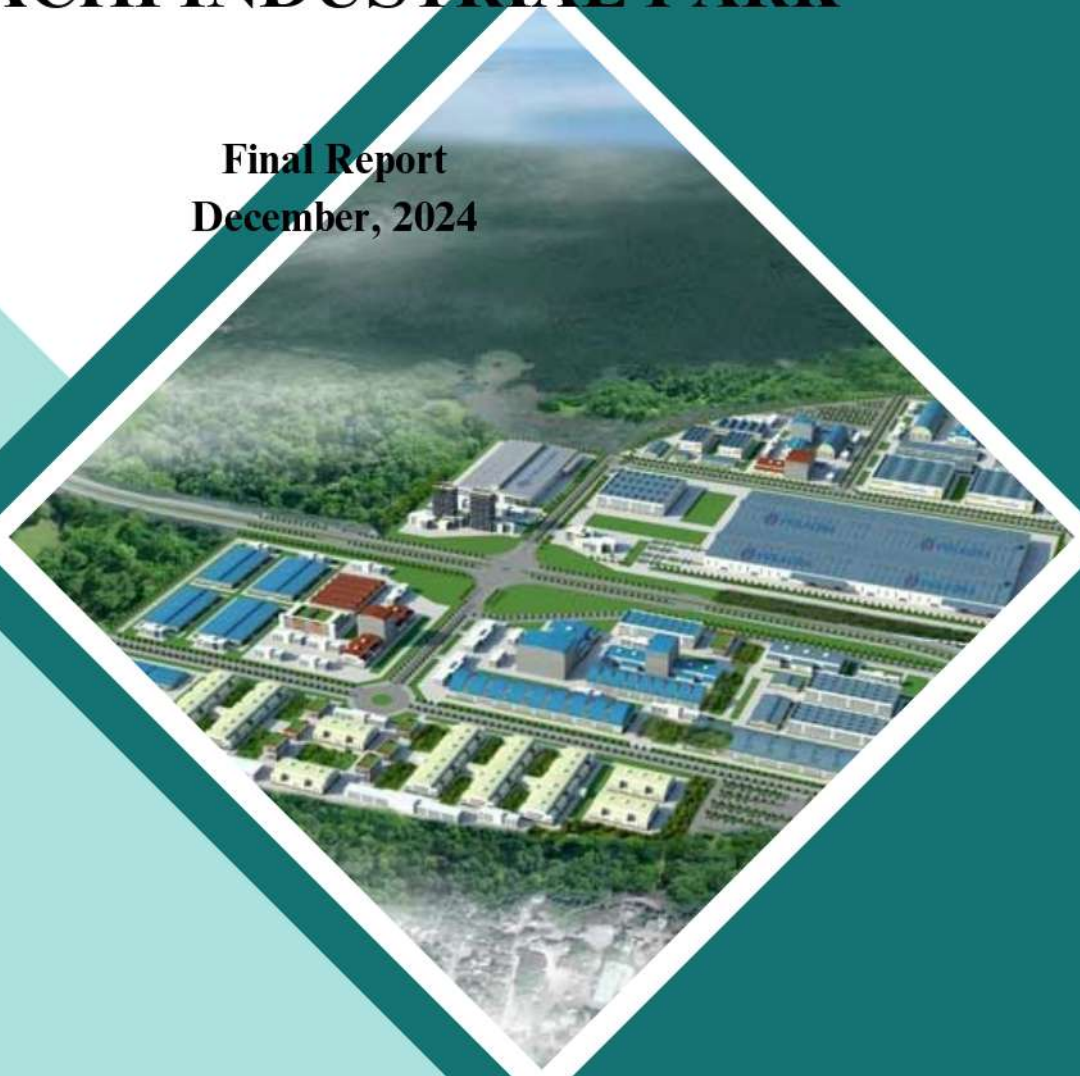
ENVIRONMENTAL IMPACT ASSESSMENT FOR KARACHI INDUSTRIAL PARK

Final Report
December, 2024



Submitted to:
Sindh Environmental Protection Agency

ENVIRONMENTAL IMPACT ASSESSMENT FOR KARACHI INDUSTRIAL PARK (KIP)

Final Report
December, 2024

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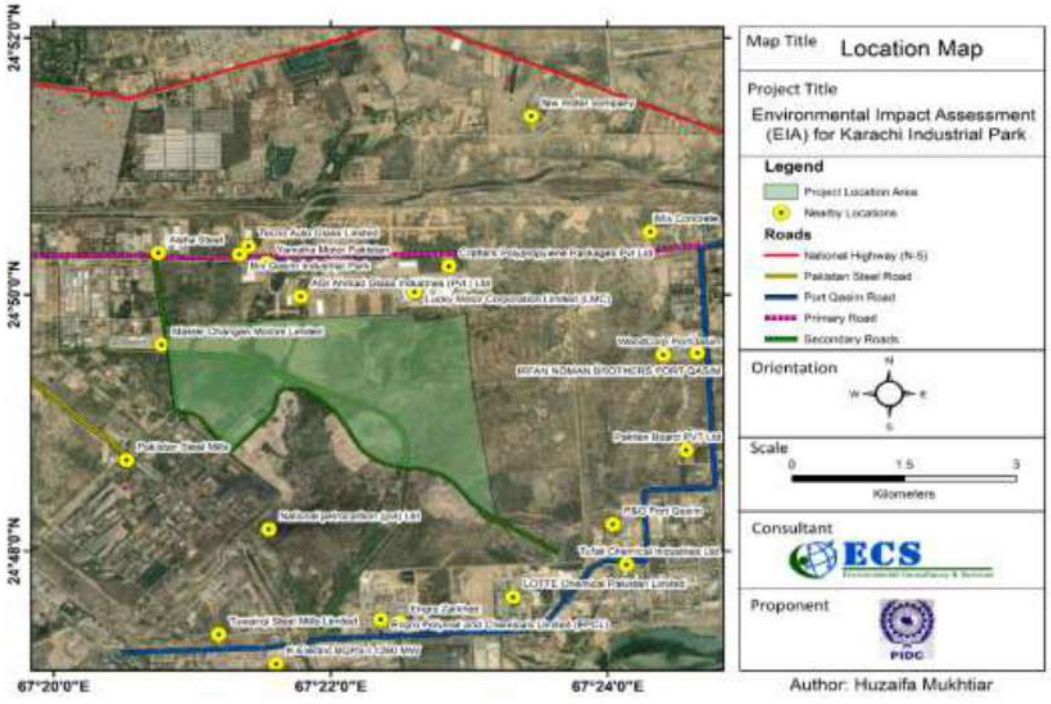
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Executive Summary

This Environmental Impact Assessment (EIA) report has been prepared for the "Karachi Industrial Park" (KIP). The Pakistan Industrial Development Corporation (PIDC) plans to establish 1500 acres Karachi Industrial Park in Karachi. PIDC is a Federal Government entity established in 1952 initially to set up industrial base in the country. Presently, PIDC primarily operates as an infrastructure developer of industrial parks /estates to facilitate industrial growth across Pakistan.

The proposed project will have total 322 industrial plots of various sizes, including 0.5 acre, 1 acre, 2-5 acre, and above 5 acres. The proposed project will be located in Pakistan Steel Mill area adjacent to Bin Qasim Industrial Park, Karachi. The location map of the project site is provided below.



This Environmental Impact Assessment (EIA) Report has been prepared in compliance with the Sindh Environmental Protection Act (SEPA), 2014 and SEPA Review of EIA/IEE Regulations, 2021. As per SEPA (Environmental Assessment) Regulations, 2021 the proposed project falls in the Category C (6) of Schedule-III "Establishment of Industrial Estates & Export Processing Zones" which means the proposed project requires full-fledged EIA to be conducted at planning stage for complying with SEPA Act, 2014.

The purpose of establishing Karachi Industrial Park (KIP) is to offer developed land on a low upfront cost having necessary infrastructure for hassle-free plug-and-play environment. It will also provide all necessary common facilities to industrial undertakings in the zone including but not limited to the following.

- One-Stop Service (OSS) center for coordination with government agencies.
- Warehouses
- Common services complex
- Exhibition / display centers
- Vocational training institutions
- Medical Center
- Firefighting Infrastructure

The Karachi Industrial Park (KIP) Project site is located in the Bin Qasim town that falls in Malir District of Karachi Division. The rock formation of this area is from Nari Formation of Oligocene age and partially from Gaj Formation of Miocene age. The Nari Formation consists mainly of sandstone, siltstone and shale with subordinate limestone while the Gaj Formation consists of shale with subordinate limestone. However, the proposed project site under focus is Pliocene and Miocene Sedimentary Rocks.

According to the Census 2017 provided by Pakistan Bureau of Statistics (PBS), total population of District Malir is 1,924,346. Total male population is 1,028,865 while female at 895,329. Sex ratio is 114.91. Total rural population is 857,634, Urban at 1,066,712. Rural sex ration is 113.34 while urban is 116.19. Average growth rate between 1998 and 2017 was 3.77%. Rural population growth was 5.02 while urban at 2.95, Bin Qasim subdivision has the population of 248,0981.

Karachi, the largest city in Pakistan and the capital of the Sindh province, experiences a hot desert climate, often referred to as an arid or semi-arid climate. Karachi's climate is characterized by extremely hot summers, mild winters, low rainfall, and high humidity. The city's weather patterns are influenced by its proximity to the Arabian Sea, the monsoon winds, and the desert conditions prevailing over much of the region.

[1] https://www.pbs.gov.pk/sites/default/files/population/2017/results/09701.pdf

The seismic activity in Karachi is monitored by institutions such as the Pakistan Meteorological Department (PMD) and the National Center for Seismology (NCS). These organizations use seismometers to detect and measure ground motion. The project area is falling in Zone 2B, varying from 0.16 to 0.24.

The flora of the project area is sparse and sporadic and at places present in clumps, mainly representing shrub formations like Capparis decidua, Euphorbia caudicifolia, Calotropis procera, Prosopis juliflora and Salvadora oleiodes out of them Prosopis juliflora seems dominating.

The project site is a part of pre-defined industrial estate and is almost sparsely inhabited with little vegetation comprising mostly bushes. The situation besides its vicinity to IBA (Important Bird Area) The Indus delta, does not offer much to the faunal group, however, some common animals representing different groups were reported and few of them identified and are provided in Chapter-4.

The public consultation and participation serves as an effective tool for social interaction. This tool helps to develop the significant confidence between the stakeholders and the proposed project holder PIDC to minimize the anticipated environmental and social impacts of the project. Primary stakeholder is usually referred to those, which may be directly affected by the proposed project's activities, while on the other hand secondary stakeholders refers to those who are usually affected indirectly or they have power to make decisions at governmental or institutional level. Based on the EIA procedures, detailed stakeholder consultative meetings, Focus Group Discussion (FGD) and Key Informant Interviews (KII) were carried out with different stakeholders. The most important objective of these consultation meetings was to determine the extent of the impact of different proposed project activities and suggest appropriate mitigation measures accordingly. The stakeholder consultation of this EIA clearly describes the issues raised by the stakeholders during different consultation meetings conducted specifically for this assignment, informal and focused group discussions with the primary and secondary stakeholders, which was primarily focused on determining the perceptions of the key stakeholders.

Establishment of KIP project at the present location is the best option for project establishment due the following.

A. **Site/Location:** The site will be located on land of Pakistan Steel Mills and thus there is hardly any chance of land dispute normally causing delays in the project. It is neither a prime agriculture land nor having any significant flora and fauna which can be disrupted from the project establishment on the site. The location of the park offers excellent link to local & global markets located

at 14 km from Port Qasim, having Rail Link at 4 km, National Highway at 5 km and Jinnah International Airport, Karachi at 25 km.

B. **Reduced operating costs:** The project offers the benefit of lower production costs because of its strategic location. Saving on logistical costs especially for export oriented industrial units due to close proximity to Port Qasim and National Highway.

C. **Availability of skilled labor and industrial culture:** Karachi is the major port city and industrial hub of the country. It is the financial and industrial capital of Pakistan and produces about 30 percent of value added in large-scale manufacturing and 25% of the GDP. As establishment of the project has the benefit of availability skilled labor in the market.

No alternate site has been provided by the client (PIDC) to be considered for environmental assessment. Thus, in the absence of any alternate site and remarkable advantages of the present site in the shape of proximity to port, airport, railway link and highway make it a very attractive site. Adjacent to the site is another industrial site (Bin Qasim Industrial Park) by the same client. This make it further attractive through cost reduction on the various facilities required for industrial establishment.

The potential impacts due to the implementation of the proposed project on the physical, biological, and socio-economic environment are identified, and the mitigation measures are proposed to mitigate the Project's adverse environmental effects. Positive impacts are also recognized and enhanced measures are proposed to make the project further beneficial for the nearby residents and local communities as well environment of the area. The proposed project's potential impacts (positive/negative), mitigation measures and enhancement measures are briefly described in Chapter-7 of this report.

The EMMP (Environmental Management and Monitoring Plan) has been designed to address how the proposed measures will be implemented. It defines the responsibilities of the PIDC and contractor; develops a system of checks and balances; proposes actions that are to be taken by each role player; and lays down the required documentation, communication, and monitoring procedures.

The process of environmental mitigation and management, as described in EMMP, involves the coordination and collaboration of several officials to ensure effective implementation. The Project Implementation Unit (PIU) is responsible for overseeing the implementation of the KIP project. The PIU plays a crucial role in managing the overall project and also ensuring compliance with environmental and social safeguards. They work closely with other stakeholders and agencies to execute the project in an environmentally and socially responsible manner.

The Project Supervision Consultant(s) (PSC) supports the PIU in construction management activities. The PSC provides oversight, and decision-making support to the PIU during the construction phase. They also play a role in ensuring that EMMP is properly integrated into the construction activities.

The Project Contractor(s) to be hired for carrying out the construction work on the KIP project are essential stakeholders in environmental management. The Project Contractor (s) is/are responsible for executing the construction activities in accordance with the project's environmental and social requirements. Contractors need to adhere to the EMMP and implement mitigation measures to minimize adverse environmental and social impacts during the construction phase of the project.

As per assessment, there are no critical environmental and social impacts associated with the project. However, several environmental concerns/ impacts are anticipated which need to be mitigated and managed through the mitigation measures and EMP and that the residual impacts will have minor significance. Overall the project will have positive socio-economic impacts.

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Acronyms

CDWP	Central Development Working Party
CETP	Combined Effluent Treatment Plant
EA	Environmental Assessment
EAC	EA Consulting Pvt. Ltd.
ECS	Environmental Consultancy & Services
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ETP	Effluent Treatment Plant
GOP	Government of Pakistan
IEE	Initial Environmental Examination
IMC	Independent Monitoring Consultant
KG/D	Kilogram Per Day
KIP	Karachi Industrial Park
KM/H	Kilometer Per Hour
M3/H	Cubic Meter Per Hour
MG/I	Milligram Per Liter
MOCC	Ministry of Climate Change
MM	Millimeter
MW	Mega Watt
NCS	National Conservation Strategy
NEP	National Environmental Policy
NEQS	National Environmental Quality Standards
NGO	Non-Government Organization
NIP	National Industrial Park
NOC	No Objection Certificate
O&M	Operation & Maintenance
OHS	Occupational Health and Safety
PEPA	Pakistan Environmental Protection Agency
PIDC	Pakistan Industrial Development Corporation
PIU	Project Implementation Unit
PM	Particulate Matter
PSDP	Public Sector Development Program
PSC	Project Supervision Consultant
PPE	Personal Protection Equipment
PQ	Port Qasim
PSM	Pakistan Steel Mills
SEPA	Sindh Environmental Protection Agency
SEQS	Sindh Environmental Quality Standards
SEZ	Special Economic Zone

CHAPTER 1: INTRODUCTION

1.1 Background Information

The Pakistan Industrial Development Corporation (PIDC) plans to establish 1500 acres Karachi Industrial Park in Karachi. PIDC is a Federal Government entity established in 1952 initially to set up industrial base in the country. Presently, PIDC primarily operates as an infrastructure developer of industrial parks /estates to facilitate industrial growth across Pakistan. The objectives of the PIDC include planned and rapid industrialization and developing a chain of new industrial estates. silent features of project are given in below.

Project Name:	Karachi Industrial Park (KIP)
Project Location:	Pakistan Steel Mills Zone Bin Qasim, Karachi
Project Land Area	1500 Acres
Project Cost	10 billion PKR
Study Category:	Environmental Impact Assessment Study
Proponent:	Pakistan Industrial Development Corporation (PIDC) 2nd Floor PIDC House, Dr. Ziauddin Road, Karachi, Pakistan. Phone: 021-3568-5041-9
Project Consultants:	EA Consulting Pvt. Ltd. Surbana Jurong Pvt Ltd. OMS Pvt. Ltd. International Consulting Associates Pvt. Ltd.
Environmental Consultant:	Environmental Consultancy & Services 223/F, Block-2, P.E.C.H.S. Karachi-75400 Ph: 021-34303165

Karachi stands as the economic powerhouse of Pakistan, driving industrial growth, international trade, and financial activities. The city's economic resilience and diverse industrial base make it a key player in the economic development of the country. Economically, Karachi is the engine driving Pakistan's financial and commercial sectors. However, despite its economic prominence, Karachi faces challenges related to infrastructure, including traffic congestion, inadequate public transportation, and issues

with utilities. Periodic security concerns have affected the business environment in the past but the recent a lot of efforts have been made to address and mitigate these challenges. The industrial growth in Karachi has largely been taking place in and disorganized and haphazard manner with many large, medium and cottage industries operating within the urban centers causing the deterioration of quality of life of city dwellers.

Special Economic Zones (SEZs) are designated geographical areas within a country that are subject to specific economic regulations and policies that differ from the rest of the country. The primary goal of establishing SEZs is to attract Foreign Direct Investment (FDI), promote economic growth, boost exports, and create employment opportunities. SEZs typically offer a business-friendly environment with various incentives and benefits to attract domestic and foreign businesses.

SEZs with various names such as Industrial parks, industrial estates and industrial zones are areas specifically planned for the purpose of industrial development. These are usually located outside the main residential areas of a city, and are provided with good transportation access, including road and rail and near to the airport and port. Such zones or area are also provided high-power and reliable electric supplies, high-end communications cables, large-volume water supplies, and high-volume gas lines. These zones are established in such areas to have minimum adverse impacts on the surrounding environment and natural resources. Such zones and parks attract new business by providing an integrated infrastructure in one location coupled with other incentives as well as simplified regulations.

Unfortunately, such specialized economic zones or industrial parks are very limited in the country which is one the main reasons of limited exports from Pakistan. Such zones and parks play a key role in employment generation and earning of foreign exchange through export of high-quality finished products with value addition.

1.2 Objectives of the Project

According to the feasibility report, the objective of the proposed project is to setup an international standard Special Economic Zone on an area of 1500 acres. The site is available with Pakistan Steel Mills at Port Qasim area. It will be equipped with all amenities / utilities at the doorstep of industries of the investors in a plug and-play environment. The project aims to encourage foreign and domestic investors with diversified entrepreneur backgrounds to setup industrial units, preferably oriented towards exports and imports substitution. Following are the key objectives of the Establishment of KIP.

1. To provide developed land on a low upfront cost and attractive payment plan.
2. To provide the necessary infrastructure for a hassle-free plug-and-play environment.
3. To provide all necessary common facilities to industrial undertakings in the zone including:
    - One-Stop Service (OSS) center for coordination with government agencies
    - Warehouses
    - Common services complex
    - Exhibition / display centers
    - Vocational training institutions
    - Medical Center
    - Firefighting Infrastructure

The industries including but not limited to the following are envisaged to be set up in the KIP.

- Automotive parts and steel downstream
- General light engineering, electronics
- Textile, packaging, food processing and cold storage
- Warehousing and logistics
- Green and sustainable technologies
- Social infrastructure

1.3 Project Proponent

The proponent of the Proposed Project is Pakistan Industrial Development Corporation (PIDC) which is a government-owned company under the administrative control of Federal Ministry of Industries & Production. The main objective of PIDC to set up industries in such sectors where the private investor was reluctant and where long gestation period was involved.

PIDC is also setting up to expand in the area of macroeconomic research to support Federal Govt. in policy making. PIDC's research arm, will spearhead this initiative, and aims to undertake research studies to substantiate the scope of long-term structured development of indigenous industrialization.

1.4 Project Outline and Location

The proposed project will have total 322 industrial plots of various sizes, including 0.5 acre, 1 acre, 2-5 acre, and above 5 acres. The proposed project will be located in Pakistan Steel Mill area adjacent to Bin Qasim Industrial Park, Karachi.

1.5 Purpose of Environmental Impact Assessment (EIA)

This Environmental Impact Assessment (EIA) Report has been prepared in compliance with the Sindh Environmental Protection Act (SEPA), 2014 and SEPA Review of EIA/IEE Regulations, 2021 for decision on environmental approval of the proposed project. As per SEPA (Environmental Assessment) Regulations, 2021 the proposed project falls in the Category C (6) of Schedule-III "Establishment of Industrial estates & Export processing zones" which means the proposed project requires full-fledged EIA to be conducted at planning stage for complying with SEPA Act, 2014.

1.6 Specific Objectives of EIA

The purpose of an Environmental Impact Assessment (EIA) for a development project is to evaluate and understand the potential environmental effects that may result from the implementation of that project. Environmental Impact Assessment serves as a valuable tool for balancing development objectives with environmental sustainability and ensuring that projects are carried out in a manner that minimizes harm to the environment. The primary objectives of an EIA are.

Identification of Environmental Impacts: Assess and identify the potential environmental impacts, both positive and negative, that may result from the proposed development project. This includes impacts on air quality, water resources, soil, biodiversity, ecosystems, and human health.

Prediction and Evaluation of Impacts: Evaluate the significance and magnitude of the identified impacts. This involves predicting the likely consequences of the project and assessing whether they are acceptable or can be mitigated to an acceptable level.

Public and Stakeholder Involvement: Involve the public, local communities, and relevant stakeholders in the decision-making process. This ensures that diverse perspectives are considered, and concerns from different groups are taken into account.

Alternatives Assessment: Explore and assess alternative project designs, locations, or technologies that may have lesser environmental impacts. This helps in identifying more sustainable options or optimizing the project to minimize negative effects.

Mitigation and Enhancement Measures: Propose measures to avoid, minimize, or mitigate adverse environmental impacts. This may involve suggesting changes to the project design, incorporating pollution control technologies, or implementing conservation and restoration measures.

Decision Support: Provide decision-makers with comprehensive information on the environmental implications of the project. This allows for informed decision-making by considering environmental factors alongside economic and social considerations.

Compliance with Regulations: Ensure that the proposed development complies with relevant environmental laws, regulations, and standards. EIA is often a regulatory requirement in many countries to obtain project approvals.

Continuous Monitoring and Adaptive Management: Establish a framework for monitoring the environmental performance of the project during and after implementation. This allows for adaptive management, where adjustments can be made to mitigate unforeseen impacts.

For achieving these targets amicably PIDC for their Karachi Industrial Park (KIP) project commissioned the services of environmental consultants namely, Environmental Consultancy & Services (ECS) for conducting this EIA study of the proposed project.

To further perform the tasks related to the subject EIA study, ECS engaged following experts as shown in the table 1.

Table 1: Detail of EIA Experts/Consultants

Sr. #	Name	Position in EIA Assessment Team
1.	Mr. Shahid Ali Lutfi	Team Leader / Sr. Environment Engineer
2.	Dr. Muhmmad Bashir Khan	Sr. Ecologist
3.	Mr. Nouman Sheikh	Sr. Environmental Engineer
4.	Dr. Atif Javed	Sr. Environmental Engineer
5.	Mr. Mian Rashid Mahboob	Sr. EHS Expert
6.	Mr. Mohsin Mushtaque	Sr. Sociologist
7.	Ms. Mariam Intesama	Environmentalist

1.7 EIA Study Stages

Stage-I **Project Data Acquisition**	- Initial meeting between environmental consultant and project design team for basic project acquisition.
Stage-II **Desk Study/Literature Review**	- Review of regulatory requirements based on preliminary assessment of project activities and the project area. - Review of secondary literature review to collect environmental data about the project area.
Stage-III **Scoping and Stakeholder Consultation Meetings**	- Disclose basic non-technical summary of the proposed project to the primary and secondary stakeholder through formal and informal discussions during scoping and consultation meetings to identify environmental and social parameters those are likely to undergo significant change due to the proposed project and document suggestions, concerns and recommendations of stakeholders consulted.
Stage-IV **Baseline Investigations and Surveys**	- Site visits for the Baseline Investigations including Physical, Ecological and Social Environmental conditions of the project area.
Stage-V **Environmental and Social Impact Analysis and Mitigation**	- Evaluation of the environmental parameters those are likely to undergo significant change due to the proposed project. - Development of Environmental Management and Monitoring Plan to mitigate the adverse impacts of the proposed project.
Stage-VII **Documentation of EIA report**	- Documentation and submission of EIA report to SEPA for preliminary scrutiny

1.8 EIA Report Structure

This EIA report has been organized in following chapters:

Chapter 1: Introduction
Highlights background information, basic overview of the proposed project, need and significance of the proposed project and purpose of this EIA study.

Chapter 2: Legislative and Policy Framework
Gives an overview of policies, legislations, and guidelines relevant to the proposed project.

Chapter 3: Project Description
Highlights detailed description of the proposed project such as construction, operations and decommissioning process, utility requirements/source and completion timeframe etc.

Chapter 4: Environmental and Social Baseline
Describes the existing environment in the proposed project area. It carries details of area's infrastructures, physical, ecological, and socio-economic conditions of the area.

Chapter 5: Stakeholder Consultations
Describes the details about all stakeholders, the overall consultation process and their concerns and recommendations about the project.

Chapter 6: Analysis of Alternatives
This section of the EIA document presents an outline for project alternatives to select the best option among all the possible project options which includes project sitting and technologies.

Chapter 7: Environmental Impacts Analysis and Mitigations
Describes the anticipated environmental and social impacts of the project and their consequent screening in accordance with the general guidelines. The screening further identifies the residual impacts resulting as a consequence of the adoption of mitigation measures.

Chapter 8: **Environmental Management and Monitoring Plan**

Details the environmental management and monitoring plan to be implemented by the proponent for effective mitigation of adverse impacts and improved environmental performance.

Conclusion:

Summarizes the report and presents conclusion.

CHAPTER 2: LEGISLATIVE AND POLICY FRAMEWORK

2.1 Background Information

The first cover to the environmental safeguards within the country was under the Pakistan Environmental Protection Ordinance (EPO), 1983. It was the first commitment at the state level to ensure environmental conservation and safeguards in developmental pursuits. EPO focused primarily on industrial operations and unspecified other environmental aspects. The perceived technical lacunas were resolved when Pakistan Environmental Protection Act (PEPA), 1997 was enacted which was ambitious to incorporate preventive and curative measure for the promotion of sustainable development in the country (GoP, 1997).

Before the 18th Amendment in the constitution of Pakistan, Environmental Protection Act empowered Pakistan Environmental Protection Agency to implement all the relevant environmental legislation across all the provinces of Pakistan. However, after the 18th amendment the environmental portfolio devolved to provincial governments. Consequently, the Sindh Environmental Protection Agencies was empowered to formulate environmental legislation, rules, regulations and standards and their enforcement/implement in the whole Sindh provinces as a formulating, regulatory and monitoring agencies. However, it is important to note that, the enactment of comprehensive legislation on the environment, covering multiple areas of concern, is a relatively an ongoing and continuous phenomenon in a developing country like Pakistan.

2.2 Environmental Legislation Framework

2.2.1 Pakistan Environmental Protection Ordinance, 1983 (PEPO, 83)

Pakistan Environmental Protection Ordinance, 1983 (PEPO), 83 was the first specialized environment law promulgated through an ordinance. Under section 8 of the PEPO, 83 it was required to get environmental approval. However, practically this law was never implemented due to lacunas in it. Environmental Protection Agencies were not established at that time and there was no judicial mechanism for implementation and execution of this law. No rules were framed and thus for practical purposed this law never got implemented. However, with this introductory law Environment Protection Agencies were established in late 80s of last century and later on in 1994 National Environmental Quality Standards (NEQS) were notified.

2.2.2 Pakistan Environmental Protection Act, 1997 (PEPA, 97)

After passed by the Majlis-e-Shoora (Parliament), Pakistan Environmental Protection Act, 1997 (PEPA), 97 received the assent of the Acting President on the 3rd December, 1997. The law provides for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution, promotion of sustainable development, and for matters connected therewith and incidental thereto.

Requirement of Section 12 of PEPA, 1997 is reproduced below.

"12. Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA). (1) No person of a project shall commence construction or operation unless he has filed with the federal Agency an Initial environmental examination or, where the project is likely to cause an adverse environmental effect an environmental impact assessment and has obtained from the Federal Agency approval in respect thereof."

2.2.3 Sindh Environmental Protection Act, 2014

After the 18th amendment all provinces adapted or enacted their own Environmental Protection Laws in the relevant province. The Sindh Environmental Protection Act was notified by the Provincial Assembly of Sindh via notification #PAS/Legis-B-06/2014 dated March 20, 2014. The Act extends to whole of the province of Sindh. The Sindh Environmental Protection Act, 2014) like PEPA, 1997 provides for the protection, conservation, rehabilitation and improvement of the environment. This Act, consisting of 37 sections divided into eleven Parts, establishes composition, duties and responsibilities of the Sindh Environmental Protection Council, entitled to: co-ordinate and supervise the enforcement of all the provisions relating to the environment in the Province; approve comprehensive provincial environmental and sustainable development policies and ensure their implementation within the framework of a conservation strategy and sustainable development plan; approve the Sindh Environmental Quality Standards; provide guidelines for the protection and conservation of species, habitats, and biodiversity and for the conservation of renewable and non-renewable resources; integrate principles and concerns of sustainable development into socio-economic and development policies, plans and programmes at the provincial, district and local levels; deal with inter-provincial and federal-provincial issues; provide guidelines for biosafety and for the use of genetically modified organisms; etc.

It creates the Sindh Environmental Protection Agency entitled to administer and implement the provisions of this Act and the rules and regulations regarding the environmental issues. The Sindh Sustainable Development Fund shall be managed by a

Board known as the Provincial Sustainable Development Fund Board. The Act specifies that no person shall discharge waste, pollutant, emit noise or any other matter that may cause or likely to cause pollution or adverse environmental effects (as defined in section 2) in levels higher than specified in Sindh Environmental Quality Standards. No person shall import hazardous waste into Sindh province or its coastal, internal, territorial or historical waters, except prior approval of the Agency. Part VI deals with Environmental Examinations and Assessments and specifies that all provincial authorities, local councils and local authorities responsible for formulating policies, legislation, plans and programs to be implemented in Sindh province which may cause any environmental impact in the jurisdiction of the province shall forward to the Sindh Environmental Protection Agency a strategic environment assessment. Copy of SEP Act is attached as Annexure-1.

2.2.4 Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021

Under these regulations the projects are categorized requiring IEE or EIA at the planning stage to be approved by Sindh Environment Protection Agency (SEPA). The categories are defined in the Sindh Environmental Protection Agency (SEPA). According to the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021 the proposed project falls under the Schedule III. Copy of SEPA Environmental Assessment Regulations is attached as Annexure-2.

- Category 'C' of Manufacturing and processing,
- Establishment of Industrial estates & Export processing zones

2.2.5 Sindh Environmental Quality Standards (SEQS)

Environmental quality standards play a crucial role in regulating industrial activities, waste disposal, and other human interventions that may impact the environment. Compliance with these standards is essential to prevent and mitigate adverse environmental effects, ensuring sustainable development and the well-being of the population.

In exercise of the powers conferred by section 37 of the Sindh Environmental Protection Act, 2014, the Sindh Environmental Protection Agency, with the approval of the Government, have notified Sindh Environmental Quality Standard, 2016 which specifies standards for industrial and municipal effluents, gaseous emissions, vehicular emissions, and noise levels. These standards would be applicable to all industrial units located inside the Karachi Industrial Park (KIP) individually as well as to the whole industrial park. Sindh Environmental Protection Agency, with the approval of the Sindh Environmental Protection Council, has established following standards.

- SEQS for Municipal and Industrial effluent
- SEQS for Industrial Gaseous Emissions and Motor Vehicle Exhaust
- SEQS for Ambient Air Quality and Ambient Noise

The Karachi Industrial Park (KIP) will have various type of industries described in the relevant section and thus would emit emission and discharge effluents which will require to be in compliance with Sindh Environmental Quality Standards (SEQS). Copy of SEQS is attached as Annexure-3.

2.2.6 The Sindh Environmental Quality Standards (Self-Monitoring and Reporting by Industry) Rules, 2014

These rules are called the Sindh Environmental Quality Standards (Self-Monitoring and Reporting by Industry) Rules, 2014. Priority parameters are parameters of Sindh environmental quality standards which are selected for the purpose of submission of Environmental Monitoring Reports to the Agency by an industrial unit. On the basis of the pollution level of an industrial unit, these rules classify the unit into category "A", "B" or "C" for liquid effluents, and category "A" or "B" for gaseous emissions.

Category "A" Industrial unit

An industrial unit in category "A" shall submit environmental monitoring reports on monthly basis. An industrial unit in category "A" shall maintain a record of the times during which start-up and upset conditions occur and shall mention the total time elapsed in such conditions in its monthly environmental monitoring report.

Category "B" Industrial unit

An industrial unit in category "B" shall submit environmental monitoring reports on quarterly basis.

Category "C" Industrial unit

An industrial unit in category "C" shall submit environmental monitoring reports on biannual basis for priority parameters in respect of liquid effluents.

2.2.7 Sindh Hazardous Substance Rules, 2014

The Sindh Hazardous Substances Rules, 2014 are a set of rules derived from the Sindh Environmental Act, 2014 and are first of the very specific hazardous substances regulations brought into force in 2014 after the initial draft set of rules devised in 2003. They represent specific regulations with aspect of handling, storage and disposal of hazardous substances and issuing an approving license to the user or facility. The

Schedule-I of the Rules enlists the hazardous substances that are under the scrutiny of the Sindh-EPA.

Under its licensing terms, the Rules highlight particular components as follows:

- Employment of Qualified technical personnel
- Packing and labeling
- Conditions of Premises
- Safety precautions
- Trainings
- A comprehensive safety plan
- Waste management Plan and
- Transporting of hazardous substances

2.2.8 Sindh Hospital Waste Management Rules, 2014

Sindh Hospital Waste Management Rules, 2014 promulgated under SEPA 2014 were enforced on December, 2014.Under these Rules, every hospital owner, occupier, operator shall be responsible for the management of the hospital waste generated by it till its final disposal in accordance with the provision of the Act and these rules.

The section 2 of Sindh Hospital Waste Management Rules, 2014 states that a "Hospital Waste Management Plan shall be based on internationally or nationally recognized environmental management practices, standards, which shall efficiently and effectively address the hospital waste".

According to Section 8, "on recognition of the type and nature of the waste material and the organisms in the waste, risk waste shall be inactivated or rendered safe before final disposal by a suitable thermal, chemical, irradiation incineration, filtration or other treatment method".

The Hospital Waste Management Plan shall include:

- Waste management points for every ward and department, indicating each point, location on the basis of risk assessment.
- The categories of waste being generated in accordance with Schedule-I
- Quantity of each waste category;
- Details of the types, numbers of containers, waste bags and trolley required annually;
- Schedule and frequency of waste collection from each ward and department;
- Effective arrangements for onsite and off-site transportation of waste as provided in Schedule-I and II;

- Contingency plans for storage or disposal of risk waste in the event of breakdowns of hospital waste facility, or of maintenance or collection arrangements;
- Training courses and programs on waste management;

The Waste Management Plan shall be regularly monitored, reviewed, revised and updated and submitted to the Agency on annual basis.

2.3 National and Provincial Environmental Policies and Guidelines

Environmental Policies and Guidelines relevant to the proposed project were also reviewed for this EIA study brief history of the national policies and guidelines is given below.

2.3.1 National Conservation Strategy (NCS)

The National Conservation Strategy (NCS) is the primary and earliest Policy document of the Government of Pakistan on national environmental issues. The Policy was approved by the Federal Cabinet in March 1992. The Strategy also attained recognition by international donor agencies, principally the World Bank. The NCS identifies 14 core areas including conservation of biodiversity, pollution prevention and abatement, soil and water conservation and preservation of cultural heritage and recommends immediate attention to these core areas in order to preserve the country's environment. A midterm review of the achievements of the NCS in 2000 concluded that achievements under the NCS have been primarily awareness raising and institutional building rather than actual improvement to environment and natural resources and that the NCS was not designed and is not adequately focused as a national sustainable development strategy2. The need therefore arose for a more focused National Environmental Action Plan (NEAP) required to bring about actual improvements in the state of the national environment with greater emphasis on poverty reduction and economic development in addition to environmental sustainability.

The NEAP was approved by the Pakistan Environmental Protection Council under the chairmanship of the President/Chief Executive of Pakistan in February 2001. NEAP now constitutes the national environmental agenda and its core objective is to initiate

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[2] *Arthur J. Hanson et al, Pakistan's National Conservation Strategy Renewing Commitment to Action, Report of the Mid-Term Review, 2000*

actions that safeguard public health, promote sustainable livelihoods, and enhance the quality of life of the people of Pakistan. A National Environmental Policy has been approved by the Federal Cabinet in its meeting held during June 20053. This policy has already been endorsed by the Pakistan Environmental Protection Council during 2004. The new policy has total 171 guidelines on sectoral and cross-sectoral issues. The objectives of new policy include assurance of sustainable development and safeguard of the natural wealth of country. The following are the approved Sectoral Guidelines:

- Water Supply and Management;
- Air Quality and Noise;
- Waste Management;
- Forestry;
- Biodiversity and Protected Areas;
- Climate Change and Ozone Depletion;
- Energy Efficiency and Renewable;
- Agriculture and Livestock;
- Multilateral Environmental Agreements.

2.3.2 National Environmental Policy, 2005

National Environmental Policy aims to protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development. The objectives of the policy are:

- Conservation, restoration and efficient management of environmental resources.
- Integration of environmental considerations in policy making and planning process.
- Capacity building of government agencies and other stockholders at all level for better environmental management.
- Meeting international obligations effectively in line with the national aspirations.
- Creation of a demand for environment through mass awareness and community mobilization4.

[3] *National Environmental Policy, GoP, 2005*
[4] National Environmental Policy, 2005.

2.3.3 National Climate Change Policy, 2011

To ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and to steer Pakistan towards climate resilient development. The main objectives of Pakistan's Climate Change Policy include:

- To pursue sustained economic growth by appropriately addressing the challenges of climate change.
- To integrate climate change policy with other inter-related national policies.
- To focus on pro-poor gender sensitive adaptation while also promoting mitigation to the extent possible in a cost-effective manner.
- To ensure water security, food security and energy security of the country in the face of the challenges posed by climate change.
- To minimize the risks arising from the expected increase in frequency and intensity of extreme weather events such as floods, droughts and tropical storms.
- To strengthen inter-ministerial decision making and coordination mechanisms on climate change.
- To facilitate effective use of the opportunities, particularly financial, available both nationally and internationally.
- To foster the development of appropriate economic incentives to encourage public and private sector investment in adaptation measures.
- To enhance the awareness, skill and institutional capacity of relevant stakeholders.
- To promote conservation of natural resources and long term sustainability5.

2.3.4 Sindh Drinking Water Policy, 2017

The Public Health Engineer and Rural Health Development Department, Government of Sindh with the approval of Chief Minister Sindh issued Drinking Water Policy in 2017. The main principles of Sindh Drinking Water Policy have been adopted from National Water Policy, 2009. The goal of Sindh Drinking Water Policy, 2017 is to improve the quality of life of people of Sindh by reducing morbidity and mortality caused by water borne diseases through provision of safely managed and potable drinking water to the entire population that is located in premises available when needed

[5] *National Climate Change Policy, 2011.*

and free from contamination, affordable and sufficient quantity and in a way that is equitable and sustainable.

2.4 Other Applicable Cross-sectoral Laws in Sindh

The term "environment" encompasses both the physical and biological factors and includes the air, water, soil, climate, flora, fauna, and various other elements that collectively create the ecological system in a specific area. The environment also encompasses the interactions and relationships between living organisms and their surroundings. The concept of the environment extends beyond the immediate physical space and incorporates the complex web of interconnected ecosystems and habitats on a global scale.

Understanding and protecting the environment are crucial for promoting sustainable development and ensuring the well-being of all living organisms. As such, apart from Sindh Environment Protection Act in general other special laws related to forests, water resources, wildlife, land, agriculture, health and planning are also applicable while preparing the EIA report of a development project. The following laws are relevant to this project and are discussed briefly in the following paras.

i. **Land Acquisition Act 1894:** Land Acquisition Act, 1894, empowers the government to acquire private land for a project of national importance and lays down the acquisition procedure. A compensation is paid to the owners as per principals laid down in the law. However, the proposed project site is available with Pakistan Steel Mill which is not used for agriculture or any other productive use and PIDC as Zone Developer will develop infrastructure.

ii. **The Sindh Forest (Amendment) Act, 2012:** Regulates forest resources in the province. Categorize the forest area such as reserve, guzara and protected forests. It empowers the government to declare any forest area reserved or protected and implement the relevant rules and regulation in such forests. As explained above the land is not protected or reserved forest. However, there are wild vegetation and 250 trees at the project site. The trees will be retained/preserved and no tree will be cut. In addition, the plantation of 5000 indigenous tree species will be carried out in the proposed project area.

iii. **The Sindh Wildlife Protection Ordinance 1972 (Amendment 2001, 2010) Act, 2007, 2020:** The law empowers the provincial wildlife department to establish game reserves, parks, and wildlife sanctuaries. It regulates the hunting and disturbance of wildlife. It provides for the preservation, protection, and conservation of wildlife by the formation and management of protected areas

and the prohibition of hunting of wildlife species declared protected under the ordinance. The ordinance also specifies three broad classifications of the protected areas which are National Parks, Wildlife Sanctuaries and Game Reserves. No protected area, game reserve is located in the surroundings of the project which can be effected by the project activities during construction and/ or operation.

iv. **The Sindh Occupational Safety and Health Act, 2017:** While, environmental laws and standards mainly focus on the impacts of the project on the surrounding environment (air, water, soil, socioeconomics), the health and safety laws primarily focus on the inside environment of the project to be suitable and safe for the staff and workers. The Sindh Occupational Safety and Health Act, 2017 provides for the health, safety and welfare of workers, disposal of solid wastes and effluents, and damage to private and public property, compulsory vaccination, inoculation, and Precautions against contagious or infectious diseases at workplaces. The project management will chalk out a standard health and safety policy and shall implement the same in accordance with provision of law.

v. **Sindh Cultural Heritage (Preservation) Act – 1994:** Preservation of culture heritage is an important role in the development of society and understanding of the past culture of the civilizations. Sindh Cultural Heritage (Preservation) Act – 1994 provides rules and regulations to preserve and protect ancient places and objects of agricultural, historical, ethnological, archaeological, artistic, and national interest in the province of Sindh. Nothing is expected to be damaged of culture and heritage importance due to execution of the Proposed KIP project. However, in case during the excavation if anything of such nature was found the same will be preserved according to the provision of the law.

vi. **The Antiquities Act 1975:** Preservation and protection of antiquities (any object more than 75 years old) is mandatory under the Antiquities Act, 1975. The law also empowers the government to declare any antiquity as protected. There is hardly any chance for finding such material in the proposed project area, however, if during digging for the infrastructures any such material was found the same shall be brought in the notice of relevant department of the Government for further action.

vii. **Sindh Solid Waste Management Board Act, 2014**. Solid waste from industrial park is mainly comprised of industrial waste and municipal waste and both type of waste shall be disposed as per provision of relevant laws and applicable good

practices. Sindh Solid Waste Management Board (SSWMB) was formed under the SSWM Act of 2014. The SSWMB is responsible for the collection and disposal of solid waste. All these regulations will apply to the project construction & operations and respective industries will make contract with SSWMB for waste disposal.

viii. **Sindh Canal and Drainage Act, 2016**: Discharge of effluents from the individual industries and the overall industrial park would be disposed after proper treatment as per requirement of the Sindh Canal and Drainage Act, 2016. The Canal and Drainage Act amended 2016, prohibits fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of the drainage. All these regulations will apply to the project construction as well as the operation phases. Badal Nallah is the nearby water body which passes right center of the proposed project area.

ix. **Employment of Child Act, 1991**: Child labour is prohibited through the world and likewise it is in Pakistan. In Pakistan, the Employment of Child Act (ECA) 1991 disallows child labour in the country. It states that no child shall be employed or permitted to work in any of the occupations outlined in the ECA (such as transport sector, railways, construction, industrial operation and any other jobs of similar nature) or in any workshop wherein any of the processes defined in the Act is carried out. The contractor will be bound by this Act to disallow any child labour at the project sites. All these regulations will apply to the project's construction & operation phases.

x. **Sindh Labour Laws:** Following the 18th constitutional amendment of 2010, the subject of labour has been devolved to the provinces prompting Departments of Labour to embark on the development of labour legislation at provincial level. Province of Sindh has developed 14 new labour laws through its tripartite consultative process. Some of the relevant laws applicable with this project are The Sindh Minimum Wages Act 2015, Sindh Payment Wages Act 2015, Sindh Workers' Welfare Management Act 2015, Sindh Companies Profit (Workers' Participation) Act 2015, Sindh Shops and Commercial Establishment Act 2015 and Sindh Factories Act 2015. The management of the KIP is committed to implement the relevant provision of these laws in the project.

xi. **Factories Act 1934;** According to this act, "factory" means any premises, including the precincts thereof, whereon ten or more workers are working, or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on or is ordinarily carried on

with or without the aid of power, but does not include a mine, subject to the operation of the Mines Act, 1923 (IV of 1923) :Under this act, effective arrangements shall be made in every industry to accommodate and dispose the effluent and waste generated due to the effect of manufacturing processes carried out on them.

xii. **Sindh Local Government Ordinance:** Under clause (h) of sub section 54 of chapter V, the law endorses the management, operation, maintenance and improvement of the sanitation disposal and solid waste collection of solid, liquid, industrial and hospital waste.

xiii. **Sindh Healthcare Commission Guidelines:** These guidelines enforce the implementation of hospital waste management under the Pakistan Environmental Protection Act 1997.

2.5 Organizational Protocols for Industrial Parks

2.5.1 Ministry of Industries and Production Government of Pakistan

The PC-I for the Project "Development of Karachi Industrial Park (KIP) on 1500 Acres of Pakistan Steel Mills Land at Karachi Including Feasibility Study" was submitted for Public Sector Development Program (PSDP) funding demand to the Ministry of Industries & Production vide PIDC letter no. PIDC/PSDP-21/22-2 dated 2nd June, 2021 amounting to Rs. 6951.00 million. The Feasibility Component of the said project, amount to Rs. 400.0 (mil), was approved in the Central Development Working Party (CDWP) meeting held on 4th June, 2021. Accordingly, Administrative Approval was issued via letter No. 1(9)/ 2021 AC (ID-1I) dated 17th August, 2021.

Authorities responsible for KIP project.

i. Sponsoring

Ministry of Industries & Production through PSDP

ii. Execution

Pakistan Industrial Development Corporation (PIDC)

iii. Operation and Maintenance

PIDC by levying appropriate service.

iv. Concerned Federal Ministry

Ministry of Industries and Production

2.5.2 Pakistan Industrial Development Corporation (PIDC)

Pakistan Industrial Development Corporation (PIDC) is a government-owned company under the administrative control of Federal Ministry of Industries & Production, with the objective to set up capital intensive industries in such sectors where the private investor was reluctant and where long gestation period was involved. PIDC established 94 such industrial units throughout the country on Build Operate and Transfer (BOT) model, which played key role in country's industrial development.

The role of PIDC was redefined during 2004-05 with a view to facilitate the pace of industrialization in the country and in line with Government of Pakistan's initiative for strategic development & competitiveness and to develop non-traditional sectors to contribute effectively towards accelerated growth in exports from Pakistan. Then the Board of Directors of PIDC was also reconstituted with total 15 members, including 10 members from private sector and the Minister of Industries & Production as its Chairman.

Pakistan Industrial Development Corporation (PIDC) under Ministry of Industries and Production, Government of Pakistan has secured funds from PSDP for conducting the feasibility study for the KIP project and is responsible for the execution of feasibility study and detail design components of the project.

2.5.3 Industries & Commerce Department Government of Sindh

Industries & Commerce Department has been playing an important role in running the economic wheel of the province. Realizing the importance of industries this department has taken all out efforts to solve the problems of industrialists. Industrial friendly policies have made it possible to have better relations with the industrialists who in turn have invested in many industries. This Department has following four attached offices.

i. Directorate of Industries (Industries Dashboard)
ii. Sindh Government Press
iii. Sindh Industrial Trading Estate Limited
iv. Sindh Small Industries Corporation

The department has adopted a very liberal policy for establishment of new industry and /or industrial estate, industrial and Special Industrial Zones NOC is required except for the following industries.

- Arms and Ammunition
- Security printing and Mint

- High Explosives
- Radioactive substances
- Alcohol/industrial alcohol manufacturing unit

2.5.4 Sindh Small Industries Corporation (SSIC)

Sindh Small Industries Corporation (SSIC) was established through an Act No. XXVI-1972 of Government of Sindh with a mandate to develop & promote Small Industries in Sindh Province as well as to promote Sindh's Handicrafts. Main objects of the SSIC are given below.

- To promote Small Industries
- To provide necessary infrastructure
- To impart training to the youth of the province in various crafts / trades
- To motivate & encourage people of rural areas for setting up of Small Industries
- To provide assistance to craftsmen in designing and adaptation in accordance with market demand
- To provide marketing facilities to the craftsmen through SSIC's Handicrafts Shops, Participation in Fairs and Exhibitions in local and foreign markets

Only following 02 Small Industrial Estates; Small Industrial Estate Sukkur and Larkana were inherited from the defunct West Pakistan Small Industries and Handicrafts Development Corporation (WPSIC). Later on, SSIC established 19 Small Industrial Estates (SIEs), 03 Industrial Parks (IPs) almost in all district headquarters of Sindh Province.

Through Sindh Small Industries Corporation has recently provided plots for small & medium size industries. More land is being taken from the Government to establish new industrial areas.

CHAPTER 3: PROJECT DESCRIPTION

3.1 Project Background and Overview

This section of the EIA report presents a detailed project description which is mainly related to the construction, commissioning, and operational phases of the proposed project. A detailed insight regarding the project description was established by reconnaissance survey, site visit, and discussions between technical team of Project Proponent and the consultant.

3.2 Purpose of the Proposed KIP Project

Karachi is the major port city and industrial hub of the country. It is the financial and industrial capital of Pakistan has an estimated GDP of $164 billion. The city produces about 30 percent of value added in large-scale manufacturing and 25% of the GDP. Industrial land occupied is about 75 sq. km. in Karachi which is about 4.16 percent of the total city area. It houses major automobile manufacturers, Textiles, cement, steel, heavy machinery, chemicals, food, banking, insurance establishments and many others.

However, the industrial growth in Karachi has largely been taking place in an unorganized and haphazard manner with many large, medium and cottage industries operating within the urban centers causing the deterioration of quality of life of city dwellers. Further, the availability of developed industrial plots is very scarce and that too at prohibitively high prices. The only available industrial estates in Karachi are as follows.

- Bin Qasim Industrial Zone
- Federal B Industrial Area
- Korangi Industrial Area
- North Karachi Industrial Area
- Karachi Export Processing Zone
- Korangi Creek Industrial Park
- Bin Qasim Industrial Park
- Pakistan Textile City
- S.I.T.E. Industrial Area
- West Wharf Industrial Area

Most of the above stated industries are unplanned and lack basic facilities. There is a possibility that the industries might be relocated to new planned industrial parks, like Karachi Industrial Park.

The purpose of establishing Karachi Industrial Park (KIP) is to offer developed land on a low upfront cost having necessary infrastructure for hassle-free plug-and-play environment. It will also provide all necessary common facilities to industrial undertakings in the zone including but not limited to the following.

- One-Stop Service (OSS) center for coordination with government agencies.
- Warehouses
- Common services complex
- Exhibition / display centers
- Vocational training institutions
- Medical Center
- Firefighting Infrastructure

3.3 Advantages of the Proposed KIP Project

With the view of the extended benefits and in order to promote industrial development in the country, the Government of Pakistan has initiated several measures and provided various incentives. Setting up or Karachi Industrial Park (KIP) is one such measures. The following are some of the advantages the project will offer for industrial sector growth.

i. Low capex requirement for land acquisition: The project will offer developed land with all necessary infrastructure at a low upfront cost with balance on a longer-term lease / rental model. This model is not available at other industrial estates.

ii. Reduced operating costs: The project offers the benefit of lower production costs because of its strategic location.

iii. Availability of skilled labor:

iv. Saving on logistical costs especially for export oriented industrial units due to close proximity to Port Qasim and National Highway.

v. Presence of repair, maintenance and service facilities.

vi. Proximity of financial institutions.

vii. Availability of infrastructure: The infrastructural facilities such as electricity, water, sewerage, roads, drainage, firefighting, internet, telecom etc., will be readily available in the Proposed Project. Entrepreneurs need not spend their time and money to get utility connections. Therefore, installation of industry and commencement production can happen very quickly without any wastage of time and resources.

viii. Prime location: The location of the park offers excellent link to local & global markets through Rail Link at 4 km, National Highway at 4 km, Jinnah International Airport, Karachi at 25 km and Port Qasim at 12 km.

ix. Employment opportunities: Industrial Parks create more employment opportunities and increase the mobility of labor. Since many of the units are labor intensive, there will be ample opportunities for both skilled and unskilled workers.

3.4 Project Location and Accessibility

The Proposed Project is located adjacent to existing Downstream Industrial Estate and Township Housing Scheme of Pakistan Steel Mills, Bin Qasim Town, Karachi, in Sindh Province. The project location offers excellent links to local and global markets.

- Port Qasim at 14 km
- Rail Link at 5 km
- National Highway at 5 km
- Jinnah International Airport, Karachi at 25 km
- City Centre at 42 km

In addition, there are local transportation options accessible, contributing to reduced operational expenses and enhanced convenience. The location map of the Proposed Project is shown below in Figure-1.

The project site consists of wild vegetation and approximately 250 trees. There are a few kachha homes, a shrine namely "Syed Ghulam Hussain Shah" and approximately 20-25 graves besides the shrine. The trees, shrine, and graves will be retained/preserved. In addition, Badal Nallah is crossing through project site.

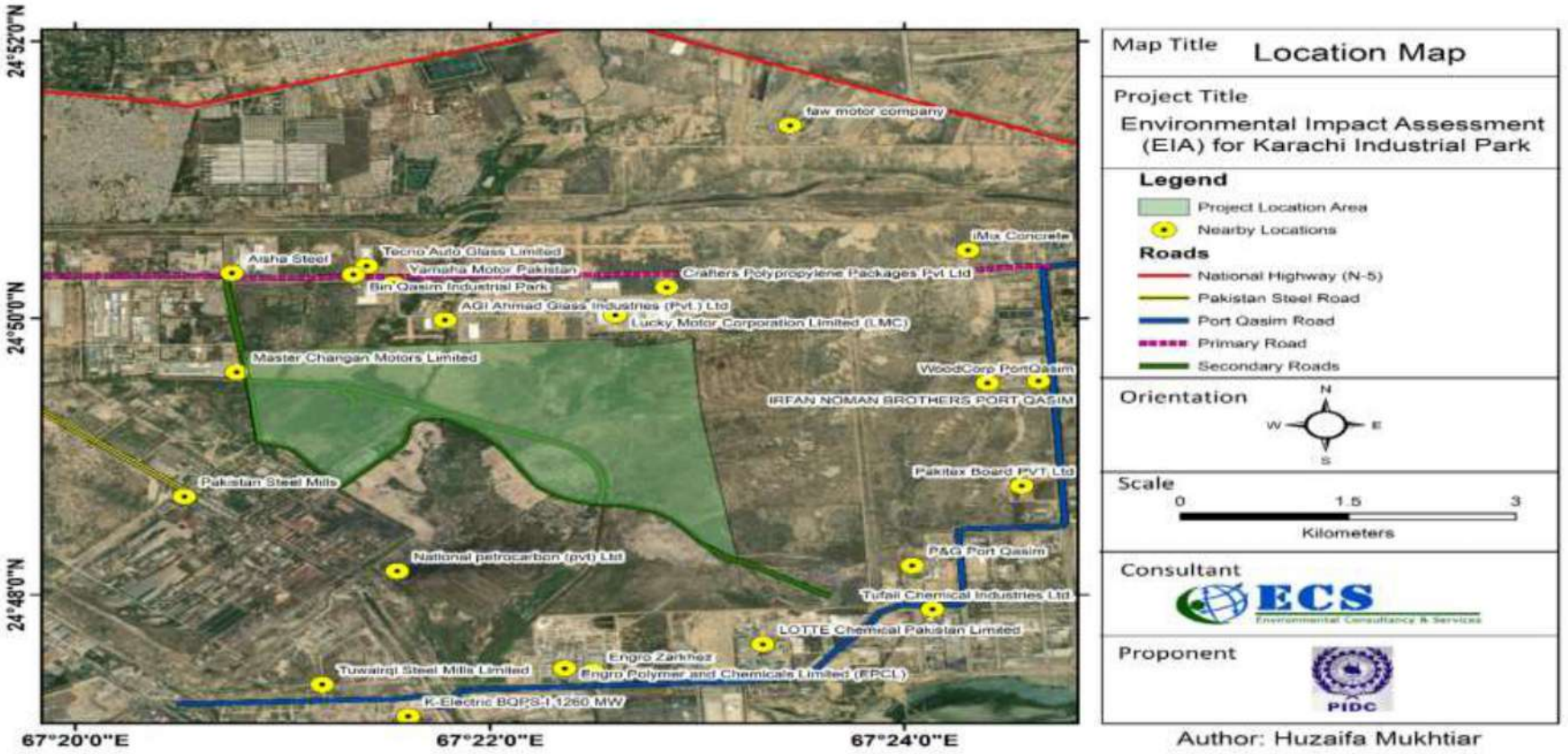


Figure 1: Location Map of the Proposed Project

3.5 Project Layout

The Karachi Industrial Park (KIP) is proposed to be established on 1500 acres land of Pakistan Still Mills located at Bin Qasim Town. The project development will be executed in phases and in first phase 500 acres will be developed. Rest of the area will be developed by funds collected via selling of plots of phase-has secured funds from PSDP for conducting the feasibility of the project.

In order to improve the physical infrastructure, the project will make use of vacant / unutilized government land, specifically Pakistan Steel Mill's land and create new industrial park, which will also be used as investment schemes to improve socioeconomic conditions of the general public as it will boost employment and will promise profits for investors. The zoning map and layout plan of the proposed project is given in Figure-2 & Figure-3 respectively and existing site condition is shown in Figure-4.

The facilities that will be provided at Karachi Industrial Park will be following:

- Road network
- Water supply
- Sewerage and treatment plant
- Gas Supply
- Telecom/ Internet
- Security
- Lighting
- Exclusive grid station

The following industries are envisaged to be set up in the KIP.

- Automotive parts and steel downstream
- General light engineering, electronics
- Textile, packaging, food processing and cold storage
- Warehousing and logistics
- Green and sustainable technologies
- Social infrastructure

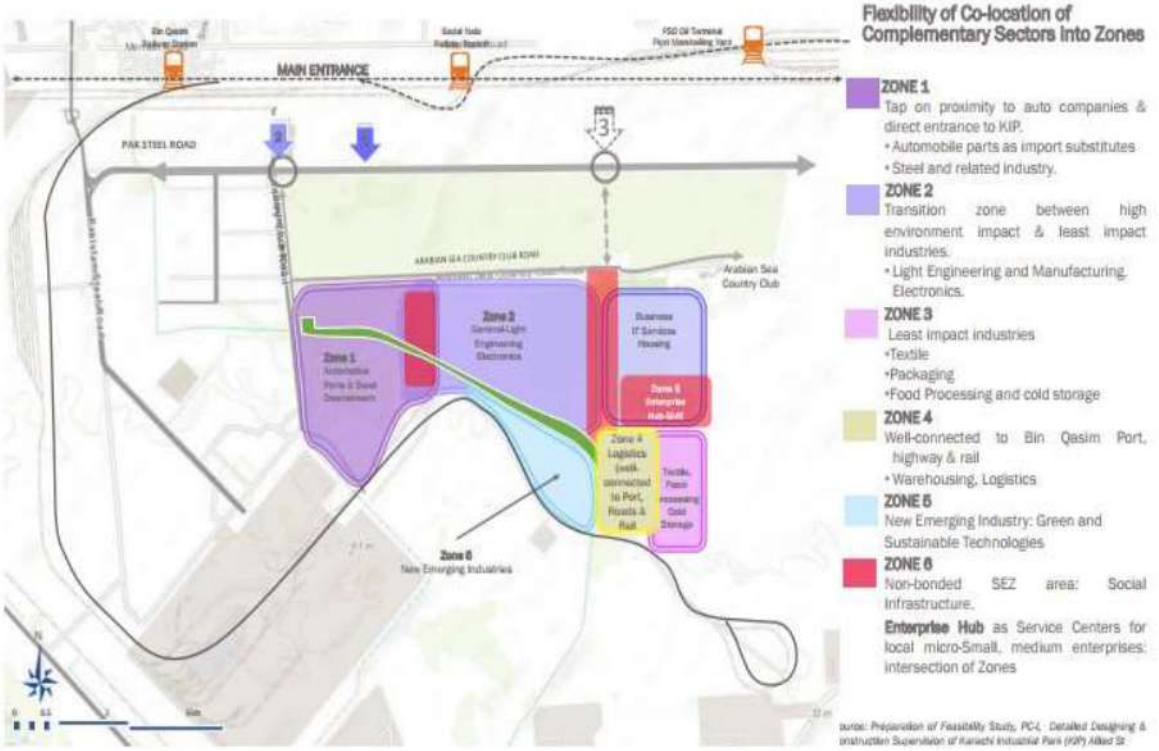


Figure 2: Zoning and Cluster of the KIP



Figure 3: Layout Plan of KIP



Figure 4: Current Site Condition of Proposed Project

3.6 Project Master Plan Salient Features

In order to improve the physical infrastructure, the project will make use of vacant / unutilized government land, specifically Pakistan Steel Mill's land and create new industrial park, which will also be used as investment schemes to improve socio-economic conditions of the general public as it will boost employment and will promise profits for investors.

The facilities that will be provided at Karachi Industrial Park (KIP) will be:

- Power Grid Station
- Green Area
- Security Check Posts
- Storm Water Drainage System
- Dedicated Firefighting Station
- Combined Effluent Treatment Plant
- Water Supply Network
- Solid Waste Management System

3.6.1 Project Facilities

The project has been designed considering the needs of modern entrepreneurs with the, following amenities:

- Combined effluent treatment plant
- State of the art firefighting system
- Safety and security signings and management system
- Roads
- Underground sewerage system
- Underground electricity distribution system
- Water supply system
- KIP owned electrical supply system.
- Civic facilities (green area, general facilities, banks etc.)
- Dedicated food areas
- Advanced weighing station
- Vocation training facilities
- Private security arrangements
- Masjids
- Warehouses

- Rescue and Emergency Service
- Amenity plots

3.6.2 Project Land Use Plan

The proposed development plan has been extending approximately 1500 Acres. A breakdown of land use suggested in the KIP is given in the Table-2. The land use plan primarily consists of industrial area, commercial area, green area, roads, and public uses. Industrial area is the biggest user of the land spreading around 70% of the KIP.

Table 2: Land Use Distribution KIP

Sr. No.	Land Use	Percentage
1.	Industrial Area	70%
2.	Commercial Area	1%
3.	Green Area	3%
4.	Roads	20%
5.	Public Uses	6%
6.	**Total**	**100%**

3.6.3 Project Industrial Zoning

The Karachi Industrial Park is envisaged to house six different types of zones which include.

- Zone 1 (Automotive parts and steel downstream)
- Zone 2 (General light engineering, electronics)
- Zone 3 (Textile, packaging, food processing and cold storage)
- Zone 4 (Warehousing and logistics)
- Zone 5 (Green and sustainable technologies)
- Zone 6 (Social infrastructure)

3.7 Technical Specifications

The proposed project site is covered with shrubs and uneven surface. The design of various infrastructure services has been planned and described in detail in the following sub-sections.

3.7.1 Leveling and Grading

Leveling and grading will be carried out in two stages, i.e. (a) leveling and grading for roads and (b) leveling and grading for development of zones.

The leveling and grading will also require excavation activities for the proposed construction. The roads will be kept 15 cm above the existing.

3.7.2 Road Network Design

Road network has been proposed to provide access to various industrial units and related facilities. Road network shall consist of 03 types of roads with R.O.W of 20 meter, 30 meter, and 40 meter. The R.O.W of roads has been proposed to accommodate road width, walkways, median strip, green area and services corridor for various types of roads. The design speed of the roads for 20 meter and 30 meter will be 30 km/hr. and for 40 meter will be 50 km/hr. within the KIP.

The road width is dependent on number of lanes provided for each road. Road having 20 meter and 30-meter width will have 3.65-meter lane and 2.5-meter shoulder without median in each direction, while the road of 40 meter will have 3.65-meter lane and 2.50-meter shoulder in each direction with 4 meter of median and a cross slope of 2% will be provided for all roads to provide proper drainage of the road surface.

3.7.3 Water Supply System

The water requirement of the project will be fulfilled from 66 inches pipe of KWSB passing through the zone. The project will require approximately 2.36 million gallons (MG) per day of fresh water for 500 acres, which is to be developed in the first phase. The water will be supplied to various industrial units through pipeline system.

The water will be stored in covered RCC underground tanks from where it will be pumped to the overhead water tanks. The RCC underground tanks will be constructed in different phases, and tank's location has been designed near the existing 66-inch water line for easy connection. The tank will have a capacity of 1.5 million gallons having dimensions 48m x 48m x 3.15m (L×W×H).

3.7.4 Storm Water Drainage

The storm water drainage network has been designed to efficiently manage storm water flow within the project site. Since the area will be developed in phases, this drainage system focuses on the first phase, which covers 500 acres. The system is designed for a 5-year return period and consists of rectangular box drains of varying sizes. These sizes range from 0.75 meters to 2.80 meters in width, with capacities built to handle the expected flow of rainwater during storms.

The box drains will be connected to collection chambers which are placed along the roads to collect water from the road surfaces and direct it into the drainage system. These drains will be positioned according to the layout of the roads. On major roads like those 40-meter wide, the drains either run through the center median or along both sides to ensure smooth water flow. On minor roads like those 30-meter wide, drain will be mainly located on one side to make better use of space.

The storm water network is designed to collect rainwater from different parts of the area and channel it to a nearby water body, which is an existing Nallah, which will serve as the final outlet for the storm water. The drains will be also aligned with the natural shape of the land to ensure efficient water flow. This system is designed not only to prevent flooding during heavy rains but also to provide a sustainable and long-term solution for managing storm water. By addressing the specific needs of the area, this drainage network plays a key role in supporting safe and organized development in the region.

3.7.5 Power Supply System

The proposed project will spread on area of 1500 acres. The project will require approximately 500 MW once fully developed. The project will have 132 kV transmission line from Dhabeji NTDC Grid Station. The project will have dedicated power grid station to meet the power requirement of the proposed industrial park. The location of the grid station will be finalized at detailed design stage.

3.8 Environmental Health and Safety Controls

The proposed project will include state-of-the-art environmental, health and safety controls as an integral part. The details of environmental, health and safety controls are described in sub-sections.

3.8.1 Solid Waste Management

The solid waste management system will involve different operations include Collection, Storage, Transportation and Transfer to the disposal site. The solid waste collection system will be developed which will include collection of solid waste for storage at proposed transfer station from where the waste will be disposed off at SSWMB Landfill site. However, the industrial waste will be managed and disposed off respective industrial units in compliance of SEPA requirements.

3.8.2 Fire & Emergency Management System

A firefighting system comprising fire hydrants, fire hose houses, gate valves, air valves etc. will be provided. 36 hydrants and 18 fire hose houses with cabinets will be installed in first phase of the project. The project will also have a dedicated fire station. The firefighting system will also include dedicated fire fighters, fire trucks, etc. The emergency response will be also developed to handle emergencies.

3.8.3 Combined Effluent Treatment Plant

Sewer lines will be installed on both sides of all roads to collect sewage into Combined Effluent Treatment Plant (CETP) with preliminary primary and secondary stage treatment to treat the wastewater to comply with SEQS Limits. The tentative effluent generation from entire 1500-acre area is estimated 6 million gallons per day (MGD). For the 500 acres, the CETP of 2 MGD will be required. The CETP will be installed on a modular basis, depending on the number of industries.

3.8.4 Safety & Security

PIDC has a dedicated safety and security policy which covers all the safety and security standards and protocols which shall be implemented during the entire life cycle of the proposed project.

CHAPTER 4: ENVIRONMENTAL & SOCIAL BASELINE

4.1 Introduction

The first step in environmental study is to recognize the existing condition of environmental resources, then identify the potential and residual impacts (both positive & negative) and after on, to recommend the detailed migratory (for negative impacts) and enhancement measures. In any environmental study the whole area should be taken into consideration and not the study area.

Taking into consideration the off-site as well as on-site impacts of the project enables to draw a clear and systematic picture of the present environmental conditions and possible changes in future. Such a picture provides information about potential or actual environmental changes in the different parts of the area and establishes the environmental trend of the study area. Thus, in any environmental study the first task is to establish the Baseline environmental conditions.

Keeping in view of the above purpose, the current chapter describes the baseline conditions of the project area and surroundings. It comprises the present condition of the various components of environment (Physical, biological and socio-economic) of the Project Area along with the whole Study Area. Both secondary data (from desk study) and primary data (on ground monitoring of air and water quality) have been used for establishing the baseline conditions. Local knowledge has also been used through public consultation with the local communities. Information on these aspects has been derived from the desk study of available data, field visits to the Project/Study Area and information obtained through the visits to the Government departments and other agencies.

To develop a comprehensive environmental and social baseline of the project area comprehensive review of literature was done by team of experts. Furthermore, the literature reviewed for developing a comprehensive environmental and social baseline was validated by frequent site visits and field investigations for ground trothing to describes the existing environmental settings in the study area and is based upon the secondary information collected from the published sources, reconnaissance survey, primary socio-economic survey and environmental monitoring of air and noise, in the study area. The major purpose of describing the environmental settings of the study area is:

- To assess the existing environmental quality, as well as study the environmental impacts due to the proposed project.
- To identify environmentally significant factors or geographical areas that could preclude any future development.

Following dedicated activities were performed at the project site for baseline development.

- Visual observations by experts were carried out within and around the project site.
- Air, noise and water quality monitoring was carried out through Sindh EPA approved laboratory at the project site.
  Ocular observations by experts were carried out to validate the ecological and social conditions of the project area.

4.2 Methodology of Baseline Study

The guiding factors for the present baseline study are the requirements laid down by the Environment Impact Evaluation a baseline study is the study of the original status of the environment in the area before the development work of the project is started and guidelines as per the Sindh Environmental Protection Act, 2014 which provides for environmental assessment in clause, and various other clauses, Review of (Environmental Assessment) Regulation, 2021 this regulation has been notified vide NO.EPA/TECH/739/2021.

Various environmental attributes were divided into primary and secondary studies.

- Primary attributes such as air environment, water, soil, noise, traffic, flora and fauna and socio-economic aspects were assessed by conducting field studies and on-site monitoring and review of the past studies conducted; and
- Secondary attributes such as land use studies, geology, physiological characteristics, have been assessed by literature review of studies conducted in the past and by various government publications.

The scoping and the extent of data generation were formulated with interdisciplinary team discussions, criteria questions and professional judgment also keeping in view of guidelines. The baseline studies started with reconnaissance survey and site visits in the study area for fixing the monitoring locations for collection of the primary data. Various Government and Semi-Government departments were approached for getting information for the secondary data generation.

The various parameters surveyed and studied for the baseline study are discussed in the following sections components:

- Physical Environment
- Ecological Environment
- Socio-Economic Environment

4.3 Physical Environment

The existing physical environmental conditions of the project area are described in this section. Data on topography and land use, geophysical, climate, water resources and drainage, Natural Disaster and Seismology was acquired from published literature and previously conducted studies. Air, noise and water quality was analyzed during extensive field surveys conducted specially for this EIA.

4.3.1 Topography

Karachi, the capital city of the Sindh province in Pakistan, is a sprawling metropolis with diverse topography that includes a mix of urban, coastal, and hilly landscapes. Situated on the Arabian Sea coastline, boasts a varied topography that significantly influences its physical and cultural landscapes.

It has been observed that the topography of the project area is plain with no notable changes in elevation, the topographical map of the Bin Qasim including project site is shown in Figure 5.

A. Coastal Areas

The southern and western parts of Karachi are characterized by a long coastline along the Arabian Sea. Clifton and Keamari are prominent coastal neighborhoods, featuring sandy beaches and rocky shores. The Port of Karachi, one of the largest and busiest ports in South Asia, is situated along the coast. The marshy lands constitute the coastal belt from Gharo Creek to Hawkes Bay. The coastline of Karachi is about 70 km long. It is generally oriented northwest to southwest.

On the western side, it is bounded by the Hub River and on the East by the Mangrove swamps and creeks of the Port Qasim area. Famous beaches include Hawkes Bay, Paradise Point, Sandspit, and Clifton. Dense Mangroves and creeks of the Indus Delta can be found towards the southeastern side of the city, towards the West and the North is Cape Monze.

B. Hills and Plateaus

Northern Karachi is marked by hills and plateaus, providing a contrast to the flat plains. The Kirthar Range, including hills like the Manghopir Hills and the Gharo Hills, influences the topography of the district. Hilly Region: Kirthar Range at the western boarder are barren, with very little to no vegetation, dry riverbeds, and water channels. The Khasa Hills lie in the Northwest and form the border between North Nazimabad Town and Orangi Town. Manghopir hill range in the Northwest start from the Hub River Dam area, running North to South, then change direction slightly towards the West. At the Eastern coast of Karachi is dominated by an eroded hilly range known as Ibrahim Hyderi Hills. In between the Lyari and the Malir River there are small portions of hilly ranges, all of which have different names and specific local characteristics.

C. Urban Plains

The central and eastern areas of Karachi consist of flat and urban plains. The city has expanded horizontally over the years, with a mix of residential, commercial, and industrial developments.

D. Malir River Basin

The Malir River flows through the eastern part of Karachi, contributing to the city's topography. The Malir River basin has witnessed urbanization, but parts of it still maintain a more natural environment.

E. Natural and Man-made Lakes

The city is home to several natural and man-made lakes, such as Haleji Lake, Keenjhar Lake (Kalri Lake), and Hub Dam, adding to the regional topography.

F. Islands

Karachi includes some small islands off its coast, such as Manora Island and Baba and Bhit Islands.

G. Green Spaces

Despite being a bustling urban center, Karachi features various parks and green spaces, providing relief from the concrete jungle. Clifton Beach and Bagh Ibne Qasim are notable recreational areas.

In summary, the topography of Karachi District is a dynamic blend of coastal plains, urban expanses, river basins, hills, lakes, and islands. This diversity contributes to the city's unique character and serves as a significant factor in its economic, social, and environmental dynamics.

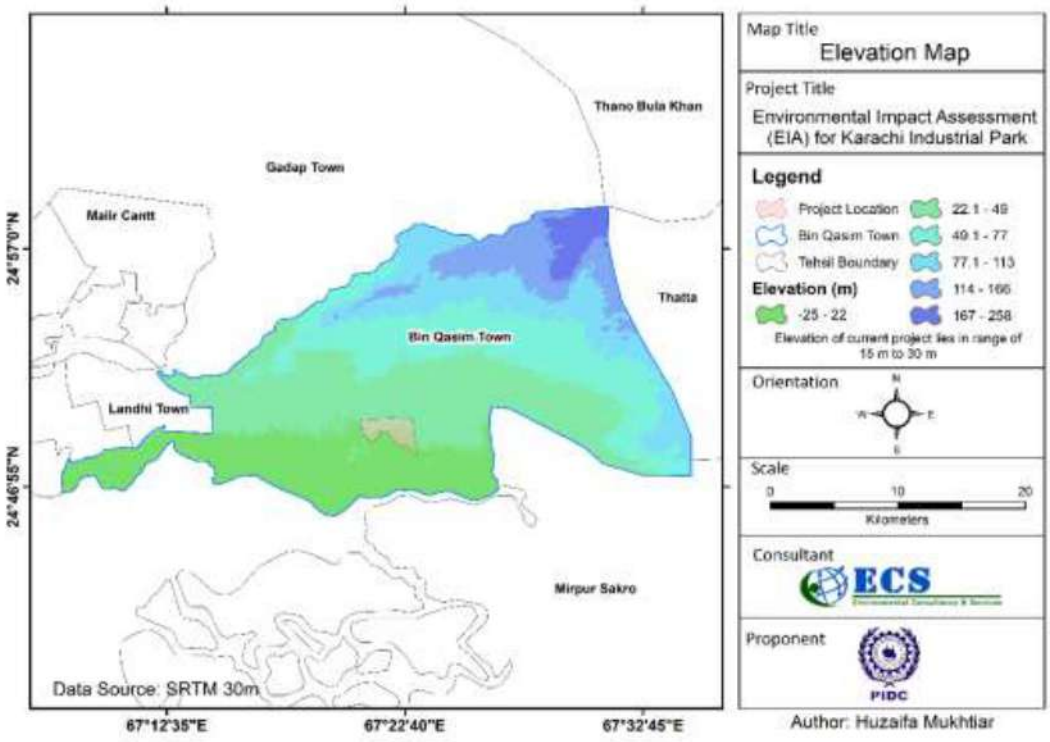


Figure 5: Topographical Elevation of Project Site

4.3.2 Geological Conditions

Geology of the local area is underlain lower Indus basin described as Indus River alluvial of early Eocene. Early deposition of sediments includes silt, sand stone, conglomerate, limestone with low compact and cementing materials. Surface feature is described as syncline delta, and valley region and anticline ridges are exposed. As stratigraphic description there are two formations Gazij and Manchar formation that dip gently northeast to southeast offshore. The coastal region is found to be of tertiary and post-tertiary origin. Blatter et al (1929) dates it as recent as Eocene. The region has been formed by the upheaval of land from the Tethys Sea, which once extended up to the northern border of Pakistan but, gradually withdrew with the rising of the Himalayas. The underlying rocks are mostly of marine origin, highly folded, faulted and fissured everywhere.

The exposed geological material in the area is generally silty sand, sandy gravel and silty clay which is either product of in-situ weathering or deposited by the action of gravity and water. Below this over burden of silty sandy gravel soil, alternating layer of sedimentary rock comprising of sandstone, shell mudstone, siltstone and limestone are present. The rock formation of this area is from Nari Formation of Oligocene age and partially from Gaj Formation of Miocene age. The Nari Formation consists mainly of sandstone, siltstone and shale with subordinate limestone while the Gaj Formation consists of shale with subordinate limestone. However, the study area (proposed project site) under focus is Pliocene and Miocene Sedimentary Rocks. Refer to Figure-6 for Geological map of the project site.

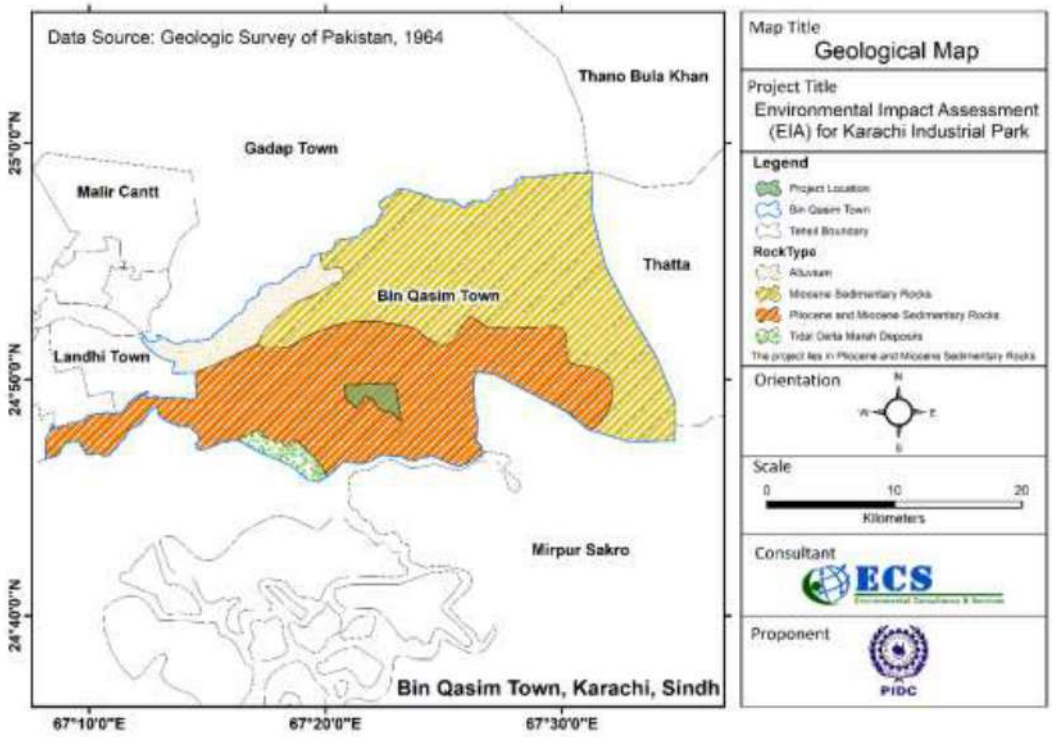


Figure 6: Geological Map of Project Site

4.3.3 Climatic Conditions

Karachi, the largest city in Pakistan and the capital of the Sindh province, experiences a hot desert climate, often referred to as an arid or semi-arid climate. Karachi's climate is characterized by extremely hot summers, mild winters, low rainfall, and high humidity. The city's weather patterns are influenced by its proximity to the Arabian Sea, the monsoon winds, and the desert conditions prevailing over much of the region.

Adaptation and resilience to the challenging climate conditions are crucial aspects of life in Karachi.

A. Temperature

The weather in Karachi is characterized by high temperatures, low precipitation, and distinct seasons. Summers in Karachi are extremely hot and can last from April to September. The city experiences scorching heatwaves, with occasional temperatures soaring even higher. Winters, lasting from November to February, are relatively mild. Daytime temperatures hover around 20-25°C (68-77°F), making it a more pleasant time for outdoor activities. The hot season lasts for 3.4 months, from April 1 to July 13, with an average daily high temperature above 33°C. The hottest month of the year in Karachi is June, with an average high of 34°C and low of 29°C. The cool season lasts for 1.8 months, from December 17 to February 12, with an average daily high temperature below 27°C. The coldest month of the year in Karachi is January, with an average low of 13°C and high of 26°C. Average high and low temperature of Karachi is shown below in Figure-7.

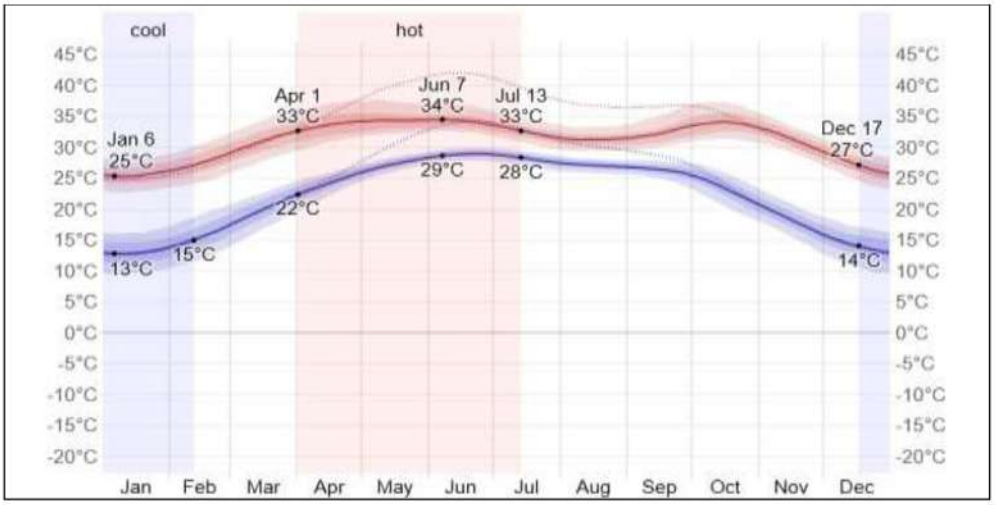


Figure 7: Temperature Trend- Karachi

B. Precipitation

Karachi has low annual rainfall, typically ranging from 100 to 150 millimeters. The majority of precipitation occurs during the monsoon season, which is relatively short and lasts from June to August. However, the city is on the western edge of the monsoon zone, so rainfall can vary greatly from year to year. Extended periods of dry weather are common, contributing to the arid conditions. Karachi may experience drought-like

situations, and water scarcity is a recurring concern. The rainy period of the year lasts for 2.7 months, from June 25 to September 15, with a sliding 31-day rainfall of at least 13 millimeters. The month with the most rain in Karachi is August, with an average rainfall of 33 millimeters. The rainless period of the year lasts for 9.3 months, from September 15 to June 25. The month with the least rain in Karachi is May, with an average rainfall of 1 millimeter. The mean monthly precipitation record for Karachi can be seen in Figure-8.



Figure 8: Precipitation Trend in Karachi

C. Sea Breeze/Moderating Effect of the Sea

The Arabian Sea has a moderating influence on temperatures, with sea breezes providing some relief during hot summer afternoons. Coastal areas, such as Clifton and Keamari, may experience slightly milder temperatures compared to inland areas. The average hourly wind speed in Karachi experiences significant seasonal variation over the course of the year. The windier part of the year lasts for 5.1 months, from April 14 to September 18, with average wind speeds of more than 4.8 meters per second. The windiest month of the year in Karachi is June, with an average hourly wind speed of 6.5 meters per second. The calmer time of year lasts for 6.9 months, from September 18 to April 14. The calmest month of the year in Karachi is November, with an average hourly wind speed of 3.1 meters per second.

D. Monsoon Influence

Monsoon Winds: The monsoon winds, originating from the Indian Ocean, bring moisture to the region during the summer. However, Karachi is on the periphery of the monsoon influence, resulting in less rainfall compared to other parts of the subcontinent.

E. Humidity

High Humidity Levels: Due to its proximity to the Arabian Sea, Karachi experiences high humidity levels, especially during the monsoon season. This combination of high temperatures and humidity contributes to the discomfort during the summer months.

F. Dust Storms

Prevalence of Dust Storms: Karachi occasionally experiences dust storms, particularly during the dry and hot months. These storms can reduce visibility and add to challenging weather conditions.

G. Urban Heat Island Effect

Urbanization Impact: The extensive urbanization and concrete structures in Karachi contribute to the urban heat island effect, causing temperatures to be higher in the city compared to surrounding rural areas.

H. Relative Humidity

Karachi experiences extreme seasonal variation in the perceived humidity. The muggier period of the year lasts for 7.8 months, from March 14 to November 8, during which time the comfort level is muggy, oppressive, or miserable at least 27% of the time. The muggiest day of the year is July 25, with muggy conditions 100% of the time. The least muggy day of the year is January 18, with muggy conditions 2% of the time.

The relative humidity typically ranges from 25% (dry) to 91% (very humid) over the course of the year, rarely dropping below 10% (very dry) and reaching as high as 100% (very humid). The air is driest around February 9, at which time the relative humidity drops below 33% (comfortable) three days out of four; it is most humid around August 2, exceeding 83% (humid) three days out of four. The mean monthly relative humidity for Karachi is shown graphically in Figure-9.

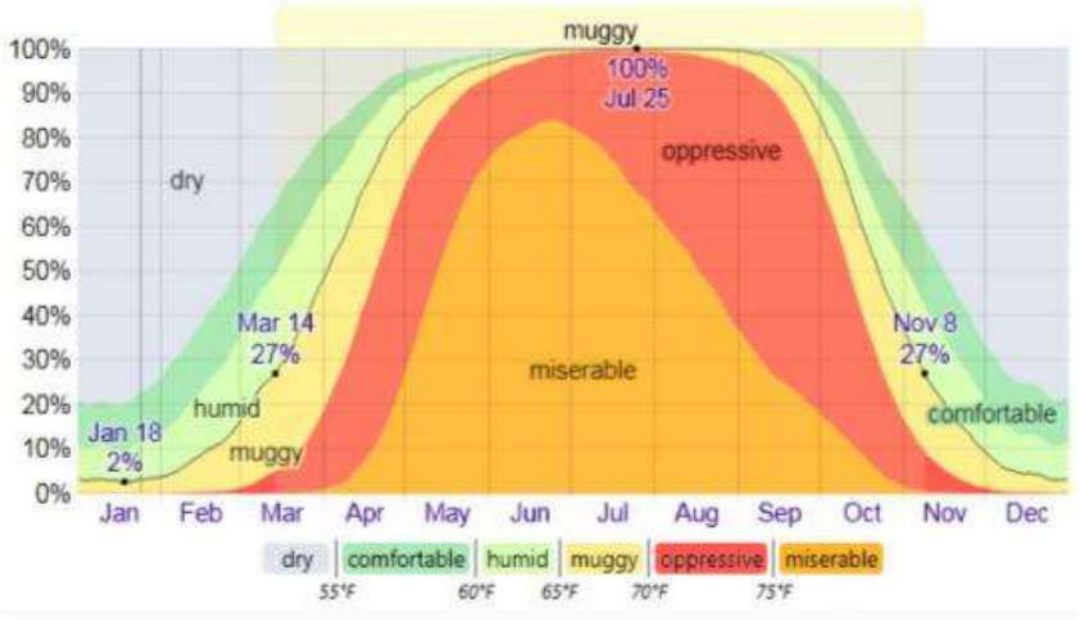


Figure 9: Mean Monthly Relative Humidity in Karachi

4.3.4 Groundwater

Karachi relies heavily on groundwater as a source of water for various purposes. The city is situated on a coastal plain, and there are aquifers beneath the surface that store and supply groundwater. Over-extraction of groundwater has been a concern in Karachi, leading to the depletion of aquifers. Rapid urbanization and population growth contribute to increased water demand, and the extraction of groundwater exceeds the natural recharge rate in some areas. Groundwater quality may also be compromised due to contamination from industrial discharges, sewage, and other pollutants. This poses health risks to residents relying on groundwater for drinking purposes.

Challenges: Some major challenges regarding Water resources in Karachi are given below.

i. **Urbanization:** The rapid urbanization of Karachi has resulted in increased impervious surfaces, reducing natural recharge of aquifers and exacerbating surface water runoff issues.

ii. **Pollution:** Industrial and domestic pollution has led to contamination of both surface water bodies and groundwater. This pollution not only affects the quality of water but also poses risks to public health.

iii. **Infrastructure Challenges:** The city faces challenges in terms of water infrastructure, distribution systems, and sewage treatment. Aging

infrastructure and inadequate management contribute to water scarcity and sanitation issues.

iv. **Climate Change:** Changing climate patterns, including variations in rainfall and temperature, can impact the availability of both surface and groundwater resources.

Efforts to address these challenges include the development of water management plans, infrastructure upgrades, and initiatives to promote sustainable water use. Organizations such as the Karachi Water and Sewerage Board (KWSB) play a crucial role in managing water resources in the city.

4.3.5 Wind Speed and Direction

The project area lies in a region where wind blows throughout the year with highest velocities during the summer months the direction of the wind is from south-west to west and during winter season the wind blows from north to northeast and it shifts southwest to west in the evening hours. The wind usually carries sand and salt with it resulting in severe corrosion and erosion. The wind direction and speed in between the two monsoon seasons, summer and winter are rather unsettled and large variations are noted in term of speed and direction. The seasonal winds are dry and have a desiccating effect during May & June, in July and August the wind contain moisture.

Over the course of the year, typical wind speeds vary from 0 mph to 19 mph (calm to fresh breeze), rarely exceeding 29 mph (strong breeze). The highest average wind speed of 13 mph (moderate breeze) occurs around May 18, at which the average daily maximum wind speed is 18 mph (fresh breeze). The lowest average wind speed of 5 mph (light breeze) occurs around November 16, at which the average daily maximum wind speed is 10 mph (gentle breeze). The wind is most often out of the west (31% of the time) and south west (23% of the time). The wind is least often out of the south east (1% of the time), south (2% of the time), east (3% of the time), north west (5% of the time), and north (5% of the time). Figure-10 & Figure-11 shows the wind speed and direction of the project area respectively.

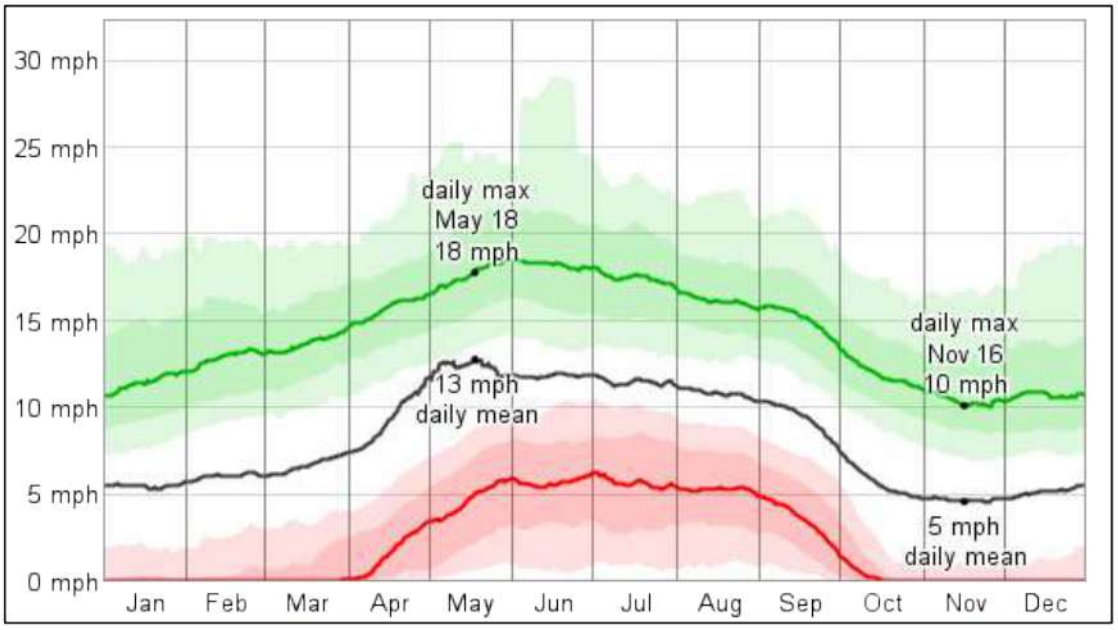


Figure 10: Wind Speed of the Project Area

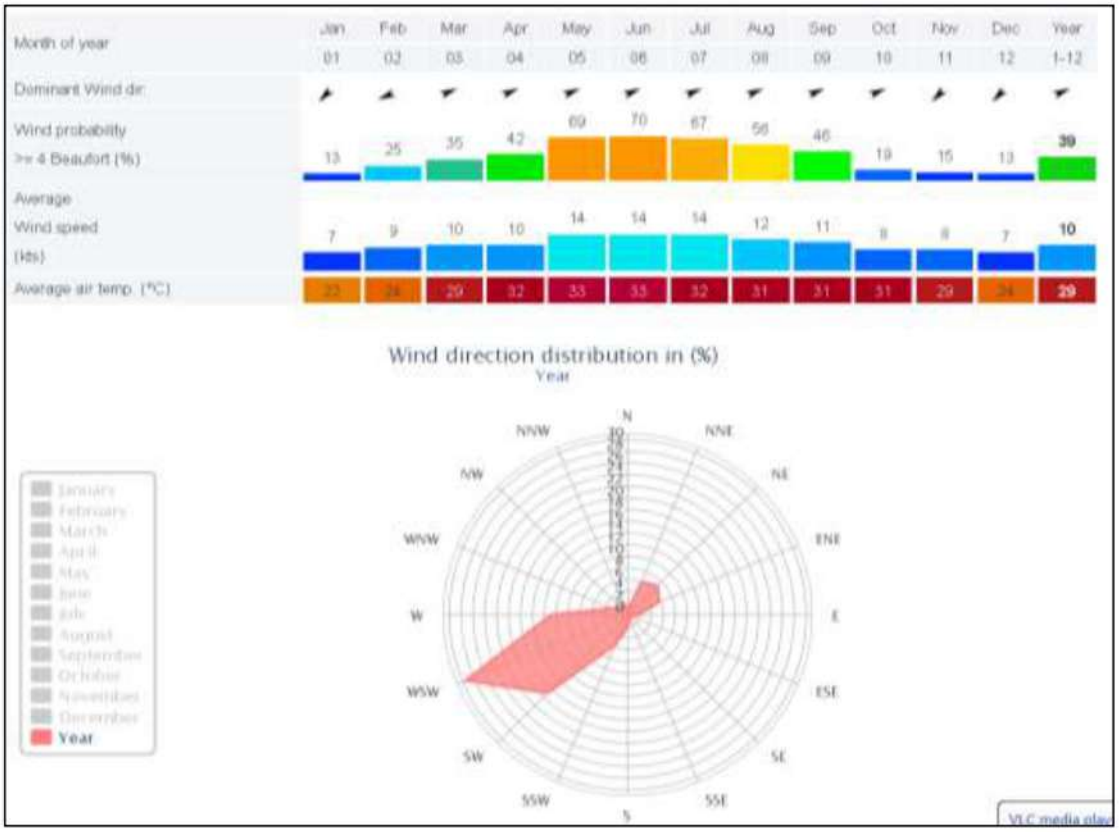


Figure 11: Wind Direction of the Project Area

4.3.6 Ambient Air and Noise

To assess the ambient air within the project area air quality monitoring was conducted. Monitoring results are presented in Table 3, while on the other hand lab report may be seen as Annexure – 4.

In addition to this, ambient noise level of the various points from the boundaries of the project area was monitored by the consultant team, which shows the project area has the average ambient noise levels that are within range of SEQS limits. Copy of Ambient Noise results of project area is also attached as Annexure-5.

Table 3: Ambient Air Monitoring Results

Parameter	Unit	Concentration	SEQS Limit
Carbon Monoxide (CO)	$mg/m^3/hr$	4.8	10
Ozone (O_3)	$\mu g/m^3/24hr$	9.2	130
Nitrogen Oxide (NO)	$\mu g/m^3/24hrs$	14.8	40
Oxides Of Nitrogen (NO_2)	$\mu g/m^3/24hrs$	28.4	80
Sulfur Dioxide (SO_2)	$\mu g/m^3/24hrs$	8.5	120
Suspended Particulate Matters	$\mu g/m^3/24hrs$	210.0	500
Particulate matter (PM_{10})	$\mu g/m^3/24hrs$	124.0	150
Particulate matter ($PM_{2.5}$)	$\mu g/m^3/24hrs$	31.0	75
Lead (Pb)	$\mu g/m^3/24hrs$	<0.1	1.5

4.3.7 Water Network

This section details the surface water resources of the proposed project area. Hydro geologically, Karachi lies in Malir River basin. It is surrounded by Hub River in the west and Malir River on east. Malir basin is mainly drained through the Malir River followed by the Lyari channel. Both these channels are transient; therefore, the flowing water is generally sewage and industrial effluent. Hub River follows on the western margin of the city is also transient but it is devoid of any sewage or anthropogenic effects. The coastal aquifers of Karachi are mainly recharged by Malir or Lyari Rivers. Hub River is recharging limited aquifers, Nari and Gaj formations. While Malir and

Lyari Rivers are mainly recharging alluvial aquifers in the coastal parts of Karachi city.[6] Figure-12 shows the water supply network of Karachi.



Figure 12: Water Supply Network of Karachi

4.3.8 Sewage Water Drainage

Sewage is gathered through RCC pipes and uncovered channels, and gathered sewerage is arranged to neighboring water bodies through rivers and Nallah's. Karachi's untreated wastewater including domestic sewage and industrial wastewater is discharged into the Lyari and Malir rivers, and finally disposed to the nearest coastal belt. According to KWSB, 417MGD untreated sewage is drained into the sea through the 232KM network of Main Nallah's & 1000Km network of town drains. These Nallah's mainly discharge into the two main rivers namely Malir River & Layari River, refer to Table 4 to observe the main sewerage containing bodies.[7]

[6]Khan, A., and EghbalBakhtiari, A. (2017). Groundwater Assessment of Coastal Aquifers in Karachi: Impact of Seawater Intrusion. *International Journal of Ground Sediment & Water*, *6*, 247-263.

[7] Hyder, I. (2007, March 16). A presentation on the reforms in Karachi Water & Sewerage Board (KW&SB). Retrieved from http://arifhasan.org/karachi/reforms-in-kwsb-an-overview-for-civil-society

Table 4: Details of Sewerage Lines in Karachi

Major *Nallah's	Major Rivers	Final Drain
Soldier Bazar Nallah	Malir River	Sea
Gujjar Nallah	Layari River	
Orangi Nallah		
Railway Station Nallah		
Nehr e Khayam		
Ferer Nallah		
Manzoor Colony Nallah		

4.3.9 Disaster Risks

Pakistan straddles the boundaries between the Indo-Pakistan, Arabian and Eurasian plates, and its structure is predominantly affected by their past and present interrelationships. Two composite plates, comprising both continental and oceanic crust (Indo-Pakistan & Arabia) are separated by an intra-oceanic transform boundary, which within the Pakistan offshore area is expressed as the Murray Ridge. The Eurasian Plate is a collage of three microplates which amalgamated in Iran-Afghanistan and western Pakistan area during Cretaceous to Paleogene times (Quad Report, 1994). The most easterly of these microplates, the Afghan Block, forms a considerable part of Pakistan's northwestern edge, and is bounded by the two major transform fault systems of Herat and Chamman. The boundaries between microplates can be traced by belts of ophiolite assemblages. The Indo-Australian plate upon which Pakistan, India and Nepal lie, is continuously moving northward, colliding with and sub-ducting under the Eurasian plate, thus forming the Himalayan mountains, and triggering earthquakes in the process. Figure-13 shows Tectonic plates configuration of Pakistan.

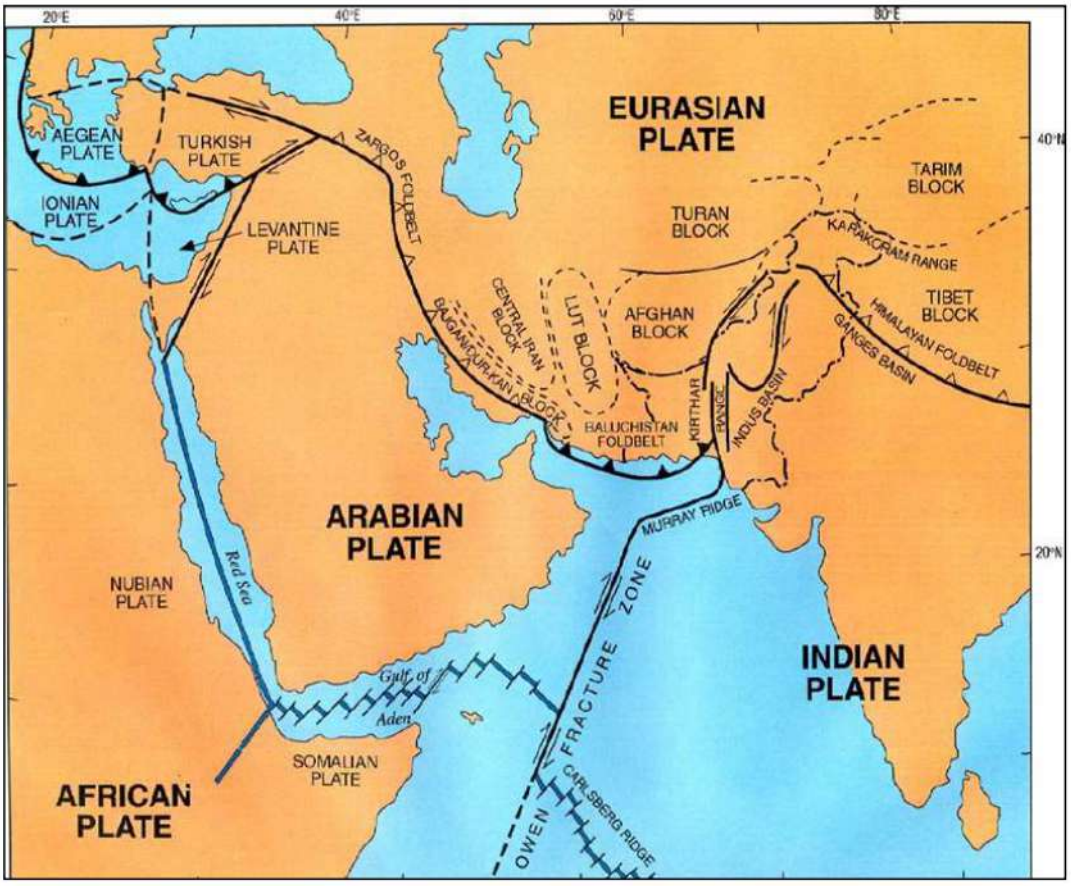


Figure 13: Tectonics Plate Configuration of Pakistan

Karachi, being a densely populated and economically significant city, is situated in a seismically active region. The city's vulnerability to seismic events stems from its location near the tectonic boundary between the Arabian and Eurasian plates. While Karachi itself may not be directly on a fault line, the broader geological setting poses a seismic risk. Karachi has experienced seismic events in the past, with varying magnitudes. The historical record indicates that the region is susceptible to seismic activity, and periodic monitoring is essential.

The Arabian Sea plate is subducting beneath the Eurasian plate near the Makran Trench to the south of Karachi. This tectonic setting can lead to seismic activity and the potential for large earthquakes. The seismic activity in Karachi is monitored by institutions such as the Pakistan Meteorological Department (PMD) and the National Center for Seismology (NCS). These organizations use seismometers to detect and measure ground motion. Table-5 indicates that the project area is falling in Zone 2B, varying from 0.16 to 0.24.

Table 5: Details of Boundaries of Seismic Zone

Seismic Zone	Peak Horizontal Ground Acceleration
Zone 1	0.05 to 0.08g
Zone 2A	0.08 to 0.16g
Zone 2B	0.16 to 0.24g
Zone 3	0.24 to 0.32g
Zone 4	> 0.32g

Note: Where "g" is the acceleration due to gravity

4.4 Biological Environment

Karachi is the industrial, financial, and trading hub of Pakistan. Economic growth of the developing countries mostly depends on agriculture growth and Industrial development. Industrialization changes the wild land and natural habitats of the species. Construction activities alter the natural landscape into concrete structures which alter the species composition in the area. Industrial effluents and other chemical processes also affect the physical and aquatic environment of the surroundings.

Karachi has a semi-arid climate, and the flora is adapted to such conditions. Some common types of plants found in the Karachi area include:

Acacia species: These are drought-resistant trees commonly found in arid regions

Euphorbia species: Succulent plants that are adapted to dry conditions.

Prosopis juliflora (Mesquite): A hardy, drought-tolerant tree commonly found in arid and semi-arid regions.

Calotropis procera (Sodom's Apple or Aak): A drought-resistant shrub that is well-suited to arid environments.

Tamarix species (Tamarisk): Salt-tolerant shrubs often found in coastal areas.

Capparis decidua (Kair): A thorny shrub well-adapted to arid conditions.

For establishing the baseline environmental conditions pertaining to biological environment, an initial reconnaissance of the project area was carried out followed by a detailed biological survey by ecological experts. Secondary data was collected regarding project area. The area where the Karachi Industrial Park (KIP) is located was historically an integral part defined rangeland as per Sindh Government Forest Department regulations. However, in 1971 it was denotified and declared as industrial zone for establishing Pakistan Steel Mills. KIP is proposed to be established in pre-defined industrial zone. Currently the area is heavily dominated by Prosopis juliflora, a well-recognized alien species the terrain is a topographically a flat plain with sporadic undulations at places.

The majority of area is flat, representing xeric characters, dominated by Prosopis juliflora, however some other associated species can also be seen, there were reports of different species from the spot and its surrounding, the unique variation of this floristic composition can be noticed along the alignment of Badal Nallah (a natural torrent carrying waste water from Pakistan Steel Mills, pours in Arabian sea at Kadero creek, some 8-9 Kms south of the project site. General view of project site is shown in below Figures.

4.4.1 Flora of The Project Area

The flora is sparse and sporadic and at places present in clumps, mainly representing shrub formations like Capparis decidua, Euphorbia caudicifolia, Calotropis procera, Prosopis juliflora and Salvadora oleiodes out of them Prosopis juliflora seems dominating.

The detail floristic composition from and the surrounding area are given below in Table-6.

Table 6: Floristic list of the Project Area and its surroundings

S. No	Botanical Name	Vernacular Name	Life form	Conservation Status (IUCN)
1	*Capparis decidua*	Kirir	Shrub	Least concern
2	*Salvadora oleoides*	Khabar	Shrub	Least concern
3	*Acacia senegal*	Kunbhat	Shrub	Least concern
4	*Calotropis procera*	Aakh	Shrub	Least concern
5	*Prosopis juliflora*	Mesquit	Small tree	Least concern
6	*Tecoma undulata*	Lohiro	Small tree	Least concern
7	*Euphorbia caudicifolia*	Thuar	Shrub	Least concern
8	*Tamarix aphylla*	Lai	Shrub	Least concern
9	*Ziziphus nummularia*	Ber	Shrub	Least concern
10	*Acacia nilotica*	Babur	Small tree	Least concern
11	*Aerva javanica*	-	Shrub	Least concern
12	*Pharagmitis sp*	-	Grass	Least concern
13	*Aristida adscenciones*	Lumb	Grass	Least concern
14	*Aristida funiculate*	Lumb	Grass	Least concern
15	*Cenchrus biflorus*	Bhurt	Grass	Least concern
16	*Cenchrus ciliarus*	Dhaman	Grass	Least concern
17	*Chrysopogon aucheri*	Putar	Grass	Least concern
18	*Cymbopogon jawarncusa*	Poi	Grass	Least concern
19	*Desmostyches bipinnata*	Dubh	Grass	Least concern
20	*Dicanthium annulatum*		Grass	Least concern
21	*Lasiurus sindicus*	Sain	Grass	Least concern
22	*Lasiurus hirsutus*		Grass	Least concern

4.4.2 Terrestrial Fauna

As already mentioned, that the project site is a part of pre-defined industrial estate and is almost sparsely inhabited with little vegetation comprising mostly bushes. The situation besides its vicinity to IBA (Important Bird Area) The Indus delta, does not offer much to the faunal group, however, some common / domesticated and scavenger animals representing different groups were reported and few of them identified and listed here: Jackal, Porcupine, Fox and Wild Hare. Birds of the eco-zone likely include Grey Partridge, Common Quail, Spotted Owlet, Indian Nightjar, Woodpecker, Passerines, etc. Reptiles of the area included Monitor Lizard, Spiny-tailed Lizard, Krait, Vipers and Rat Snake. Table 7 present the Faunal composition of the project area.

Table 7: Faunal composition of the project area

S. No.	Common name	Scientific name	IUCN Conservation Status	Sighted	Reported
1	Jackal	*Canis aureus*	LC		X
2	Porcupine	*Erethizon dorsaum*	LC		X
3	Fox	*Vulpes vulpes*	LC		X
4	Wild Hare	*Lepus europaes*	LC		X
5	Horned viper	*Cerastes cerastes*	LC		X
6	Monitor lizard	*Varanus bengalensis*	LC		X
7	House Crow	*Corvus splendens*	LC		X
8	Cattle Egret	*Bubulcus ibis*	LC		X
9	House Sparrow	*Passer domesticus*	LC	X	X
10	Common Myna	*Acridotheres tristis*	LC	X	X
11	Black Kite	*Milvus migrans*	LC	X	X
12	Blue Rock Pigeon	*Columba livia*	LC	X	X

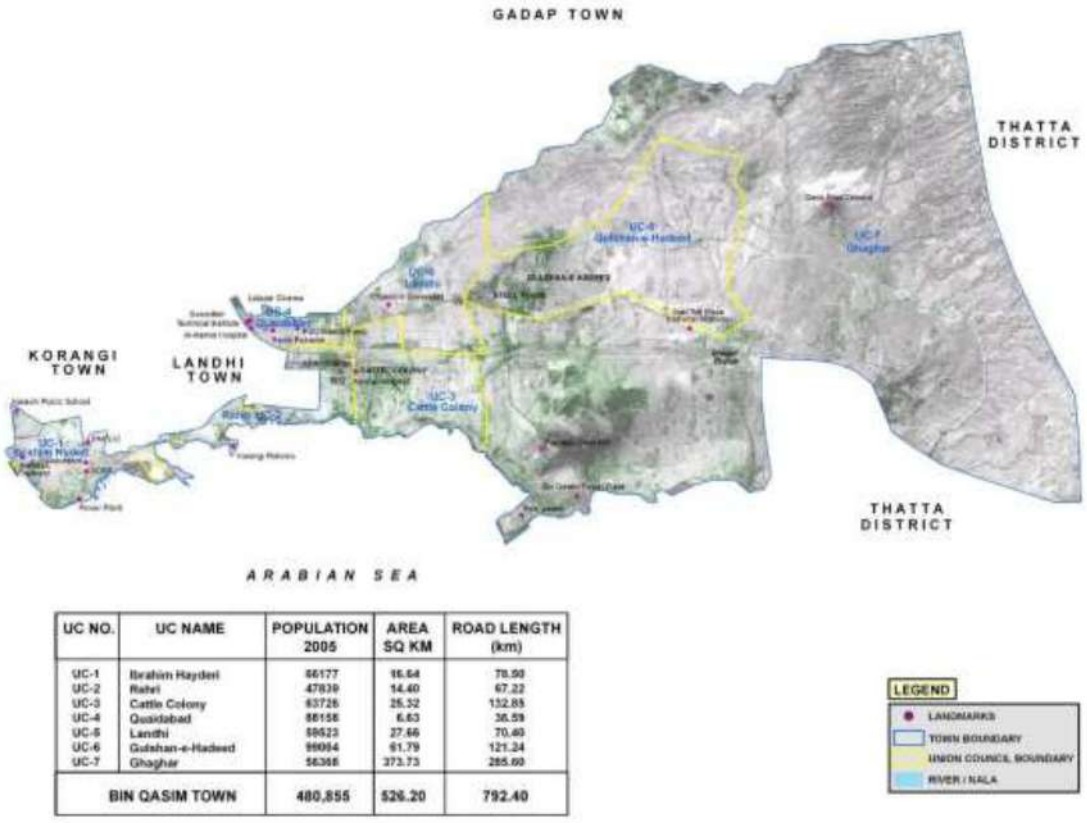
4.5 Social-Economic Environment

The Socio-Economic baseline provides an overview of the social and economic conditions of the project area based on primary and secondary data sources. This overview helps in understanding the socioeconomic importance of the project area and contributes towards identification of any social risk that the project proponents must be aware of during the project design phase. Moreover, interaction with stakeholders in the vicinity of the project area helps identify the scope of CSR activities for Industrial Park industries. The baseline data presented here also provides a basis for monitoring project activities during the project construction and operation phase.

Karachi is among the most populous metropolitan cities of the world. According to the census conducted in 2017, Karachi inhabits 14.9 million people. The population of Karachi is increasing exponentially which is coupled by the effect of rural population migration to urban center for more livelihood opportunities. The city credits its growth to the mixed populations of economic and political migrants and refugees from different national, provincial, linguistic and religious origins largely come to settle here permanently.

One notable aspect of Karachi's population is its remarkable ethnic and cultural diversity. The city is home to people from various ethnic backgrounds, including Muhajirs, Sindhis, Punjabis, Pashtuns, and Balochis. This diversity is reflected in the city's rich cultural tapestry, with a blend of languages, traditions, and cuisines. Karachi's economic importance is evident in its role as the financial and industrial heart of Pakistan. The city hosts the Karachi Stock Exchange, major corporate offices, and a bustling port that contributes significantly to the country's trade activities. Its economic vibrancy attracts people from different regions seeking employment opportunities.

The Karachi Industrial Park (KIP) Project site is located in the Bin Qasim town that falls in Malir District of Karachi Division, as per the old administrative structure, the project site falls in Bin Qasim Town. Therefore, the social baseline for this project is based on secondary data for Malir District and Bin Qasim Town and primary data collected through consultations with primary stakeholders. Bin Qasim Town Map of is shown in Figure 14.



UC NO.	UC NAME	POPULATION 2005	AREA SQ KM	ROAD LENGTH (km)
UC-1	Ibrahim Hayderi	66177	16.64	78.50
UC-2	Rehri	47839	14.40	67.22
UC-3	Cattle Colony	63726	25.32	132.85
UC-4	Quaidabad	86156	6.63	36.59
UC-5	Landhi	89623	27.66	70.40
UC-6	Gulshan-e-Hadeed	99894	61.79	121.24
UC-7	Ghaghar	56366	373.73	285.60
BIN QASIM TOWN		480,855	526.20	792.40

Figure 14: Bin Qasim Town Map

The city of Karachi is divided into seven districts and Malir District is the largest district by area within Karachi. Malir District is also the most rural district of Karachi Division. The district covers an enormous area of 2160 sq. Km, which is more than half of Karachi's total land area. The district derives its name from its headquarters town of Malir. The word Malir basically denotes a region of pastoral wealth, a path of rich and fertile plain or meadow in Rajasthani, Siraiki and Sindhi.

4.5.1 Demography and Religious Affiliations

According to the Census 2017 provided by Pakistan Bureau of Statistics (PBS), total population of District Malir is 1,924,346. Total male population is 1,028,865 while female at 895,329. Sex ratio is 114.91. Total rural population is 857,634, Urban at 1,066,712. Rural sex ration is 113.34 while urban is 116.19. Average growth rate

between 1998 and 2017 was 3.77%. Rural population growth was 5.02 while urban at 2.95, Bin Qasim subdivision has the population of 248,0988.

The majority religion is Islam, with 96.39% of the population. Christianity is practiced by 1.78% and Hinduism (including Scheduled Castes) is practiced by 1.77% of the population.

According to the 2017 census, Sindhi was spoken by 31.37% of the population, Pashto by 19.37%, Urdu by 12.91%, Punjabi by 12.08%, Balochi by 8.18%, Hindko by 6.83%, Saraiki by 3.96%, and Brahui by 1.26% as their primary language.[9]

4.5.2 Household Characteristics

According to the Census, the average household size for Malir was 6.2, while the rural household size (5.8 persons) was slightly lower the urban statistics (6.8). This may be due to the lack of health services and relatively higher infant mortality rate in the rural areas. The Multi-Indicator Cluster Survey (MICS) 2014 provides several important parameters for Malir District's housing and utility aspects. According to the MICS survey, 75% of the residents are owners of their homes, regardless whether they in bungalows, apartment, and villages. Only 25% of Malir's residents live as tenants. With respect to housing structures concerning flooring, roofing and exterior walls. Electricity is available through K- Electric to 95% of Malir's inhabitants; those deprived of electricity are small goths in the rural areas.

4.5.3 Overview of Health Sector

Apart from private health facilities across the district, there are a variety of public health facilities. The most common public health facility in the district are Dispensaries (70), followed by (12) Basic Health Units (BHUs), (5) Rural Health Centers, and (5) Mother & Child Health Facilities. There are only two public hospitals in Malir District.

4.6 Project Surroundings

[8] https://www.pbs.gov.pk/sites/default/files/population/2017/results/09701.pdf
[9] https://dcmalir.sindh.gov.pk/profile-district-malir/

Several sites' visits were carried out in order to examine the socio-economic conditions around the project environment. During the social baseline survey, nearby industrial and institutional stakeholders were identified. As the project site will be located in Pakistan Steel Mill's allocated land adjacent to Bin Qasim Industrial zone and is largely surrounded by other industrial units falling in Bin Qasim Town. Residential settlements are far from the project site. Similarly, there are no major social services such as clinics/hospitals and schools/colleges in the immediate vicinity of the project site. Detailed description of the microenvironment is discussed below.

The project boundaries are surrounded by Changan Motors to the west, while Pakistan Steel Mill Industries lies to the south-west. Bin Qasim Industrial Park, and Wastewater Collection and Treatment Plant (WWCTP) and Aisha Steel Mills Limited are positioned to the north. The surrounding area is predominantly vacant, with only Pakistan Suzuki Motors Ltd and a few small industries present. In the northeast, Marvi Village, Sardar Ghulam Hussain Sandelo Goth and Gohram Bhugti Goths are located at a considerable distance from the project site.

CHAPTER 5: STAKEHOLDER CONSULTATION

5.1 Background Information

The main objective of public consultation is to disseminate information about the project and its expected impact on the primary and secondary stakeholders. The public consultation and participation serves as an effective tool for social interaction. This tool helps to develop the significant confidence between the stakeholders and the proposed project holder PIDC to minimize the anticipated environmental and social impacts of the project. Primary stakeholder is usually referred to those, which may be directly affected by the proposed project's activities, while on the other hand secondary stakeholders refers to those who are usually affected indirectly or they have power to make decisions at governmental or institutional level. Based on the EIA procedures, detailed stakeholder consultative meetings, Focus Group Discussion (FGD) and Key Informant Interviews (KII) were carried out with different stakeholders. The most important objective of these consultation meetings was to determine the extent of the impact of different proposed project activities and suggest appropriate mitigation measures accordingly. This section of EIA clearly describes the issues raised by the stakeholders during different consultation meetings conducted specifically for this assignment, informal and focused group discussions with the primary and secondary stakeholders were carried out which was primarily focused on determining the perceptions of the following key stakeholders:

- Communities/Villagers
- Governmental Departments & NGOs

The overall objectives of the process were identified as follows:

- To inform and acquire feedback from primary and secondary stakeholders on proposed project activities.
- To identify potential issues and mitigation measures
- To incorporate stakeholders concerns in the project documents.
- To identify the negative impacts due to the project execution

Following stakeholders approached for consultation meetings during this EIA study:

Primary Stakeholders:

- Communities Villagers
- Arabian Sea Country Club

- Bin Qasim Industrial Park

Secondary Stakeholders

- Sindh EPA
- Sindh Forest Department
- Wildlife Department
- District Administration
- WWF
- HANDs

5.2 Stakeholder Consultation Outcomes/Findings

Consultation outcomes have been discussed in the following sub sections.

5.2.1 Feedback by Primary Stakeholders

The comments, concerns and recommendations received during the primary stakeholder consultations have been included in this section. The comments gathered from stakeholder consultation were helpful in the screening of potential environmental and social aspects of the project. Figure 15 shows the primary stakeholders' consultations.

- The primary stakeholders expressed their optimistic views for project and expressed that new developments like these will attract more development in the area and will create jobs.
- The nearby communities supported the project and expressed that it will create job opportunities and developments in surrounding areas.
- Fire protection system must be part of project.
- Project executers were urged to consider local peoples for all jobs.
- Appropriate waste management system should be adopted.
- Schools and hospital should be considered as part of project.
- The right of way (RoW) of Arabian sea club should not be disturbed.
- The storm drain nallah should not be re-routed or blocked.



Figure 15: Pictorial View of Consultation with Primary Stakeholders

5.2.2 Views, Opinions and Recommendations of Secondary Stakeholders / Government Departments

The recommendations received from secondary stakeholder consultation have been provided in this section. Figure 16 shows the secondary stakeholders' consultations.

- Appropriate design should be developed without disturbing the surroundings.
- Traffic management mechanism should be developed for operation phase.
- The project executers must provide transparent information about the type of industries that will be established.

- The construction of the Industrial Park should be high quality and environment friendly.
- Efforts should be made to develop a proper mechanism for pollution control system.
- Power generation should be considered as part of project.
- Water recycling system should be considered.
- Wastewater treatment and recycling plant should be considered under design.
- Appropriate safety and security system should be developed prior to commencement of construction.
- The project will help in reducing poverty in the area. More jobs will be created for the local community.
- Proponent should involve the local Town Administrator in development project and avoid any conflict.
- Tree removal should be avoided, and tree relocation should be encouraged.
- Sustainable tree plantation must be carried out as per international standards







Figure 16: Pictorial View of Consultation with Secondary Stakeholders

CHAPTER 6: PROJECT ALTERNATIVES

A key component in the EIA process is the consideration of alternatives. Most guidelines use terms such as 'reasonable', 'practicable', 'feasible' or 'viable' to define the range of alternatives that should be considered. Essentially there are two types of alternatives:

- Incrementally different (modifications) alternatives to the Project; and
- Fundamentally (totally) different alternatives to the Project.

Alternatives are essentially, different ways in which the developer can feasibly meet the Project's objectives, for example by carrying out a different type of action, choosing an alternative location or adopting a different technology or design for the project. At the more detailed level, alternatives merge into mitigating measure where specific changes are made to the project design or to methods of construction or operation to avoid, reduce or remedy environmental effects. All EIA systems also require developers to consider mitigation (i.e. measures to avoid, reduce and remedy significant adverse effects).

Alternatives and mitigation therefore cover a spectrum ranging from a high level to very detailed aspects of Project design. The "No Project" scenario must also be considered as the baseline against which the environmental effects of the Project should be considered.

This section presents an analysis of the following alternatives from the perspective of economic and environmental considerations:

6.1 Rationale for Site Selection

Establishment of KIP project at the present location is the best option for project establishment due the following.

D. **Site/Location:** The site will be located on land of Pakistan Steel Mills and thus there is hardly any chance of land dispute normally causing delays in the project. It is neither a prime agriculture land nor having any significant flora and fauna which can be disrupted from the project establishment on the site. The location of the park offers excellent link to local & global markets located at 14 km from Port Qasim, having Rail Link at 4 km, National Highway at 5 km and Jinnah International Airport, Karachi at 25 km.

E. Reduced operating costs: The project offers the benefit of lower production costs because of its strategic location. Saving on logistical costs especially for export oriented industrial units due to close proximity to Port Qasim and National Highway.

F. Availability of skilled labor and industrial culture: Karachi is the major port city and industrial hub of the country. It is the financial and industrial capital of Pakistan and produces about 30 percent of value added in large-scale manufacturing and 25% of the GDP. As establishment of the project has the benefit of availability skilled labor in the market.

6.2 No Project Option

Industry is backbone for the economy of country and as already explained in earlier sections that Pakistan is legging behind in providing proper industrial infrastructure and allied facilities to attract the local and foreign investment. Therefore, unless an economically and environmentally more viable option can be found, which appears unlikely, the 'no project' option will have a negative impact on the overall economy the country.

6.3 Alternative Sites

No alternate site has been provided by the client (PIDC) to be considered for environmental assessment. Thus, in the absence of any alternate site and remarkable advantages of the present site in the shape of proximity to port, airport, railway link and highway make it a very attractive site. Adjacent to the site is another industrial site (Bin Qasim Industrial Park) by the same client. This make it further attractive through cost reduction on the various facilities required for industrial establishment.

A. Alternate Type of Activity:

The site is most suitable for industrial activity. The land cannot be developed as prime agriculture land or any other productive use other than industrial development. It is adjacent to another industrial park and is located on the land Pakistan Steel Mills. Thus, any other activity is not feasibly as compared to the industrial park establishment. Establishment of an Industrial Park on this land is the most appropriate use of the proposed land.

B. Provision of Water and Electricity:

Water from supply line/ground will be used for the development of the project which would have no negative impact on the water availability for other purposes currently used by the surrounding population. 132kV grid station is proposed only for the utilization of park. This will ensure proper electricity distribution in the park. This will also reduce the chance of voltage fluctuations.

C. Design and Layout Alternative.

The proposed industrial park is envisaged have following types of industries. A high-level zoning is proposed for each sector given in the Figure-2 above. Such zoning would be highly beneficial for individual industry to be establishment in the appropriate zone specified for that purpose.

CHAPTER 7: SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

7.1 Environmental Evaluation Process

Environmental evaluation process includes identification and assessment of the anticipated environmental impacts of the project. For this project, the potential impacts due to the implementation of the proposed project on the physical, biological, and socio-economic environment are studied. Once these potential impacts are identified, it is followed by identification of mitigation measures to mitigate the Project's adverse environmental effects. Positive impacts are also studied and enhance measures are proposed to make the project further beneficial for the residents and local communities as well environment of the area.

7.1.1 Approach Applied for Impact Identification

There are several guidelines and textbooks on identification and description of environmental and social impacts. These documents use various tools in an attempt to define a comprehensive and consistent method to capture the potential impacts of a proposed Project. However, it is now widely recognized by EIA practitioners that impact evaluation is not a purely objective and quantitative exercise. It has a subjective element; often based on judgment and values as much as scientific criteria.

The description of each impact has the following features:

- Definition of the impact using an impact statement identifying the Project activity or activities that causes the impact, the pathway or the environmental parameter that is changed by the activity, and the potential receptors of the impact.
- Description of the sensitivity and importance value of the receiving environment or receptors (based on the stakeholder consultations undertaken)
- Extent of change associated with the impact.
- Description of appropriate mitigation and management measures and potential effectiveness of the proposed measures.
- Characterization of the level of uncertainty in the impact assessment.

A preliminary assessment has been carried out for the potential impacts that could arise if no migratory measures were incorporated within the project. Based on observation during field visit, discussions with proponent of the project and local communities during public consultation, impression drawn from the primarily monitoring conducted for air and water quality, availability of water sources and secondary data for all components of the environment, significant impacts were enlisted. Later, five evaluation factors were set for the impacts assessment for each environmental issue which are as follow:

- Magnitude of the impact
- Prevalence (extent) of the impact
- Duration and/or frequency of the impact
- Risk of serious environmental damage
- Importance of the issue in question

7.1.2 Potential Impacts

Potential impact is any possible impact expected to arise from the implantation of a project on any component of the environment (Physical, biological & socio-economic). Characterization of potential impacts is done on the basis of significance, probability, and prevalence in the surrounding environment. Various parameters to be taken into account in impact prediction, evaluation and decision-making include:

i. Nature: (positive, negative, direct, indirect)
ii. Magnitude: (high, moderate, low);
iii. Extent/location: (area/volume, distribution);
iv. Timing: (construction, operation, immediate, delayed etc.)
v. Duration: (short term, long term, intermittent)
vi. Reversibility/irreversibility
vii. Likelihood: (probability, uncertainty, or confidence level).

A very important factor in evaluation of potential impacts is their significance level. Various indicators are used to determine the significance of an impact like compliance with standards, its duration, impacts on local community and biological components of environment etc. The criteria used in this report to define the significance of impacts in terms of low, Moderate, and severe impacts are as follows:

a. Negligible/No Impact: An impact is considered negligible where a resource or community will not be affected in any way by a particular activity.

b. Low: An impact where an effect will be experienced, but the impact magnitude is sufficiently small and well within accepted standards, very minor effect on community

c. Medium: Moderate significance means that will have a noticeable effect on a particular resource or community of the area. Effective mitigation measures are proposed to bring the severity of such impact to a minimum possible level.

d. High: An impact is considered of major significance where an accepted limit or standard may be exceeded, or where continues damage is predicted to a resource or community. Such impacts may also involve compensation along with mitigation to decrease their severity.

7.1.3 Mitigation and Enhancement Measures

Wherever the Project is likely to result in unacceptable impact on the environment, additional mitigation measures are proposed (over and above the inherent design measures included in the Project description). In addition, good practice measures may be proposed however these are unlikely to change the impact significance. In the case of positive impacts, management measures are suggested to enhance the benefits to be gained. Where mitigation measures are required the impact will be rated again to show the residual impact after implementation of management controls.

The following mitigation hierarchy will be utilized in selecting practical mitigation measures for unacceptable impacts as follows (in order of preference):

- Avoid the impact wherever possible by removing the cause(s)
- Reduce the impact as far as possible by limiting the cause(s)
- Ameliorate the impact by protecting the receptor from the cause(s) of the impact.
- Providing compensatory measures to offset the impact, particularly where an impact is of high significance and none of the above are appropriate.

The adverse environmental impact mitigation measures are proposed bases on experience from other similar project, knowledge of the subject, brainstorming and discussion with locals as well as subject experts. The main aim of the mitigation measures to modify and reduce the severity of the adverse environmental impacts to a minimum possible level with optimal cost and latest techniques.

7.1.4 Residual Impacts

Every development project may have some impact which may not be fully addressed through mitigation measures and even compensation. Incorporation of suggested mitigation measures may reduce the magnitude of the environmental impacts of the project but sometimes, it may fall in bringing them within acceptable limits. The residual impacts refer to those remaining impacts after mitigation measures have been applied and compensation paid.

7.1.5 Monitoring Requirements (Parameters & Frequency)

Environmental impact assessment is a process where impacts are predicted, mitigations measures are proposed to mitigate the adverse impacts during the construction and operation phase of the project. To assure that the mitigation measures proposed are working well, a monitoring program is developed. The monitoring program/plan also proposes the frequency/interval of samples and parameters to be monitored. The purpose of the monitoring is to confirm that the impact is within the prescribed limits and to provide timely information if acceptable limits/standards are violated.

7.2 Project Area and Study Area (Area of Influence)

The project area is the area that will be possibly directly impacted by the project. It includes areas where major construction activities are proposed for the project main structures, the establishment of construction and labor camps, borrowing, quarrying and waste disposal areas, etc.

The study area is a wider area where indirect impacts of the project are studied. The study area depends on many factors relating to the environmental settings, type of resources and project-related parameters Construction-related and subsequently traffic-borne noise and air pollution may influence areas at large distances away from the primarily affected areas (project area). The project construction, as well as operational activities, may have a variety of direct and indirect effects on the physical, biological, and human resources of the surrounding environment. This study area will take into consideration the impacts of the project on the surrounding environment.

7.3 Impact Characteristics (Assessment of Significance)

The assessment of effects and identification of residual significance takes account of any incorporated mitigation measures adopted due to any impact of project activities and is largely dependent on the extent and duration of change, the number of people or size of the resource affected, and their sensitivity to the change. Impacts can be both adverse and beneficial and the methodology defined below has been applied to define both beneficial and adverse impacts of the project.

The criteria for determining significance are specific for each environmental and social aspect but generally, the magnitude of each impact is defined along with the sensitivity of the receptor. Generic criteria for impact Characterization are given in table 8.

Table 8: Impact Characteristics Criteria

Impact Characteristics	Category
Nature of the impact	**Direct**: The environmental parameter is directly changed by the project. **Indirect:** The environmental parameter changes as a result of the change in another parameter.
Duration of the impact	**Short term:** Lasting only till the duration of the project such as noise from the construction activities. **Medium-term:** Lasting for a period of a few months to a year after the project before naturally reverting to the original condition such as contamination of soil or water by fuels or oil.
Impact Characteristics	**Category**
	Long term: Lasting for a period much greater than medium-term impacts before naturally reverting to the original condition such as loss of soil due to soil erosion.
Geographical Location of the impact	**Local:** Within the area of the project i.e. operation site and access road. **Regional:** Within the boundaries of the project area. **National:** Within the boundaries of the country.
Timing	**Construction** and/or **Operation**

Likelihood of the impact	Qualitatively measured on a scale of: **Almost certain:** Impact is expected to occur under most circumstances. **Likely:** Impact will probably occur under most circumstances. **Possibly:** Impact may occur at some time. **Unlikely:** Impact could occur at some time. **Rare:** Impact may occur but only under exceptional circumstances.
Consequence severity of impact	Rated as: **Major:** When an activity causes irreversible damage to a unique environmental feature; affects an entire population or species of flora or fauna in sufficient magnitude so as to cause a decline in abundance or change in distribution over more than one generation; has long-term effects (years) on socio-cultural or economic activities of regional significance. **Moderate:** When an activity causes long-term (period of years) reversible damage to a unique environmental feature; affects a portion of a population of flora or fauna causing reversible damage or change in abundance or distribution over one generation; has short term effects (months) on sociocultural or economic activities of regional significance. **Minor:** When an activity causes short term (period of few months) reversible damage to an environmental feature; slight reversible damage to a few species of flora or fauna within a population over a short period of time; has short-term (months) effects on socio-cultural or economic activities of local significance. **Negligible:** When no measurable damage to the physical, socio-economic, or biological environment above the existing level of impacts occurs.
Significance of the impact	Categorized as **High, Medium, or Low** Based on the consequence, likelihood, reversibility, geographical extent, duration, level of public concern and conformance with legislative or statutory requirements.

7.4 Impacts during the Construction Phase

7.4.1 Soil Contamination

During construction, a lot of heavy machinery is used for digging the soil, transportation of raw material/construction material and transport of workers. A significant amount of solvents, lubricants oil is used and stores at the project site. Any accidental release of such material can contaminate the soil and surrounding environment.

Impact No 1: Contamination of soil as a result of accidental release of solvents, oils and lubricants can degrades soil fertility and agricultural productivity.						
Project Phase: Construction Phase						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/ _
	Moderate	medium	possible	High	medium	-
Mitigation measures proposed: i. Prepare a Spill Prevention and Response Plan. ii. Appropriately mark fuel tanks by content and store in dyke areas. iii. Install grease traps on the site, wherever needed, to prevent flow of oily water. iv. Spill cleaning kit (shovels, plastic bags, and absorbent materials) will be available near fuel and oil storage areas. v. Carry cleanup kits in all fuel trucks. vi. The bottom of any soak pit or septic tank shall be at least 10 m above the groundwater table.						

7.4.2 Ground Water Contamination

During Construction activities of the project, a lot of water is used and the discharge from construction activities has the potential to contaminate the soil and sub-surface/ underground water in the project are even behind the project area. The increase in pollution of sub-surface soil and ground water may impair the health of the workers and local population, using this water.

Impact No 2: Discharge from construction activities can potentially result in the contamination of groundwater and soil.						
Project Phase: Construction Phase						
	Magnitude	Duration	Probability	Consequences	significance	+/_

Potential Impacts	Major	Short term	Definite	High	High	-

Mitigation measures proposed:

i. Prepare and implement a Spill Prevention and Response Plan.
ii. Run off from workshops be passed through oil water separators (OWS) before disposal.
iii. Build separate pits at sites for temporary handling of contaminated soil and water.
iv. Store fuels and lubricants in covered and dyked areas, underlain with impervious lining.
v. Spill control kits should be available near fuel and oil storage areas.
vi. Remove contaminated soil from the site and dispose to ensure protection of water sources.
vii. Construct bottom of soak pit or septic tank at least 100 meters away from water sources.
viii. Use silt traps to prevent contamination of river and streams.
ix. Construct Proper washrooms for the workers.
x. Proper waste management practices to be implemented.
xi. Sewage should not be let exposed in open areas.

7.4.3 Soil Erosion

Impact No 3: Land clearing, excavation and other construction activities may loosen the topsoil in the Project area resulting in loss of soil and possible acceleration of soil erosion, especially in the wet season.

Project Phase: Construction Phase

Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	Moderate	Short term	moderate	medium	low	-

Mitigation measures:

i. Limit vegetation loss to demarcated construction area.
ii. Cover areas such as muck disposal area and batching plant etc.
iii. Store and reuse all topsoil at all construction sites.
iv. The height of the stockpile will be minimized to the extent possible by increasing the size of the land for the stockpile.
v. Topsoil will be carefully stripped to ensure that it is not mixed with subsoil.
vi. Select local species for plantation to restore the biodiversity of the area in consultation with Forest Department after completion of respective activities.

7.4.4 Disposal of Solid Waste

During construction phase, the major sources of solid waste, associated with the construction of the project are given below..

- Domestic solid waste from labor camps/contractors housing facilities.
- Construction debris and waste.
- Waste mechanical equipment and parts.
- Used Oil from machinery and transport.
- Waste construction chemicals.

The extent of environmental Impacts of the solid waste would depend upon their disposal practices indiscriminate disposal of solid waste would lead to surface as well as ground water pollution.

Impact No 4: Pollution from improper solid waste disposal						
Project Phase: Construction Phase						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/ _
	Major	Medium term	Definite	High	High	-

Mitigation measures proposed:

i. A proper waste management plan is recommended to deal with the collected waste and to dump that at the proper location.
ii. Sanitary landfill is one of the most popular methods for the safe disposal of solid waste.
iii. Discarded construction material should be disposed of at the proper dumping sites.
iv. Used lubricants may be send back to the suppliers for recycling or otherwise environmentally safe disposal.
v. Leakage from fuel storages on construction sites should be handled properly.
vi. Establish an adequate inspection, maintenance, and cleaning program for soil waste management in the project area.
vii. Keep temporary disposal sites away from sensitive area and labor camps.
viii. Cover the trucks that will be used for the transportation of spoil material/debris to disposal sites.

7.4.5 Air Pollution

The ambient air quality will be affected by the Project activities primarily during the construction phase. During construction stage of the project the following are the main sources of air pollution (in particular dust and particulate matter).

- Construction material stock piles earthen materials and sand, blown by wind if openly stored.
- Transportation of construction materials like earthen materials, sand, in uncovered trucks, blown by wind and vibration.
- Land clearing, excavation, dumping, spreading, grading and compaction.
- Fugitive dust emissions from concrete batching plants
- Movements of construction machinery and construction materials transport vehicles over unpaved areas.

The dust emissions from the above sources and operations would result in dust and particulate matter at the ground level, with less chances of diffusion and thus hazardous to the nearby communities and worker of the project. Much of the fugitive dust generated by construction activities consists of relatively large size particles, which are expected to settle within a short distance from their source. A continuous flux of PM generation, however, during the active construction period, would keep the atmosphere polluted for longer periods.

Major sources of other principal pollutants including CO, Sox, NOx and VOC would be construction machinery, equipment and construction materials transport vehicles, mostly diesel based, employed for the project Generators, to be operated as standby in case of power outage, shall also contribute to air pollution. The extent of pollution would depend on the rate of usage of these equipment dispersion of these pollutants in the atmosphere would be primarily governed by the prevalent climatic conditions of the area.

Impact 05: Increase in ambient and ground level concentration of air pollutants from construction activities and vehicular movement may cause health impacts to the community						
Project Phase: Construction Phase						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	Medium	Medium	possible	medium	medium	-

Mitigation measures proposed:

i. Develop and implement an Air Pollution Control Plan.
ii. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
iii. Install and maintain all vehicles and machinery with appropriate emission control equipment.
iv. To the extent possible, use new and low emission equipment and vehicles.
v. Purchase best quality fuel and lubes and where possible use lead free oil and lubes.
vi. Sprinkle water on all unsealed roads used by Project vehicles that are within 200 m of any settlement.
vii. Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less.
viii. Paved roads shall be swept frequently.
ix. Install wheel washers where vehicle exit onto paved road from unpaved.
x. Appropriate maintenance of vehicles and machinery.
xi. Retain as much natural vegetation as possible.
xii. Adequately wet, cover with plastic, or provide with wind shield all stockpiles

7.4.6 Noise Pollution and Vibration

Construction noise is a component of environmental noise associated with construction activities. Construction noise is noise that arises from an activity at a construction site. It includes:

- Noise from operation of construction machinery and equipment for the construction activities including excavation and demolition work, site preparation work, foundations and concrete placement, erection of metal structures, installation of mechanical and electrical equipment and building maintenance or repair work.
- Noise from movement of vehicles within, entering or leaving a construction site.

The noise generated through these activities can be categorized as below.

- Airborne noise: Noise that travels through the air and is caused by general construction and construction traffic.
- Ground borne noise: Noise that is generated through rumbling sound caused by vibration due to impact induced construction activities such as pile driving and tunneling and movement of heavy transportation such as trucks.

Construction noise emanates from the source and propagates through the atmosphere. There are numerous factors influencing the noise level received at a sensitive receptor which are directivity of the source, Atmospheric absorption, meteorological influences, ground absorption and topography and structures.

Noise may have both physiological as well as psychological effects on human beings. Exposure to high level of noise causes dizziness, nausea, unusual blood pressure variation, physical fatigue, hearing Impairment and, in acute cases, permanent hearing loss. The psychological effects may comprise reduced mental capability and irritations chronic exposure of people to higher noise levels also impairs their efficiencies and skills. According to Sindh Environment Quality Standards (SEQS) noise level (for vehicles) is 75 dBA, at a distance of 7.5 meters from the source.

Impact 6: Increase in ambient noise levels due to operation of construction equipment and movement of construction traffic may create nuisance for nearby communities.						
Project Phase: Construction Phase						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	Moderate	Short term	possible	low	low	-

Mitigation measures proposed:

i. Select the quietest available plant and equipment that can economically undertake the work required.
ii. Undertake regular maintenance of the equipment.
iii. Use visual alarms in preference to audible alarms.
iv. Enclose noisy equipment and build an enclosure around the noise source.
v. Locate noisy equipment behind parking lots or parks.
vi. Close liaison with the community and regular monitoring of the noise levels.
vii. Fit and maintain appropriate mufflers on earth-moving and other vehicles such as excavators, front-end loaders and other diesel-engine equipment.
viii. Reduce workers' exposure to high noise levels by rotating workers tasks.
ix. Use earplugs to reduce workers' exposure to high noise levels.
x. Noise emissions from concrete batching
xi. Locate noisy equipment and batching plants behind sound barriers or sound absorbers – for example, gravel stockpiles or constructed barriers.

7.4.7 Socio-economic Impacts

The project will provide employment to several persons during the construction and operation phases. The Project will directly and through indirect and induced mechanisms contribute to alleviating poverty and vulnerability in Sindh province, and to prosperity and well-being of the people employed by the Project. A summary of the possible impacts to the livelihood and well-being of the surrounding communities is as follows:

- Direct, indirect, and induced employment at the local levels, resulting in increased prosperity and wellbeing due to higher and stable incomes of people.
- Increase in the stock of skilled human capital due to transfer of knowledge and skill under the Project resulting in enhanced productivity of the local labor.

7.4.7.1 Employment

Impact 7: Direct, indirect, and induced employment at the local levels, resulting in increased prosperity and wellbeing due to higher and stable incomes of people.						
Project Phase: Construction Phase and Operation Stage						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	Minor	long term	Possible	Medium	Medium	-

Enhancement measures proposed:

1. Ensure preferential recruitment of local candidates provided they have the required skills and qualifications.
2. Include an assessment of the contractor's demonstrated commitment to domestic and local procurement and local hiring in the tender evaluation process.
3. Coordinate recruitment efforts related to non-skilled labor, including for non-skilled labor positions required by contractors. Good practice measures:
4. Determine what is considered to be 'fair and transparent' in recruitment and in distribution of jobs between different community groups, in consultation with local communities and their leaders.

7.4.7.2 Socio-Cultural Impacts

The project may result potential sociocultural changes that can be induced by the Project including enhancement or possible degradation of social and economic landscape, pressure on the local services and hindrance in mobility of the local people. Key impacts are listed below and discussed in this section:

- Increase in population due to in-migration of job seekers (in-migrants) leading to pressure on existing social infrastructure and services.
- Disputes over distribution of Project employment within and between Study Area inhabitants and the in-migrants resulting in social unrest.
- Potential social unrest in the Study Area due to conflicting sociocultural norms amongst the inhabitants and in-migrants.

Pressure on Social Infrastructure and Services

Impact 8: Pressure on Social Infrastructure and Services						
Project Phase: Construction Phase and Operation Stage						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	Minor	long term	Possible	Medium	Medium	-

There is a potential for an influx of job seekers in the Study Area due to the jobs created by the Project. The potential in-migration in study area due to the Project will be negligible in comparison to the present population of Karachi city. The influx of job seekers will pose pressure on the availability of infrastructure and services, such as those pertaining to education, health care and medication, water, and communication in the Project area.

Impact 9: Conflicts Due to Provision of Employment to Outsiders
Project Phase: Construction Phase and Operation Stage

Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	Minor	Short term	Possible	low	low	-

7.4.8 Impacts on Public Health and Safety.

During construction stage if proper mitigation measures proposed in the above section for air pollution, waste and wastewater disposal are not taken it may result in public health and safety issues in the project area and surrounding communities. The incidences of diseases in the local population may result from the rise in populations of disease vectors including flies and mosquitoes, from increased levels of wastewater and solid waste pollution, generated by the construction workers in the area. Increased air pollution levels in the atmosphere may also affect public health. Similarly, workers' safety hazards would be associated with the operation of construction machinery and equipment, transportation.

Impact 9: Direct, indirect, and induced environmental issue may result in spread of diseases and public health issues in project area.						
Project Phase: Construction Phase and Operation Stage						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	Minor	short term	Possible	Medium	Medium	-
Mitigation measures proposed: 1. Implementation of the mitigation measures proposed for air pollution control disposal of wastewater and solid waste (relevant section above). 2. Staff and workers proper training and awareness. 3. Strict compliance with the established safety rules and regulations.						

7.5 Impacts During Operational Phase

7.5.1 General

Industrial activities contribute significantly to environmental pollution through the generation of various types of industrial waste. Understanding the sources, types, and impacts of industrial waste is crucial for developing effective waste management strategies and mitigating environmental harm.

7.5.1.1 Sources of Industrial Waste

Manufacturing Processes: The production of goods often results in the generation of waste materials, including by-products, defective products, and unused raw materials.
Chemical Processing: Industries involved in chemical manufacturing produce a wide range of hazardous and non-hazardous waste, including solvents, acids, and toxic chemicals.
Mining and Extraction: The extraction of minerals and metals produces large volumes of waste, such as tailings and slag, which can contain harmful substances.
Construction and Demolition: Construction activities generate waste materials such as concrete, wood, and metals, contributing to the overall industrial waste stream.

7.5.1.2 Types of Industrial Waste

Solid Waste: includes materials like packaging, scrap metal, and sludge from wastewater treatment processes.
Liquid Waste: Often contaminated with chemicals and heavy metals, liquid waste includes industrial effluents and wastewater.
Gaseous Waste: Emissions from industrial processes can release pollutants such as sulfur dioxide, nitrogen oxides, and greenhouse gases into the atmosphere.
Hazardous Waste: Contains substances harmful to human health and the environment, including heavy metals, toxic chemicals, and radioactive materials.
E-waste: Discarded electronic devices and components, which may contain hazardous materials like lead, mercury, and brominated flame retardants.

7.5.1.3 Impacts of Industrial Waste:

Water Pollution: Improper disposal of liquid waste can contaminate water bodies, affecting aquatic ecosystems and posing risks to human health.
Air Pollution: Gaseous emissions contribute to air pollution, leading to respiratory issues and other health problems in nearby communities.
Soil Contamination: Improper disposal of solid waste can result in soil pollution, negatively impacting plant growth and contaminating the food chain.
Biodiversity Loss: Industrial activities can contribute to habitat destruction and fragmentation, leading to the decline of plant and animal species.
Human Health Risks: Exposure to hazardous waste materials can lead to various health issues, including respiratory problems, cancers, and developmental disorders.
Climate Change: The release of greenhouse gases from industrial processes contributes to global warming and climate change.

Addressing the challenges posed by industrial waste requires a comprehensive approach involving strict regulations, sustainable practices, and innovative technologies. By understanding the sources, types, and impacts of industrial waste, individual industrial located in Karachi Industrial Park (KIP) will prepare their specific pollution control/management plan. They will also be required to get approval of their EIA/IEE submitted to Sindh Environment Protection Agency (SEPA). KIP will have a combined wastewater treatment plant where the common parameter will be treated and then disposed.

7.5.2 Air Pollution

Industrial estates, comprising clusters of manufacturing and processing facilities, are significant sources of gaseous emissions that can have environmental and health implications. Understanding the sources, impacts, and potential mitigation measures for gaseous emissions is crucial for sustainable industrial development. Common sources of Gaseous Emissions in Industrial Estates are as follows:

Combustion Processes: Industrial estates often house facilities that burn fossil fuels for energy production. Combustion processes release pollutants such as sulfur dioxide (SO2), nitrogen oxides (NOx), and particulate matter into the air.

Chemical Manufacturing: Facilities engaged in chemical production may emit volatile organic compounds (VOCs), ammonia, and other hazardous gases during manufacturing processes.

Waste Treatment and Disposal: Industrial estates may include waste treatment facilities, such as incinerators or landfills, which can release gases like carbon monoxide (CO) and methane (CH4) into the atmosphere.

Metal Processing: Metal smelting and processing activities within industrial estates can result in emissions of heavy metals and other pollutants, including arsenic and lead

Transportation: The movement of goods and personnel within industrial estates can contribute to air pollution through the emissions of nitrogen dioxide (NO2) and particulate matter from vehicles

7.5.2.1 Impacts Air Pollutants

A. Particulate Matter

- Damage to plants by choking the leaf pores and restricting photosynthesis.
- Global cooling of earth by reflecting back the solar radiation.
- Impairment of the atmospheric visibility affecting transportation safety.
- Deterioration of aesthetic quality of atmosphere, land and water .
- Soiling of materials physical properties and infrastructure.
- Increase in the frequency of respiratory infections such as bronchitis.

B. Carbon Monoxide

- Heart attack by reducing the oxygen carrying capacity of blood.
- Birth defects include mental retardation and impairment of fetus growth.
- Dizziness, headache, and nausea.
- Increase in reaction time of the drivers, a threat to road safety.

C. Oxides of Sulphur and Nitrogen

- Chlorosis and Plasmolysis in plants.
- Damage to material and property, by aid rains, resulting from oxidation of sulfur oxides to sulfuric acid, after reacting with water vapors.
- Serious lung damage, particularly in sulphate form.
- Respiratory diseases like bronchitis.
- Formation of photochemical oxidants.
- Retardation of growth in plants.
- Reduction in oxygen carrying capacity of blood.
- Impairment of olfactory sense and night vision.
- Dryness and roughness of throat.

D. VOC

- Formation of photochemical oxidants.
- Leaf discoloration and cell collapse in plants.
- Damage to rubber, textiles, paints, and other materials.
- Sever eye, nose, and throat irritations.
- Serve coughing and shortness of breath.

Presently, the air quality of the project area is in compliance of SEQS, but the project operational activities will invariably result into pollution of the ambient air fugitive particulate matter (PM) emissions.

The dust emissions would cause public health hazard and nuisance to the nearby communities particularly when these emissions are released at the ground level, with less chances of diffusion. Most of the dust generated by construction activities consists of relatively large size particles, which are expected to settle within a short distance from their source. A continuous flux of particulate matter generation, however, during active construction period, would keep the atmosphere polluted for longer periods.

The Karachi Industrial Park (KIP) will have a blend of different industrial clusters, which will produce air emissions (of varying Intensities) relative to their respective processes. All these industries at planning stage will be required to have their own EIA's /IEE as per their category mentioned in IEE/EIA regulations prior to construction in the KIP and get their approvals from SEPA. Specific mitigation measures for the air pollution control from this industry would be an essential component of the IEE/EIA submitted and the approval issue by SEPA in this regard.

Impact 01: Increase in ambient and ground level concentration of air pollutants from industries will cause health impacts to the community						
Project Phase: Operation Phase						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	High	Long term	possible	medium	medium	-

Mitigation measures proposed:

i. Develop and implement an Air Pollution Control Plan.
ii. Cover all trucks carrying raw material and finished products.
iii. Install and maintain all vehicles and machinery with appropriate emission control equipment.
iv. To the extent possible, use new and low emission equipment and vehicles.
v. Purchase the best quality fuel and lubes and where possible use lead free oil and lubes.
vi. Sprinkle water on all unsealed roads used by Project vehicles that are within 200 m of any settlement.
vii. Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less.
viii. Paved roads shall be swept frequently.
ix. Appropriate maintenance of vehicles and machinery.
x. Retain as much natural vegetation as possible.
xi. Adequately wet, cover with plastic, or provide with wind shield all stockpiles.
xii. Chimneys and particulate scrubber should be provided to the plants generating, Particulate matter.
xiii. Masks should be provided to drivers and operators of vehicles and construction machinery.
xiv. Regular monitoring and reporting to Sindh EPA.
xv. Training and awareness of the staff and workers.

7.5.3 Noise Pollution and Vibration

There are two types of noise sources i.e., plant noise and vehicular noise. The possible sources of noise after the establishment of the KIP would be different processing equipment (depending upon the types of Industries), boilers and generators.

A. Vehicular Noise

The industrial activities In the KIP will increase traffic in the area the vehicular noise will be one of the added nuisances for the nearby community. An area of about 1 km radius will be directly affected by vehicular noise. Generally, the well-maintained vehicles have noise levels within the SEQS level of 75 dBA.).

B. Acoustic Trauma

Acoustic trauma, which results from a single or relatively few exposures, is defined as "immediate organic damage to the ear from excessive sound energy". If the noise is intense enough, other structures outside the Inner ear may also be affected, such as the eardrum, which may become ruptured. Although such damage is rare but may cause some degree of permanent damage to the auditory system.

C. Temporary and Permanent Threshold Shift

The difference between these two effects is that, in temporary threshold shift, the auditory level returns to its original level, whereas in permanent, problems remain permanent. Thus, a person with permanent threshold shift, no further recovery is possible sometimes, the permanent threshold shifts results from acoustic trauma, but it often results from long period of repeated exposure of noise.

D. Physiological Effects

Studies have shown that anti-hypertensive medication consumption is generally higher in noisy areas. Loud noise is related to vasoconstriction with the consequent increase in blood pressure. One laboratory study showed that plasma cortisol and blood cholesterol levels were increased with the Increase of noise level above 75 dBA. Exposure to noise can also lead to gastric changes. A study showed noise level above 70 dBA resulted in a reduction in stomach contraction strength and helped in ulcer development.

E. Other Effects

Some of the other effects of noise are cognitive performance, occupational performance, effects on social behavior and effects on aggression.

Impact 02: Increase in ambient noise levels due to operation of Industries and related traffic may create nuisance for nearby communities.						
Project Phase: Operation Phase						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	Moderate	Long term	possible	low	low	-

Mitigation measures proposed:

i. Undertake regular maintenance of the equipment.
ii. Use visual alarms in preference to audible alarms.
iii. Enclose noisy equipment and build an enclosure around the noise source.
iv. Locate noisy equipment behind parking lots or parks.
v. Close liaison with the community and regular monitoring of the noise levels.
vi. Reduce workers' exposure to high noise levels by rotating workers tasks
vii. Use earplugs to reduce workers' exposure to high noise levels.
viii. Locate noisy equipment behind sound barriers or sound absorbers.
ix. Noise measurement of the noisy areas (If required).
x. Audiometric testing of workers exposed to high noise levels.
xi. Record keeping of medical tests and follow up.
xii. Engineering control for noise reduction.
xiii. Administrative control for noise reduction.
xiv. Training of employees.

7.5.4 Industrial Wastewater Impacts

As already explained that KIP will have a blend of industry each one with specific process and thus resulting specific effluents. As under the law every industry will have to submit an IEE/EIA at time of planning and industry should have treatment facility for its effluents. However, the following parameters are general in nature and discharged by majority of the industrial process. Such parameters would be treated through a combined wastewater treatment Plant for which location has been identified in the project. The impacts of these parameters are discussed below.

A. pH

- Growth Inhibition of bacterial species (responsible for removing organic pollution) under highly acidic or alkaline conditions.
- Corrosion of water carrying system and structures with acidic wastewater having low pH.

- Malfunctioning and impairment of certain physic-chemical treatment process under highly acidic or alkaline conditions.

B. Organic Pollutants

- Depletion of dissolved oxygen (DO) levels, of the receiving water body, below limits necessary to maintain aquatic life (4-5 mg/l).

C. Suspended Solids

- Sedimentation in the bottom of water bodies leaving adverse impacts on flora and fauna.
- Localized depletion of dissolved oxygen in the bottom layers of water bodies.
- Reduced light penetration in natural waters and consequent reduction in photosynthesis.
- Aesthetic nuisance.

D. Oil and Grease

- Reduced re-aeration in natural surface bodies, because of floating Oil and grease film and consequent depletion in dissolved oxygen levels.
- Reduced light penetration in natural waters and consequent reduction in photosynthesis.
- Aesthetic nuisance

Impact 03: Untreated wastewater Industries can pollute the receiving water bodies and their ecosystem/biodiversity in it.						
Project Phase: Operation Phase						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	Moderate	Long term	Possible	high	high	-

Mitigation measures proposed:

i. Pre-treatment facility at individual industry level
ii. Fully functional Combined Effluent Treatment Plant (CETP).
iii. Water consumption both for the process and sanitary purposes should be monitored and its quantities recorded by each industry.
iv. Installment of flow meters to record daily water intake unit water consumption with respect to production.
v. Use of the septic tank for pre-treatment of sanitary wastewater in each industrial unit.
vi. Establishment of CETP to treat wastewater of all industries by adopting Activated Sludge Process technique.
vii. Wastewater discharged from all the industries including CETP be monitored with respect to its quantity and quality.

viii. Cleaner production, techniques be adopted by the industries, in order to reduce the resources consumption.
ix. Regular reporting of the priority parameters to the SEPA according to the nature of industry.
x. Training and awareness to the staff and worker on cleaner production practices.

7.5.5 Solid, Liquid, and Hazardous Waste Impacts

Apart from emission and effluents the third most important pollutant would be in for of solid, liquid, and hazardous waste.

7.5.5.1 Solid Waste

The solid waste will generally comprise empty containers of lube oil and chemicals, metal scrap, discarded mechanical parts and domestic solid waste from all the Industries in the KIP. Other major solid waste streams will depend upon the varying nature of Industries in the KIP. Solid waste will also be produced from commercial and industrial activities in the KIP.

7.5.5.2 Liquid Waste

The liquid waste is generally the used lube oil from different machines, especially from the gears and from the vehicles. The quantity of this waste stream is not possible to estimate at this stage. The Improper disposal of liquid waste can cause air, water and soil pollution. The solid and liquid waste impacts on different environmental conditions would be medium adverse.

7.5.5.3 Hazardous Waste

During industrial processes many chemicals of hazardous nature are also used. All such chemicals need special care d using transportation, storage, handling, and disposal.

Impact 04: improper handling and disposal of solid, liquid and hazardous waste can contaminate and pollute the receiving water bodies and terrestrial ecosystem..						
Project Phase: Operation Phase						
Potential Impacts	Magnitude	Duration	Probability	Consequences	significance	+/_
	Moderate	Long term	Possible	moderate	moderate	-

Mitigation measures proposed:

i. For safe disposal of industrial wastes, the management can encourage the use of three R's concept (reduce, reuse, and recycle the solid waste).
ii. The plant operators should be trained to do their best to produce less solid waste from the process by employing different cleaner production techniques.

iii. Proper waste segregation, collection and storage be integrated with the plant's operations.
iv. Agreement with local authorities for timely collection of municipal solid waste
v. Implement a Spill Prevention and Response Plan.
vi. Remove contaminated soil from the site and dispose to ensure protection of water sources.
vii. Construct bottom of soak pit or septic tank at least 100 meters away from water sources.
viii. Training and awareness to the staff and workers on handling of hazardous waste.

7.5.6 Miscellaneous

Following mitigation measures are recommended.

- Appropriate storm water drainage system inside the industrial park
- Develop and communicate a work plan on safe working for Communicable diseases.
- Establish a proper Occupational Health and Safety system.
- Proper training in occupational health and safety equipment.
- A proper firefighting system is recommended for the whole KIP and individual industrial units.
- Regular training to staff and workers on Occupational health and safety (OSH) and use of OHS equipment, firefighting, first aid and emergency response etc.
- A rehabilitation plan should be chalked out after completion of construction phase by filling of all the excavation and restore land to its original form, Clearing of soil from soil pollutants like lubricants and chemicals.
- Program for sufficient plantation inside the industrial park and development of green corners is recommended.

CHAPTER 8: ENVIRONMENTAL MANAGEMENT PLAN

8.1 Background Information

The potential environmental impacts during the construction and operation phase of the proposed project on various environmental components such as social, biological and physical environment were predicted in the course of the EIA study. This EIA document has also identified mitigation measures to minimize the environmental impacts of the proposed project, keeping these effects within acceptable limits.

The EMMP (Environmental Management and Monitoring Plan) has been designed to address how the proposed measures will be implemented. It defines the responsibilities of the PIDC and contractor; develops a system of checks and balances; proposes actions that are to be taken by each role player; and lays down the required documentation, communication, and monitoring procedures.

8.1.1 Objectives and Purpose of EMMP

The purpose of this EMMP is not only to address the expected environmental impacts of the proposed project, but also to enhance project benefits and to introduce standards of good practice to be adopted for the proposed project.

The primary objectives of the EMMP are to:

- Facilitate the implementation of the mitigation measures that are identified in the EIA;
- Define the responsibilities of the project proponent and contractor and to provide a means for effective communication of environmental issues between them;
- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures guidelines.

8.2 Roles & Responsibilities

The process of environmental mitigation and management, as described in this section, involves the coordination and collaboration of several officials to ensure effective implementation. The key organizations in this process include:

8.2.1 Role of PIU PIDC

The Project Implementation Unit is responsible for overseeing the implementation of the KIP project. Within PIDC, the PIU plays a crucial role in managing the overall project and also

ensuring compliance with environmental and social safeguards. They work closely with other stakeholders and agencies to execute the project in an environmentally and socially responsible manner.

8.2.2 Role of PSC

The Project Supervision Consultants (PSC) support the PIU in construction management activities. The PSC provides oversight, and decision-making support to the PIU during the construction phase. They also play a role in ensuring that environmental management measures are properly integrated into the construction activities.

8.2.3 Role of Project Contractor(s):

The Project Contractors to be hired for carrying out the construction work on the KIP project are essential stakeholders in environmental management. The Project Contractor (s) is/are responsible for executing the construction activities in accordance with the project's environmental and social requirements. Contractors need to adhere to the Environmental Management Plan (EMP) and implement mitigation measures to minimize adverse environmental and social impacts during the construction phase and operational phase of the project.

Contractor's E&S compliance will be monitored by E&S team of Project Supervision Consultant (PSC) which will be supervised by E&S team of PIU.

The Project Contractor will be required to develop and implement robust Environmental and Social Management System (ESMS) within an organization to manage and address environmental, health, and safety risks and responsibilities. The ESMS will be developed under the light of present EMP document and will focus but not be limited to the following:

- **Planning and Commitment:** The initial step will require leadership support and commitment to implement the ESMS and EMP which will involves developing a clear vision and objectives for the system's implementation and identifying the necessary resources and personnel to lead the process.

- **E&S and OHS Resource Persons:** To ensure effective implementation of ESMS and an EMP, Project Contractor will appoint dedicated E&S and OHS resource personnel after the approval from PSC and PIU. These individuals will play a crucial role in overseeing and managing the E&S and OHS aspects of projects during the construction and operational phase of the project. The Contractor shall provide details of its organizational framework, in particular the designation of a senior manager to take overall responsibility and the designation of the following positions:

- Manager E&S Compliance.
- Manager OHS.
- Community Liaison Officer (CLO).
- HSE Executives/Supervisors.

The following table provides job description and qualification criteria for the E&S and OHS resource persons likely to be engaged by Project Contractor.

Sample Job Description and Qualification Criteria of E&S and OHS Resource Persons

Position	Responsibility and Qualification Criteria
Manager E&S Compliance	**Responsibilities:** • Develop, implement, and monitor the ESMS and EMP ensuring compliance with relevant environmental and social standards, policies, and regulations. • Conduct environmental and social impact assessments and risk assessments to identify potential hazards and impacts. • Prepare and maintain environmental and social management plans. • Oversee the integration of environmental and social considerations into project planning, design, and decision-making processes. • Facilitate consultation and engagement with stakeholders, including local communities, NGOs, and relevant government authorities. • Monitor project activities to ensure adherence to environmental and social requirements and address any non-compliance issues. • Conduct regular audits and assessments to evaluate the effectiveness of the ESMS and propose improvements as needed. • Prepare reports and documentation for internal and external stakeholders, including regulatory authorities and funding agencies. **Qualification Criteria:** • Bachelor's or Master's degree in Environmental Science, Environmental Engineering, Sustainability, or a related field. • Knowledge of environmental and social impact assessment methodologies and regulatory requirements. • Familiarity with international environmental and social standards, such as those of the International Finance Corporation (IFC) or World Bank. • Strong communication and interpersonal skills to engage with stakeholders and build effective relationships. • Analytical and problem-solving abilities to identify and address environmental and social issues. • Experience in project management and knowledge of various industries and their environmental and social challenges.

Position	Responsibility and Qualification Criteria
Manager OHS	**Responsibilities:** • Develop and implement Occupational Health and Safety (OHS) management systems and protocols in alignment with relevant laws and standards. • Conduct workplace risk assessments and identify potential occupational health and safety hazards. • Design and deliver OHS training programs for employees to promote safety awareness and best practices. • Ensure compliance with OHS regulations and standards, including the provision of personal protective equipment (PPE) and safety procedures. • Investigate accidents and incidents, prepare incident reports, and recommend corrective actions to prevent future occurrences. • Collaborate with project managers and teams to integrate OHS considerations into project planning and execution. • Conduct regular inspections and audits to assess workplace safety and identify areas for improvement. • Stay up-to-date with OHS regulations and industry best practices to implement the most effective safety measures. **Qualifications Criteria:** • Bachelor's or Master's degree in Environmental Engineering or Science, Industrial Hygiene, or a related field. • Knowledge of OHS regulations, standards, and best practices. • Experience in developing and implementing OHS management systems. • Excellent communication and training skills to promote a safety-conscious culture. • Strong problem-solving skills and attention to detail in identifying workplace hazards. • Ability to collaborate with teams and communicate OHS requirements effectively.
Community Liaison Officer (CLO).	**Responsibilities:** • Develop and implement strategies to engage with local communities, including residents, stakeholders, community leaders, and non-governmental organizations (NGOs). • Conduct regular meetings, workshops, and outreach programs to understand community needs and concerns • Facilitate clear and transparent communication between the organization and community members.

Position	Responsibility and Qualification Criteria
	• Disseminate information about the organization's projects, initiatives, and activities, as well as collect feedback and opinions from the community to be relayed back to the organization. • Address community grievances, complaints, and conflicts in a timely and empathetic manner. • Ensure compliance with relevant laws, regulations, and policies related to community engagement, environmental protection, and social responsibility. **Qualifications and Skills:** • Bachelor's degree in a relevant field such as community development, social sciences, environmental management, or a related discipline. • Proven experience in community engagement, stakeholder management, or related fields. • Excellent communication, interpersonal, and negotiation skills. • Empathy and cultural sensitivity to work effectively with diverse communities. • Strong problem-solving and conflict resolution abilities. • Knowledge of environmental and social impact assessment processes is a plus. • Ability to work independently and as part of a team, and willingness to travel to project sites as needed.
HSE Executive/Supervisor	**Responsibilities:** • Prepare and submit regular reports on EHS performance and compliance to management and regulatory authorities as required. • Maintain accurate records of incidents, inspections, training sessions, and safety-related activities. • Continuously assess the effectiveness of EHS programs and seek opportunities for improvement. Develop and implement strategies to enhance the organization's EHS performance. **Qualifications and Skills:** • Bachelor's degree in a relevant field such as community development, social sciences, environmental management, or a related discipline. • Relevant certifications in HSE such as: IOSH, NEBOSH and OHSAS etc.

Note*

All the above-mentioned job descriptions may vary from one organization to another, and the specific responsibilities outlined above may be adapted after the approval of PSC and PIU if required.

8.3 Environmental Management Monitoring Plan

Detailed Environmental Management Plan for construction phase is given in Table 9 and monitoring plan is given in Table 10. Meanwhile on the other hand the detailed Environmental Management Plan for operational phase is given in Table 11 and its monitoring plan is given in Table 12.

Table 9: Environmental Management Plan (EMP) Construction Phase

S. No.	Aspect	Probable Impact	Safeguards and Mitigations	Responsibility	Supervised by
1.1.	**Soil Contamination**	A lot of heavy machinery is used for digging the soil, transportation of raw material/construction material and transport of workers. A significant amount of solvents, lubricants oil is used and stores at the project site. Any accidental release of such material can contaminate the soil and surrounding environment.	• Prepare a Spill Prevention and Response Plan. • Appropriately mark fuel tanks by content and store in dyke areas. • Install grease traps on the site, wherever needed, to prevent flow of oily water. • Spill cleaning kit (shovels, plastic bags, and absorbent materials) will be available near fuel and oil storage areas. • Carry cleanup kits in all fuel trucks. • The bottom of any soak pit or septic tank shall be at least 10 m above the groundwater table.	Contractor	PIU-PIDC
1.2.	**Ground Water Contamination**	A lot of water is used and the discharge from construction activities has the potential to	• Run off from workshops be passed through oil water	Contractor	PIU-PIDC

		contaminate the soil and sub-surface/ underground water in the project area even behind the project area. The increase in pollution of sub-surface soil and ground water may impair the health of the workers and local population, using this water.	separators (OWS) before disposal. • Build separate pits at sites for temporary handling of contaminated soil and water. • Store fuels and lubricants in covered and dyked areas, underlain with impervious lining. • Spill control kits should be available near fuel and oil storage areas. • Remove contaminated soil from the site and dispose to ensure protection of water sources. • Construct bottom of soak pit or septic tank at least 100 meters away from water sources. • Use silt traps to prevent contamination of river and streams.		

			• Construct Proper washrooms for the workers. • Proper waste management practices to be implemented. • Sewage should not be let exposed in open areas.		
1.3.	**Soil Erosion**	Land clearing, excavation and other construction activities may loosen the topsoil in the Project area resulting in loss of soil and possible acceleration of soil erosion, especially in the wet season.	• Limit vegetation loss to demarcated construction area. • Cover areas such as muck disposal area and batching plant etc. • Store and reuse all topsoil at all construction sites. • The height of the stockpile will be minimized to the extent possible by increasing the size of the land for the stockpile. • Topsoil will be carefully stripped to ensure that it is not mixed with subsoil. • Select local species for plantation to restore the biodiversity of the area in	Contractor	PIU-PIDC

			consultation with Forest Department after completion of respective activities.		
1.4.	**Disposal of Solid Waste**	The extent of environmental Impacts of the solid waste would depend upon their disposal practices indiscriminate disposal of solid waste would lead to surface as well as ground water pollution. The major sources of solid waste, associated with the construction of the project are domestic solid waste, construction debris and waste, waste mechanical equipment and parts, used oil from machinery and transport and waste construction chemicals.	• A proper waste management plan is recommended to deal with the collected waste and to dump that at the proper location. • Sanitary landfill is one of the most popular methods for the safe disposal of solid waste. • Discarded construction material should be disposed of at the proper dumping sites. • Used lubricants may be send back to the suppliers for recycling or otherwise environmentally safe disposal. • Leakage from fuel storages on construction sites should be handled properly.	Contractor	PIU-PIDC

			• Establish an adequate inspection, maintenance, and cleaning program for soil waste management in the project area. • Keep temporary disposal sites away from sensitive area and labor camps. • Cover the trucks that will be used for the transportation of spoil material/debris to disposal sites.		
1.5.	**Air Pollution**	The main sources of air pollution (in particular dust and particulate matter) are; Construction material stock piles earthen materials and sand, blown by wind if openly stored, transportation of construction materials like earthen materials, sand, in uncovered trucks, blown by wind and vibration, land clearing, excavation, dumping, spreading, grading and compaction, fugitive dust emissions from concrete batching plants, movements of construction	• Develop and implement an Air Pollution Control Plan. • Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer). • Install and maintain all vehicles and machinery	Contractor	PIU-PIDC

		machinery and construction materials transport vehicles over unpaved areas. Major sources of other principal pollutants including CO, Sox, NOx and VOC would be construction machinery, equipment and construction materials transport vehicles, mostly diesel based, employed for the project Generators, to be operated as standby in case of power outage, shall also contribute to air pollution. The extent of pollution would depend on the rate of usage of these equipment dispersion of these pollutants in the atmosphere would be primarily governed by the prevalent climatic conditions of the area.	with appropriate emission control equipment. • To the extent possible, use new and low emission equipment and vehicles. • Purchase best quality fuel and lubes and where possible use lead free oil and lubes. • Sprinkle water on all unsealed roads used by Project vehicles that are within 200 m of any settlement. • Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less. • Paved roads shall be swept frequently. • Install wheel washers where vehicle exit onto paved road from unpaved. • Appropriate maintenance of vehicles and machinery. • Retain as much natural vegetation as possible.		

			• Adequately wet, cover with plastic, or provide with wind shield all stockpiles		
1.6.	**Noise Pollution and Vibration**	Construction noise includes; Noise from operation of construction machinery and equipment for the construction activities including excavation and demolition work, site preparation work, foundations and concrete placement, erection of metal structures, installation of mechanical and electrical equipment and building maintenance or repair work. Noise from movement of vehicles within, entering or leaving a construction site. Noise may have both physiological as well as psychological effects on human beings. Exposure to high level of noise causes dizziness, nausea, unusual blood pressure variation, physical fatigue, hearing Impairment and, in acute cases, permanent hearing loss. The psychological effects may comprise	• Select the quietest available plant and equipment that can economically undertake the work required. • Undertake regular maintenance of the equipment. • Use visual alarms in preference to audible alarms. • Enclose noisy equipment and build an enclosure around the noise source. • Locate noisy equipment behind parking lots or parks. • Close liaison with the community and regular monitoring of the noise levels. • Fit and maintain appropriate mufflers on earth-moving and other	Contractor	PIU-PIDC

		reduced mental capability and irritations chronic exposure of people to higher noise levels also impairs their efficiencies and skills. According to Sindh Environment Quality Standards (SEQS) noise level (for vehicles) is 75 dBA, at a distance of 7.5 meters from the source.	vehicles such as excavators, front-end loaders and other diesel-engine equipment. • Reduce workers' exposure to high noise levels by rotating workers' tasks. • Use earplugs to reduce workers' exposure to high noise levels. • Noise emissions from concrete batching • Locate noisy equipment and batching plants behind sound barriers or sound absorbers – for example, gravel stockpiles or constructed barriers.		
1.7.	**Socio-economic Impacts**	The project will directly and through indirect induced mechanisms contribute to alleviating poverty and vulnerability in Sindh province, and to prosperity and well-being of the people employed by the Project.	• Ensure preferential recruitment of local candidates provided they have the required skills and qualifications. • Include an assessment of the contractor's demonstrated commitment to domestic and local	Contractor	PIU-PIDC

			procurement and local hiring in the tender evaluation process. • Coordinate recruitment efforts related to non-skilled labor, including for non-skilled labor positions required by contractors. Good practice measures: • Determine what is considered to be 'fair and transparent' in recruitment and in distribution of jobs between different community groups, in consultation with local communities and their leaders.		
1.8.	**Health and Safety**	If proper mitigation measures proposed in the above section for air pollution, waste and wastewater disposal are not taken it may result in public health and safety issues in the project area and surrounding communities. The incidences of diseases in the local population may	• Implementation of the mitigation measures proposed for air pollution control disposal of wastewater and solid waste (relevant section above).	Contractor	PIU-PIDC

		result from the rise in populations of disease vectors including flies and mosquitoes, from increased levels of wastewater and solid waste pollution, generated by the construction workers in the area. Increased air pollution levels in the atmosphere may also affect public health. Similarly, workers' safety hazards would be associated with the operation of construction machinery and equipment, transportation.	• Staff and workers proper training and awareness. • Strict compliance with the established safety rules and regulations.		

Table 10: Environmental Monitoring Plan (Construction Phase)

Aspect	Monitoring Parameters	Monitoring Frequency	Responsibility
Soil Contamination	Visual inspection for site leveling and surface topography	Weekly	PIU-PIDC
Ground Water Contamination	Spillage control and prevention plan.	Before commencement of construction activities and implementation monitoring on weekly basis during construction phase.	PIU-PIDC
	Water utilization inventories.	Weekly basis during construction phase,	PIU-PIDC
	Water recycling inventories.	Weekly basis during construction phase,	PIU-PIDC
Soil Erosion	Visual Inspection	During excavation activities.	PIU-PIDC
Disposal of Solid Waste	Housekeeping and construction debris management	Weekly	PIU-PIDC
	Waste Storage Practices	Weekly	PIU-PIDC
	Waste Disposal Mechanism	Quarterly	PIU-PIDC

Air Pollution	Water sprinkling	Daily	PIU-PIDC
Noise Pollution and Vibration	Vehicle, equipment and machinery fitness, emissions and noise.	Daily	PIU-PIDC
Health and Safety	HSE inspection.	Weekly basis during construction.	PIU-PIDC
	Staff and contractor's Qualification.	Before procurement.	PIU-PIDC
	HSE toolbox talk and training records.	Monthly basis.	PIU-PIDC
	Speed limit.	Daily basis during construction phase.	PIU-PIDC
			PIU-PIDC

Table 11: Environmental Management Plan (EMP) Operational Phase

S.No.	Aspect	Probable Impact	Safeguards and Mitigations	Responsibility
2.1.	**General**	Industrial activities contribute significantly to environmental pollution through the generation of various types of industrial waste. Understanding the sources, types, and impacts of industrial waste is crucial for developing effective waste management strategies and mitigating environmental harm.	• Addressing the challenges posed by industrial waste requires a comprehensive approach involving strict regulations, sustainable practices, and innovative technologies. By understanding the sources, types, and impacts of industrial waste, individual industrial located in Karachi Industrial Park (KIP) will prepare their specific pollution control/management plan. They will also be required to get approval of their EIA/IEE submitted to Sindh Environment Protection Agency (SEPA). KIP will have a combined wastewater treatment plant where the common parameter will be treated and then disposed.	KIP Management

2.2.	**Air Pollution**	Industrial estates, comprising clusters of manufacturing and processing facilities, are significant sources of gaseous emissions that can have environmental and health implications.	• Develop and implement an Air Pollution Control Plan. • Cover all trucks carrying raw material and finished products. • Install and maintain all vehicles and machinery with appropriate emission control equipment. • To the extent possible, use new and low emission equipment and vehicles. • Purchase the best quality fuel and lubes and where possible use lead free oil and lubes. • Sprinkle water on all unsealed roads used by Project vehicles that are within 200 m of any settlement. • Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less. • Paved roads shall be swept frequently. • Appropriate maintenance of vehicles and machinery. • Retain as much natural vegetation as possible. • Adequately wet, cover with plastic, or provide with wind shield all stockpiles.	KIP Management

			• Chimneys and particulate scrubber should be provided to the plants generating, Particulate matter. • Masks should be provided to drivers and operators of vehicles and construction machinery. • Regular monitoring and reporting to Sindh EPA. • Training and awareness of the staff and workers.	

2.3.	**Noise Pollution and Vibration**	There are two types of noise sources i.e., plant noise and vehicular noise. The possible sources of noise after the establishment of the KIP would be different processing equipment (depending upon the types of Industries), boilers and generators. **A. Vehicular Noise** The industrial activities in the KIP will increase traffic in the area the vehicular noise will be one of the added nuisances for the nearby community. An area of about 1 km radius will be directly affected by vehicular noise. Generally, the well-maintained vehicles have noise levels within the SEQS level of 75 dBA. **B. Acoustic Trauma** Acoustic trauma, which results from a single or relatively few exposures, is defined as "immediate organic damage to the ear from excessive sound energy". If the noise is intense enough, other structures outside the Inner ear may also be affected, such as the eardrum, which may become ruptured.	• Undertake regular maintenance of the equipment. • Use visual alarms in preference to audible alarms. • Enclose noisy equipment and build an enclosure around the noise source. • Locate noisy equipment behind parking lots or parks. • Close liaison with the community and regular monitoring of the noise levels. • Reduce workers' exposure to high noise levels by rotating workers' tasks. • Use earplugs to reduce workers' exposure to high noise levels. • Locate noisy equipment behind sound barriers or sound absorbers. • Noise measurement of the noisy areas (If required). • Audiometric testing of workers exposed to high noise levels. • Record keeping of medical tests and follow up. • Engineering control for noise reduction. • Administrative control for noise reduction.	KIP Management

		Although such damage is rare but may cause some degree of permanent damage to the auditory system. **C. Temporary and Permanent Threshold Shift** The difference between these two effects is that, in temporary threshold shift, the auditory level returns to its original level, whereas in permanent, problems remain permanent. Thus, a person with permanent threshold shift, no further recovery is possible sometimes, the permanent threshold shifts results from acoustic trauma, but it often results from long period of repeated exposure of noise. **D. Physiological Effects** Studies have shown that anti-hypertensive medication consumption is generally higher in noisy areas. Loud noise is related to vasoconstriction with the consequent increase in blood pressure. One laboratory study showed that plasma cortisol and blood	• Training of employees.	

		cholesterol levels were increased with the Increase of noise level above 75 dBA. Exposure to noise can also lead to gastric changes. A study showed noise level above 70 dBA resulted in a reduction in stomach contraction strength and helped in ulcer development. **E. Other Effects** Some of the other effects of noise are cognitive performance, occupational performance, effects on social behavior and effects on aggression.		
2.4.	**Industrial Wastewater Impacts**	KIP will have a blend of industry each one with specific process and thus resulting specific effluents. As under the law every industry will have to submit an IEE/EIA at time of planning and industry should have treatment facility for its effluents. However, the following parameters are general in nature and discharged by majority of the industrial process. Such parameters would be	• Pre-treatment facility at individual industry level • Fully functional Combined Effluent Treatment Plant (CETP). • Water consumption both for the process and sanitary purposes should be monitored and its quantities recorded by each industry.	KIP Management

		treated through a combined wastewater treatment Plant for which location has been identified in the project. The impacts of these parameters are discussed below. **A. pH** • Growth Inhibition of bacterial species (responsible for removing organic pollution) under highly acidic or alkaline conditions. • Corrosion of water carrying system and structures with acidic wastewater having low pH. • Malfunctioning and impairment of certain physic-chemical treatment process under highly acidic or alkaline conditions. **B. Organic Pollutants** • Depletion of dissolved oxygen (DO) levels, of the receiving water body, below limits necessary to maintain aquatic life (4-5 mg/l). **C. Suspended Solids**	• Installment of flow meters to record daily water intake unit water consumption with respect to production. • Use of the septic tank for pre-treatment of sanitary wastewater in each industrial unit. • Establishment of CETP to treat wastewater of all industries by adopting Activated Sludge Process technique. • Wastewater discharged from all the industries including CETP be monitored with respect to its quantity and quality. • Cleaner production, techniques be adopted by the industries, in order to reduce the resources consumption. • Regular reporting of the priority parameters to the SEPA according to the nature of industry. • Training and awareness to the staff and worker on cleaner production practices.	

		• Sedimentation in the bottom of water bodies leaving adverse impacts on flora and fauna. • Localized depletion of dissolved oxygen in the bottom layers of water bodies. • Reduced light penetration in natural waters and consequent reduction in photosynthesis. • Aesthetic nuisance. **D. Oil and Grease** • Reduced re-aeration in natural surface bodies, because of floating Oil and grease film and consequent depletion in dissolved oxygen levels. • Reduced light penetration in natural waters and consequent reduction in photosynthesis. • Aesthetic nuisance.		
2.5.	**Solid, Liquid, and Hazardous Waste Impacts**	Apart from emission and effluents the third most important pollutant would be in for of solid, liquid, and hazardous waste.	• For safe disposal of industrial wastes, the management can encourage the use	KIP Management

2.5.1.	**Solid Waste**	The solid waste will generally comprise empty containers of lube oil and chemicals, metal scrap, discarded mechanical parts and domestic solid waste from all the Industries in the KIP. Other major solid waste streams will depend upon the varying nature of Industries in the KIP. Solid waste will also be produced from commercial and industrial activities in the KIP.	of three R's concept (reduce, reuse, and recycle the solid waste). • The plant operators should be trained to do their best to produce less solid waste from the process by employing different cleaner production techniques. • Proper waste segregation, collection and storage be integrated with the plant's operations. • Agreement with local authorities for timely collection of municipal solid waste • Implement a Spill Prevention and Response Plan. • Remove contaminated soil from the site and dispose to ensure protection of water sources. • Construct bottom of soak pit or septic tank at least 100 meters away from water sources. • Training and awareness to the staff and workers on handling of hazardous waste.	
2.5.2.	**Liquid Waste**	The liquid waste is generally the used lube oil from different machines, especially from the gears and from the vehicles. The quantity of this waste stream is not possible to estimate at this stage. The Improper disposal of liquid waste can cause air, water and soil pollution. The solid and liquid waste impacts on different environmental conditions would be medium adverse.		
2.5.3.	**Hazardous Waste**	During industrial processes many chemicals of hazardous nature are also used. All such chemicals need special care using transportation, storage, handling, and disposal.		
2.6.	**Miscellaneous**	The mitigation measures are recommended.	• Appropriate storm water drainage system inside the industrial park.	KIP Management

			• Develop and communicate a work plan on safe working for Communicable diseases. • Establish a proper Occupational Health and Safety system. • Proper training in occupational health and safety equipment. • A proper firefighting system is recommended for the whole KIP and individual industrial units. • Regular training to staff and workers on Occupational health and safety (OSH) and use of OHS equipment, firefighting, first aid and emergency response etc. • A rehabilitation plan should be chalked out after completion of construction phase by filling of all the excavation and restore land to its original form, Clearing of soil from soil pollutants like lubricants and chemicals. • Program for sufficient plantation inside the industrial park and development of green corners is recommended.	

Table 12: Environmental Monitoring Plan (Operational Phase)

Aspect	Monitoring Parameters	Monitoring Frequency	Responsibility
General	Housekeeping practices and visual inspection.	Weekly basis	KIP's Administration and HSE Staff
	Standard procedures and practices for effective housekeeping	Weekly basis	KIP's Administration and HSE Staff
Ambient Air and Noise	Provision of ambient air and noise pollution systems in operational phase equipment, machineries, and vehicles.	Monthly basis	KIP's Administration and HSE Staff
	Generators and vehicles maintenance record and gaseous emissions monitoring as per SEQS, 2016.	Quarterly basis	KIP's Administration and HSE Staff
Industrial Wastewater	CETP operation and maintenance record and monitoring as per SEQS, 2016.	Monthly basis	KIP's Administration and HSE Staff
	Visual inspection and checks	Monthly basis	
Native Soil	Native soil conservation.	Weekly basis during operational phase.	KIP's Administration and HSE Staff
	Chemicals, lubricants, oil leakages from equipment, machinery and vehicles.	Weekly basis during operational phase.	KIP's Administration and HSE Staff

Human Health and Safety	Availability of HSE team and systems	Daily basis during operational phase.	KIP's Administration and HSE Staff
	Display of HSE signs and symbols	Weekly basis during operational phase.	KIP's Administration and HSE Staff
	Tool box talk training records.	Monthly basis.	KIP's Administration and HSE Staff
	Firefighting systems, and fire extinguisher maintenance records.	Monthly basis.	KIP's Administration and HSE Staff
	Provision of PPEs.	Daily basis.	KIP's Administration and HSE Staff
Miscellaneous	Survival rate of the existing species on quarterly basis and in case if it is declining the species should be replanted by ratio of 1:5 by the help of local communities.	Quarterly basis	KIP's Administration and HSE Staff

8.4 Environmental Monitoring and Sampling Plan

The environmental monitoring and sampling plan for construction and operation phase is given in Table-13 with approximate budget.

Table 13: Environmental Monitoring and Sampling Plan

Construction phase						
Components	**Parameters**	**Quantity** (No. Samples × No. of Locations × Frequency)	**Frequency**	**Responsibility**	**Unit Cost PKR**	**Total Cost PKR**
Ambient Air Quality	SO_2, NO, NO_2, CO, Suspended Particulate Matter, PM_{10} and $PM_{2.5}$	1×4×4 =16	Quarterly	Contractor and PIU-PIDC	30,000	480,000
Noise Level	Noise level monitoring as per SEQS	1×4×4 = 16	Quarterly	Contractor and PIU-PIDC	2,000 /point	32,000
Drinking Water Quality	Sampling and testing of water samples from SEPA approved laboratory	1×2×4 = 8	Quarterly	Contractor and PIU-PIDC	20,000	160,000
Surface Water Quarterly	Sampling and testing of water samples from SEPA approved laboratory	1×2×4 = 8	Quarterly	Contractor and PIU-PIDC	20,000	160,000
Total Annual Cost PKR						**832,000**

Operation Phase						
Ambient Air Quality	SO_2, NO_2, CO, Suspended Particulate Matter, PM_{10} and $PM_{2.5}$ and Lead	1×2×2 = 4	Biannually	KIP Management	30,000	120,000
Noise Level	Day and night time levels on dBA Scale (min-max)	1×2×2 = 4	Biannually	KIP Management	2,000 /point	8,000
Drinking Water Quality	Sampling and testing of water samples from SEPA approved laboratory	1×1×2 = 2	Biannually	KIP Management	20,000	40,000
Surface Water Quality	Sampling and testing of water samples from SEPA approved laboratory	1×1×2 = 2	Biannually	KIP Management	20,000	40,000

Conclusion

Karachi is the major port city and industrial hub of the country. It is the financial and industrial capital of Pakistan has an estimated GDP of $164 billion. The city produces about 30 percent of value added in large-scale manufacturing and 25% of the GDP. Industrial land occupied is about 75 sq. km. in Karachi which is about 4.16 per cent of the total city area. It houses major automobile manufacturers, Textiles, cement, steel, heavy machinery, chemicals, food, banking, insurance establishments and many others.

However, the industrial growth in Karachi has largely been taking place in an unorganized and haphazard manner with many large, medium and cottage industries operating within the urban centers causing the deterioration of quality of life of city dwellers. Further, the availability of developed industrial plots is very scarce and that too at prohibitively high prices. The purpose of establishing Karachi Industrial Park (KIP) is to offer developed land on a low upfront cost having necessary infrastructure for hassle-free plug-and-play environment.

To develop a comprehensive environmental and social baseline of the project area comprehensive review of literature was done by team of experts. Furthermore, the literature reviewed for developing a comprehensive environmental and social baseline was validated by frequent site visits and field investigations for ground trothing to describes the existing environmental settings in the study area and is based upon the secondary information collected from the published sources, reconnaissance survey, primary socio-economic survey and environmental monitoring of air and noise, in the study area.

Establishment of KIP project at the present location is the best option for project establishment due the following.

A. **Site/Location:** The site will be located on land of Pakistan Steel Mills and thus there is hardly any chance of land dispute normally causing delays in the project. It is neither a prime agriculture land nor having any significant flora and fauna which can be disrupted from the project establishment on the site. The location of the park offers excellent link to local & global markets located at 14 km from Port Qasim, having Rail Link at 4 km, National Highway at 5 km and Jinnah International Airport, Karachi at 25 km.

B. **Reduced operating costs:** The project offers the benefit of lower production costs because of its strategic location. Saving on logistical costs

especially for export oriented industrial units due to close proximity to Port Qasim and National Highway.

C. **Availability of skilled labor and industrial culture:** Karachi is the major port city and industrial hub of the country. It is the financial and industrial capital of Pakistan and produces about 30 percent of value added in large-scale manufacturing and 25% of the GDP. As establishment of the project has the benefit of availability skilled labor in the market.

The potential impacts due to the establishment of the proposed project on the physical, biological, and socio-economic environment are identified, and the mitigation measures are proposed to mitigate the Project's adverse environmental effects. Implementation of suggested mitigation measures may eliminate or reduce the magnitude of the environmental impacts of the project.

As per assessment, there are no critical environmental and social impacts associated with the project. However, several concerns/ impacts with regard to environmental are anticipated which need to be mitigated and managed through the mitigation measures and EMMP and that the residual impacts will have minor significance. Overall the project will have positive socio-economic impacts.

Annexures

Annexure 1: Sindh Environmental Protection Act, 2014

The Sindh Government Gazette

Published by Authority

KARACHI THURSDAY MARCH 20, 2014

PART-IV

PROVICIAL ASSEMBLY OF SINDH
NOTIFICATION
KARACHI, THE 20th MARCH, 2014.

NO.PAS/Legis-B-06/2014-The Sindh Environmental Protection Bill, 2014 having been passed by the provincial Assembly of Sindh on 24th Feburary, 2014 and assested by the Governer of Sindh on 19th March, 2014 is hereby published as an Act of the legislature of Sindh

THE SINDH ENVIRONMENTAL PROTECTION ACT, 2014

SINDH ACT NO.VIII OF 2014

AN
ACT

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

Preamble

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

PART-I

It is hereby enacted as follows:-

Short title and commencement

1. (1) This Act may be called the Sindh Environmental Protection Act, 2014.

(2) It extends to the whole of the Province of Sindh.
(3) It shall come into force at once

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

(i) "adverse environmental effect" means impairment of, or damage to, the environment and includes—

(a) impairment of, or damage to, human health and safety to biodiversity or property;
(b) pollution; and

(c) any adverse environmental effect as may be specified in the rules or regulations made under this Act;

(ii)"Agency" means the Sindh Environmental Protection Agency established under section 5 of this Act;

(iii) "agricultural waste" means waste from farm and agricultural activities including poultry, cattle farming, animal husbandry residues from the use of fertilizers, pesticides and other farm chemicals and agricultural runoff;

(iv) " "air pollutant" means any substance that causespollution of air and includes soot, smoke, dust particles, odor, light, electro-magnetic, radiation, heat, fumes, combustion exhaust, exhaust gases, noxious gases, hazardous substances and radioactive substances;

(v) "biodiversity" or "biological diversity" means the variability among living organisms from all sources, including inter-alia terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems;

(vi) "biosafety" means the mechanism developing through policy and procedure to ensure human health and the environmentally safe application of biotechnology:

(vii) "Council" means the Sindh Environmental Protection Council established under section 3 of this Act;

(viii) "discharge" means spilling, leaking, pumping, depositing, seeping, releasing, flowing-out, pouring, emitting, emptying or dumping into the land, water or atmosphere;

(ix) "ecosystem" means a dynamic complex of plant, animalnd micro-organism communities and their non-living environment interacting as a functional unit;

(x) "effluent" means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour;

(xi) "emission standards" means the permissible standards established by the Agency for emission of air pollutants and noise and for discharge of effluent and waste;

(xii) "environment" means-
(a) air, water, land and natural resources;
(b) all layers of the atmosphere;
(c) all organic and inorganic matters and living organisms;
(d) ecosystems and ecological relationships;
(e) buildings, structures, roads, facilities and works;
(f) all social and economic conditions affecting community life; and

(g) the inter-relationship between any of the factors in sub-clause (a) to (f) made under this Act;

(xiii) "environmental aspect" means an organization's activities or services that can interact with the environment;

(xiv) "environment audit" means a systemic scrutiny of environmental performance of an organization, factory, company or manufacturing and production unit regarding to its operations;

(xv) "environmental impact assessment" means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigation and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed;

(xvi) "Environmental Management Plan" means a site specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with the environmental legislation;

(xvii) "Environmental Protection Order" means an order passed under Section 21 made under this Act.

(xviii) "Environmental Protection Tribunal" means the Environmental Protection Tribunal constituted under section 25 of this Act ;

(xvix) "Environmental Review" means a quantitative and qualitative assessment of documents submitted by proponent, comments from public and Government agencies or organizations;

(xx) "factory" means any premises in which industrial activity is being undertaken;

(xxi) "genetically modified organism" means any organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology and which does not occur naturally through mating and or recombination and includes both living and non-living modified organisms;

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

(xxiii) "Government Agency" includes:-

(a) A department, attached department or any other office of Government; and

(b) A development authority, local authority, company body corporate established or control by Government;

(xxiv) "Court" means the Court of the Judicial Magistrate First Class;

(xxv) "hazardous substance" means-

(a) a substance or mixture of substances, other than a pesticide as defined in the Agricultural Pesticides Ordinance, 1971 (II of 1971), which, by reason of its chemical activity or toxic, explosive, flammable, corrosive, radioactive or other characteristics, causes, or is likely to cause, directly or in combination with other matters an adverse environmental effect; and

(b) any substance which may be prescribed as a hazardous substance;

(xxvi) "hazardous waste" means waste which is or which contains a hazardous substance or which may be prescribed as hazardous waste, hospital waste, nuclear waste, obsolete pesticides and persistent organic pollutants;

(xxvii)"hospital waste" means waste medical supplies and materials of all kinds, and waste blood, tissue, organs and other parts of the human and animal bodies, from hospitals, clinics, laboratories and veterinary facilities;

(xxviii) "industrial activity" means any operation or process for manufacturing, making, formulating, synthesising, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal, or for mining, for oil and gas exploration and development, or for pumping water or sewage, or for generating, transforming or transmitting power or for any other industrial or commercial purposes;

(xxix) "industrial waste" means waste resulting from an industrial activity;

(xxx) "initial environmental examination" means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an adverse environmental effect for requiring preparation of an environmental impact assessment;

(xxxi) "local authority" means any agency set up or designated by Government, by notification in the official Gazette, to be a local authority for the purposes of this Act;

(xxxii) "local council" means a local council constituted or established under a law relating to local government;

(xxxiii) "motor vehicle" means any mechanically propelled vehicle adapted for use upon land whether its power of propulsion is transmitted thereto from an external or internal source, and includes a chassis to which a body has not been attached, and a trailer, but does not include a vehicle running upon fixed rails;

(xxxiv) "municipal waste" includes sewage, refuse, garbage, waste from abattoirs, sludge and human excreta and the like;

(xxxv) "noise" means the intensity, duration and character of sounds from all sources, and includes vibration;

(xxvi) "non degradable plastic products" means a plastic product which are made from the non-biodegradable substances;

(xxxvii) "nuclear waste" means waste from any nuclear reactor or nuclear plant or other nuclear energy system, whether or not such waste is radioactive;

(xxxviii) "Oxo-biodegradable Plastic Products" means a plastic product made of a polymer by adding a pro-degrading additive containing a transition metal salt, except cobalt, which cause the plastic to degrade and bio-grade from oxidative and cell mediated phenomena either simultaneously or successfully;

(xxxix) "person" means any natural person or legal entity and includes an individual, firm, association, partnership, society, group, company, corporation, co-operative society, Government Agency, non-governmental organization, community-based organization, village organization, local council or local authority and, in the case of a vessel, the master or other person having for the time being the charge or control of the vessel;

(xxxl) "pollution" means the contamination of air, land or water by the discharge or emission of effluent or wastes or air pollutants or noise or other matter which either directly or indirectly or in combination with other discharges or substances alters unfavorably the chemical, physical, biological, radiational, thermal or radiological or aesthetic properties of the air, land or water or which may, or is likely to make the air, land or water unclean, noxious or impure or injurious, disagreeable or detrimental to the health, safety, welfare or property of persons or harmful to biodiversity;

(xli) "prescribed" means prescribed by rules made under this Act;

(xlii) "project" means any activity, plan, scheme, proposal or undertaking involving any change in the environment and includes-

(a) construction or use of buildings or other works;

(b) construction or use of roads or other transport systems;

(c) construction or operation of factories or other installations;

(d) mineral prospecting, mining, quarrying, stone-crushing, drilling and the like;

(e) any change of land use or water use; and

(f) alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems, factories or other installations;

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(xliii) " proponent" means the person who proposes or intends to undertake a project;

(xliv) "regulations" means regulations made under this Act;

(xlv) "rules" means rules made under this Act;

(xlvi) "sewage" means liquid or semi-solid wastes and sludge from sanitary conveniences, kitchens, laundries, washing and similar activities and from any sewerage system or sewage disposal works;

(xlvii) "Schedule Plastic Products" means all types of flexible plastic packaging and disposable plastic products made of Polythene, Polypropylene, Polystyrene and Poly-ethylene Terephthalate (PET), used for food and non-food items, like shopping bags, garbage bags, snacks packs, water and milk packaging, shrink wraps, bubble pellet wraps, films, liners, woven or non-woven bags, mulch films;

(xlviii) "Sindh Environmental Quality Standards" means standards established by the Agency under clause (e) of sub-section(1) of section 6 and approved by the Council under clause (c) of sub-section(1) of section 4 made under this Act;

(xlix) "standards" means qualitative and quantitative standards for discharge of effluent and wastes and for emission of air pollutants and noise either for general applicability or for a particular area, or from a particular production process, or for a particular product, and includes the Sindh Environmental Quality Standards, emission standards and other standards established under this Act and the rules and regulations;

(l) "strategic environmental assessment" mean an analysis of a proposed policy, legislation, plan or programme to determine whether the principles of sustainable development have been integrated therein and to identify its likely environmental effects and such components as require an initial environmental examination or environmental impact assessment;

(li) "sustainable development" means development that meets the needs of the present generation without compromising the ability of future generations to meet their needs;

(lii) "trans-boundary environmental impacts" means environmental impact arising from beyond the boundaries or limits of Sindh province and causing any adverse environmental impact or pollution in the air, land, water and coaster water of Sindh province;

(liii) "waste" means any substance or object which has been, is being or is intended to be, discarded or disposed-of, and includes liquid waste, solid waste, waste gases, suspended waste, industrial waste, agricultural waste, nuclear waste, municipal waste, hospital waste, used polyethylene bags and residues from the incineration of all types of waste.

(liv) "waters (coastal waters, internal waters, territorial waters and historical waters)" means such limits of the waters adjacent to the land territory as may be specified in the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976).

PART-II
THE SINDH ENVIRONMENTAL PROTECTION COUNCIL.

Establishment of the Sindh Environmental Protection Council.

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

(i)	Chief Minister or such other person as the Chief Minister may nominate in this behalf.	**Chairperson**
(ii)	Minister-in-charge of the Environment Protection Department.	**Vice Chairperson**
(iii)	Additional Chief Secretary, Planning and Development Department, Government of Sindh.	**Ex-officio member**
(iv)	Secretaries of the Environment, Finance, Public Health Engineering, Irrigation, Health, Agriculture, Local Government, Industries, Live Stock and Fisheries, Forest and Wildlife, Energy, Education, Departments of Government of Sindh and the divisional commissioners of Sindh.	**Ex-officio members**

(v)	Such other persons not exceeding twenty- five as Government may appoint from representatives of the Chambers of Commerce and Industry and industrial associations, representatives of the Chambers of Agriculture, the medical and legal professions, trade unions, non-governmental organizations concerned with the environment and sustainable development, and scientists, technical experts and educationists.	**Non-official members**
vi)	Director General, Sindh Environment Protection Agency	**Member / Secretary**
vii)	Two Members of the Provincial Assembly of Sindh amongst the eleven Members of the Standing Committee on Environment nominated by the Speaker	**Mambers**

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

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

(4)The Council shall frame its own rules of procedure.

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

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

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

4. (1) The Council shall-

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

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

(c) approve the Sindh Environmental Quality Standards;

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

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

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

(g) deal with inter-provincial and federal-provincial issues, and liaise and coordinate with other Provinces through appropriate inter-provincial forums regarding formulation and implementation of standards and policies relating to environmental matters with an inter-provincial impact;

(h) provide guidelines for biosafety and for the use of genetically modified organisms; and

(i) assist the Federal Government or Federal Agency in implementation and or administration of various provision of United Nation Convention on Laws on Seas, 1980 (UNCLOS) in coastal waters of the province.

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

PART III
THE SINDH ENVIRONMENTAL PROTECTION AGENCY

Establishment of the Sindh Environmental Protection Agency.

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

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

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

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

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

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

Functions of the Agency.

6. (1) The Agency shall –

(a) administer and implement the provisions of this Act and the rules and regulations;

(b) prepare, in co-ordination with the appropriate Government Agency or local council and, in consultation with the concerned Advisory Committees where established, environmental policies for the approval of the Council;

(c) take all necessary measures for the implementation of the environmental policies approved by the Council;

(d) prepare and publish an annual Sindh Environment Report on the state of the environment in the province;

(e) prepare or revise and establish the Sindh Environmental Quality Standards with approval of the Council:

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

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

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

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

(h) establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation, research, inspection and audit to prevent and control pollution, and to estimate the costs of cleaning up pollution and rehabilitating the environment in various sectors;

(i) take measures to promote research and the development of science and technology which may contribute to the prevention of pollution, protection of the environment, and sustainable development;

(j) issue licences, approval for the consignment, handling, transport, treatment, disposal of, storage, handling or otherwise dealing with hazardous substances;

(k) certify laboratories as approved laboratories for conducting tests and analysis and one or more research institutes as environmental research institutes for conducting research and investigation for the purposes of this Act;

(l) identify the needs for and initiate legislation in various sectors of the environment;

(m) provide assistance to relevant Federal and Provincial Government Agencies in the management of environment accidents and natural and environmental disasters, including conduct of inquiry thereto;

(n) render advice and assistance in environmental matters including such information and data available with it as may be required for carrying out the purposes of this Act:

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

(o) assist Government Agencies, local councils, local authorities and other persons to implement schemes for the proper disposal of wastes so as to ensure compliance with the Sindh Environmental Quality Standards;

(p) provide information and guidance to the public on environmental matters;

(q) recommend environmental courses, topics, literature and books for incorporation in the curricula and syllabi of educational institutions;

(r) promote public education and awareness of environmental issues through mass media and other means including seminars and workshops;

(s) establish and maintain mechanisms, including its own website, to disseminate information, subject to the provisions of this Act, regarding policies, plans and decisions of the Government, the Council and the Agency, relating to the environment;

(t) specify safeguards for the prevention of accidents and disasters which may cause pollution, collaborate with the concerned persons in the preparation of contingency plans for control of such accidents and disasters, and co-ordinate implementation of such plans;

(u) review and approve mitigation plans and give guidance and directions, where necessary, relating to clean up operations ordered under this Act;

(v) encourage the formation and working of non-governmental organizations, community organizations and village organizations to prevent and control pollution and promote sustainable development;

(w) take or cause to be taken all necessary measures for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development; and

(x) perform any function that the Council may assign to it.

(2) The Agency may-

(a) undertake inquiries or investigation into environmental issues, either of its own accord or upon complaint from any person or organization;

(b) request any person to furnish any information or data relevant to its functions;

(c) initiate, with the approval of Government, requests for foreign assistance in support of the purposes of this Act and enter into arrangements with foreign agencies or organizations for the exchange of material or information and participate in international seminars or meetings;

(d) recommend to Government and the Council the adoption of financial and fiscal programmes, schemes or measures for achieving environmental objectives and goals and the purposes of this Act, including -

(i) taxes, duties, cesses and other levies; and

(ii) incentives, prizes, awards, rewards, subsidies, tax exemptions, rebates and depreciation allowances;

(e) establish and maintain laboratories to help in the performance of its functions under this Act and to conduct research in various aspects of the environment and provide or arrange necessary assistance for the establishment of similar laboratories in the private sector;

(f) arrange, in accordance with such procedure as may be prescribed, financial assistance for projects designed to facilitate in discharge of its functions; and

(g) acquire assistance of concerned authorities of district administration and other relevant agencies, departments and police assistance for enforcement of this Act.

Power of the Agency

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

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

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

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

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

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

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

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

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

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

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

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

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

PART IV
SINDH SUSTAINABLE DEVELOPMENT FUND

8. (1) There shall be established a Sindh Sustainable Development Fund. **Establishment o the Sindh Sustainable Development Fund.**

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

(a) allocations and grants made or loans advanced by the Government of Sindh or by the Federal Government;

(b) aid and assistance, grants, advances, donations and other non-obligatory funds received from foreign governments, national or international agencies, and
non-governmental organizations: and

(c) voluntary contributions from private, corporate, multinational organizations and other persons.

(d) Any fees generated under the provision of this act including the fines imposed against contraventions including penalties.

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

(a) providing financial assistance to projects designed for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, the sustainable development of resources and for research in any specified aspect of the environment; and

(b) any other purposes which, in the opinion of the Board, will help achieve environment objectives and the purposes of this Act.

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

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

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

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

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

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

(a) sanction financial assistance for eligible projects;

(b) invest moneys held in the Sindh Sustainable Development Fund in such profit-bearing Government bonds, saving schemes and securities as it may deem suitable; and

(c) take such measures and exercise such powers as may be necessary for utilization of the Sindh Sustainable Development Fund for the purposes specified in sub-section (3) of section 8.

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

Accounts

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

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

PART V
PROHIBITIONS AND ENFORCEMENT

Prohibition of certain discharges or emissions and compliance with standards.

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

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

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

Prohibition of import of hazardous waste.

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

Handling of hazardous substances.

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

(a) under a licence issued by the Agency; or

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

Prohibition of action adversely affecting Environment.

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

(a) recycling or reuse of hospital waste and infectious waste;

(b) disposal of solid and hazardous wastes at unauthorized places as prescribed;

(c) dumping of wastes or hazardous substances into coastal waters and inland water bodies;

(d) release of emissions or discharges from industrial or commercial operations as prescribed;

(e) recycling or reuse or recovery of hazardous wastes or industrial by-products in an unauthorized or non-prescribed manner or procedure; and

(f) any activity which may cause adverse environmental affect due to trans boundary projects of Province of Sindh.

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

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

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

Regulation of motor vehicles.

15. (1) Subject to the provisions of this Act, no person shall operate or manufacture a motor vehicle or class of vehicles from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the Sindh Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of clause (g) of sub-section (1) of section 6.

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

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

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

Certified Environmental Laboratory

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

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

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PART VI
ENVIRONMENTAL EXAMINATIONS AND ASSESSMENTS

Initial environmental examination and environmental impact assessment.

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

(2) The Agency shall –

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

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

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

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

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

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

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Strategic environmental assessment.

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

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

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

(c) analysis of possible alternatives; and

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

(2) The Agency shall, in consultation with the concerned Government Agencies and Advisory Committees where established, review the strategic environment assessment, within sixty (60) days of its filing, and prepare a report containing its comments and recommendations in respect thereof which shall be forwarded to the initiating Government Agency, authority, local council or local authority and duly considered by it and the competent authority before approval or otherwise of the proposed policy, legislation, plan or programme.

(3) The provisions of sub-sections (1), and (2) shall apply to such categories of policies, plans and programmes and in such manner as may be prescribed.

Environmental monitoring.

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

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

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(a) discharge of effluents, wastes, emissions of air pollutants, noise and any other matter or action that may be found offensive under section 14 from the project on daily, weekly, monthly or annual basis;

(b) ambient quality of the air, water, noise and soil before, during and after construction and during operation of the project.

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

Environmental Audit and Review

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

(2) The report of a project prepared under sub-section (1) shall include -

(a) analysis of the predicted qualitative and quantitative impact of the project as compared to the actual impact;

(b) evaluation of the efficacy of the preventive, mitigation and compensatory measures taken with respect to the project; and

(c) recommendations for further minimizing or mitigating the adverse environmental impact of the project.

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

PART VII
ENVIRONMENTAL PROTECTION ORDER

Environmental Protection Order.

21. (1) Where the Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or the handling of hazardous substances, or any other act or omission is likely to occur, or is occurring, or has occurred, in violation of any provision of this Act, the rules or regulations or of the conditions of a licence, or is likely to cause, or is causing or has caused an adverse environmental effect, the Agency may, after giving the person responsible for such

discharge, emission, disposal. handling, act or omission an opportunity of being heard, by order direct such person to take such measures as the Agency may consider necessary within such period as may be specified in the order.

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

(a) immediate stoppage, preventing, lessening or controlling the discharge, emission, disposal, handling, act or omission, or to minimize or remedy the adverse environmental effect;

(b) installation, replacement or alteration of any equipment or thing to eliminate, control or abate on a permanent or temporary basis. such discharge, emission. disposal, handling, act or omission;

(c)action to remove or otherwise dispose of the effluent, waste, air pollutant, noise, or hazardous substances;

(d) action to restore the environment to the condition existing prior to such discharge, disposal, handling, act or omission, or as close to such condition as may be reasonable in the circumstances, to the satisfaction of the Agency; and

(e) impose a penalty as prescribed.

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

PART VIII
OFFENCES AND PENALTIES

Penalties.

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

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

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

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

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

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

(a) sentence him to imprisonment for a term that may extend up to three years;

(b) order the closure of the factory;

(c) order confiscation of the facility, machinery and equipment, vehicle or substance, record, document or other object used or involved in contravention of the provisions of this Act;

(d) order such person to restore the environment at his own cost, to conditions existing prior to the contravention or as close to such conditions as may be reasonable in the circumstances to the satisfaction of the Agency; and

(e)order that compensation be paid to any person or persons for any loss, or damage to their health or property suffered by such contravention.

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

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

Offences by body corporate.

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

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

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

Offences by Government Agencies, local authorities or local councils.

24. Where any contravention of this Act has been committed by any Government Agency, local authority or local council, and it is proved that such contravention has been committed with the consent or connivance of, or is attributable to any negligence on the part of, the Head or any other officer of Government Agency, local authority or local council, such Head or other officer shall also be deemed guilty of such contravention along with the Government Agency, local authority or local council and shall be liable to be proceeded against and punished accordingly.

PART IX
ENVIRONMENTAL PROTECTION TRIBUNALS AND COURTS

Environmental Protection Tribunals.

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

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

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

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

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

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

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

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

Jurisdiction and powers of Environmental Protection Tribunals.

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

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

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

(a) the Agency or any Government Agency or local council; and

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

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

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

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

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

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

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

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

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

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

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Appeals to the Environmental Protection Tribunal.

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

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

Appeals from orders of the Environmental Protection Tribunal.

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

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

Jurisdiction of Judicial Magistrate.

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

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

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

(a) the Agency; and

(b) any aggrieved person.

Appeals from orders of the Judicial Magistrate.

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

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PART X
PUBLIC PARTICIPATION

Public participation.

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

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

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

PART XI
GENERAL

Power to make and amend schedule.

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

Indemnity

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

Dues recoverable as arrears of land revenue.

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

Act to override other laws.

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

Power to make rules.

36. The Sindh Environment Protection Agency may, by notification in the Official Gazette, make rules for carrying out the purposes not in consistence of this Act with the approval of Government.

Power to make regulations.

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

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

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

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

(c) appointment of officers, advisors, experts, consultants and employees;

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

(e) monitoring and measurement of discharges and emissions;

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

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

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

(i) providing procedures for handling hazardous substances; and

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

Annexure 2: SEPA (Environmental Assessment) Regulations, 2021

GOVERNMENT OF SINDH
SINDH ENVIRONMENTAL PROTECTION AGENCY

Karachi dated the 03rd September, 2021

NOTIFICATION

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

1. **Short title and commencement**

   (1) These regulations may be called the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021.

   (2) They shall come into force at once.

2. **Definitions. -**

   (1) In these regulations, unless there is anything repugnant in the subject or context

   (a) "Act" means the Sindh Environmental Protection Act, 2014 (VIII of 2014);

   (b) "Agency" means the Sindh Environmental Protection Agency as defined under section 2(ii);

   (c) "Director General" means the Director General of the Agency;

   (d) Environmental Checklist means rapid environmental assessment or environmental screening through a prescribed checklist in respect of projects having least/minimal impacts on the environment.

   (e) "Firm" means the Environmental Consulting Firm registered by the Agency.

   (f) "Environmentally sensitive area" means a location, large or small, that has significant environmental values that contribute to maintaining biological diversity and integrity, have intrinsic or attributed scientific, historical or cultural heritage value, or are important in providing amenity, harmony or sense of community, ecosystem as declared by Agency.

   (g) "Protected area" means any area which safeguards the earths precious bio-diversity, protected areas of natural beauty and conservation of cultural significance as declared by relevant authority;

   (h) "Schedule" means the Schedules provided in these regulations;

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(i) "Urban area" means an area within the limits of a town, municipality or city as determined by the Agency on the basis of population and environmental issues

(2) All other words and expressions used but not defined in these regulations shall have the same meaning as are assigned to them in the Act.

3. Projects requiring Environmental Checklist (EC)

A proponent of a project falling in any category listed in Schedule-I shall file environmental checklist with the Agency and the provisions of section 17 shall apply to such projects.

4. Projects requiring an Initial Environmental Examination (IEE)

A proponent of a project falling in any category listed in Schedule-II shall file an IEE with the Agency, and the provisions of section 17 shall apply to such projects.

5. Projects requiring an Environmental Impact Assessment (EIA)

A proponent of a project falling in any category listed in Schedule-III shall file an EIA with the Agency, and the provisions of section 17 shall apply to such projects.

6. Projects not requiring an Environmental Assessment

(1) A project not falling in any category listed in Schedules-I, II and III shall not be required to file an EC, IEE or EIA

(2) Notwithstanding anything contained in sub-regulation (1), the Agency may direct the proponent of a project, whether or not listed in Schedule I or II or III, to file an EC or IEE or EIA, for reasons to be recorded in such direction:

Provided that no such direction shall be issued without the recommendations in writing of the Advisory Committee constituted under regulations 21.

7. Preparation of environmental assessment report

(1) The Agency may issue guidelines for preparation of an EC or IEE or EIA reports including guidelines of general applicability, and sectoral guidelines indicating specific assessment requirements for planning, construction and operation of projects relating to particular sector.

(2) The Agency may issue guidelines for preparation scope of an Environmental Management Plan(EMP) or Environmental Audit(EA).

(3) Where guidelines have been issued under sub-regulation (1) & (2), an EC, IEE or EIA or EMP or EA shall be prepared, to the extent practicable, in accordance therewith and the proponent shall justify any departure therefrom.

8. Review Fees

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

9. Filing of report

(1) Two hard copies and two electronic copies for an EC or IEE or EIA report shall be filed with the Agency by the proponent. The Agency may require the proponent to submit additional copies, as and when required during the review process.

(2) Every EC, IEE and EIA shall be accompanied by -

(a) an application, in the form prescribed in Schedule-V;

(b) Copy of receipt showing payment of review fee as prescribed in Schedule-IV

10. Preliminary Scrutiny

(1) Any report filed by the proponent or applicant shall be returned, if found incomplete in terms of Regulation 9.

(2) Notwithstanding anything contained in sub-regulation (1) of regulation 12, the Agency may require the proponent to submit an additional information at any stage during the review process.

11. Public participation

(1) In the case in an EIA, the Agency shall issue a public notice to be published in widely circulated English or Urdu or Sindhi national newspaper and in a local newspaper of general circulation in the area affected by the project, mentioning the type of project, its exact location, the name and address of the proponent and the date, time and place of public hearing for inviting comments from primary stakeholders.

(2) The date fixed under sub-regulation (1) shall not be earlier than ten days from the date of publication of the notice.

(3) The Agency shall also ensure the circulation of the EIA, where necessary, to the concerned Government Agencies and solicit their comments thereon.

(4) All comments received by the Agency from the public or any Government Agency shall be duly considered before issuance of decision.

(5) The Agency may issue guidelines indicating the basic techniques and measures to be adopted to ensure effective public consultation, involvement and participation in EIA assessment.

12. Review process

(1) Notwithstanding anything contained in sub section (4) of Section 17, the Agency shall make every effort to conclude its review process of the EA, EMP or environmental checklist within fifteen days, of the IEE within thirty days, and of the EIA within sixty days after receiving of complete case.

(2) In reviewing an EIA, the Agency shall consult such Committee of Experts be constituted for the purpose by the Director General, and may also solicit views of concerned Advisory Committee, if any, constituted by the Agency.

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(3) The Director General may, where considers it necessary, constitute a committee to inspect the site of the project and submit its report on such matters as may be specified.

(4) In reviewing the IEE, the Director General may constitute a committee of the officers from within the Agency, on case to case basis, in view of the jurisdiction and location of the project for the purpose to extend final recommendation about the approval or rejection of the IEE.

(5) The review of the IEE or EIA by the Agency shall be based on quantitative and qualitative assessment of the documents and data furnished by the proponent, comments from the public and Government Agencies received under regulation 12, and views of the committees mentioned in sub-regulations (2) and (3) above.

(6) EMP, EA, EC shall be reviewed as per guidelines issued by SEPA

13. Decision

(1) The documentary evidence in the form of videos (soft copies) of public hearing shall be submitted by the proponent within three days after conclusion of public hearing to the Agency.

(2) On completion of the review process, the decision of the Agency shall be communicated to the proponent in the form prescribed in Schedule-VI or in case of an IEE or EMP or environmental checklist or environmental audit in the form prescribed in Schedule-VII in case of an EIA.

14. Conditions of approval

(1) Every approval of an EC or IEE or EIA or EMP or EA shall, in addition to such conditions as may be imposed by the Agency, be subject to the condition that the project shall be designed, constructed or operated and mitigatory and other measures adopted, strictly in accordance with the EC or IEE or EIA or EMP or EA, unless any variations thereto have been specified in the approval by the Agency.

(2) Where the Agency accords its approval subject to certain conditions, the proponent shall submit an undertaking to the Agency, before commencing operation of the project, in the form prescribed in Schedule-VIII that the conditions of approval, and the requirements in the IEE or EIA relating to design and construction, adoption of mitigation and other measures have been duly complied with.

15. Validity period of Approval

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

(2) If construction is commenced during the initial three years validity period, the

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

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

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

16. Entry and inspection

(1) For the purpose of verification of any matter relating to the review or to the conditions of approval of an EC or IEE or EIA or EMP or EA list prior to, before or during and after commencement of construction or operation of a project, duly authorized staff of the Agency shall be entitled to enter and inspect the project site, factory building and plant and equipment installed therein.

(2) The proponent shall ensure full cooperation of the project staff at site to facilitate the inspection, and shall provide such information as may be required by the Agency for this purpose and pursuant thereto.

17. Cancellation of approval

(1) Notwithstanding anything contained in these regulations, if, at any time, on the basis of information or report received or inspection carried out, the Agency is of the opinion that the conditions of an approval have not been complied with, or that the information supplied by a proponent in the approved EC or IEE or EIA or EMP or EA list is incorrect, it shall issue notice to the proponent for show cause within two weeks of receipt thereof as to why the approval should not be cancelled.

(2) In case no reply is received or if the reply is considered unsatisfactory, the Agency may, after giving the proponent an opportunity of being heard -

(i) require the proponent to take such measures and to comply with such conditions within such period as it may specify, failing which the approval shall stand cancelled; or

(ii) cancel the approval.

(3) On cancellation of the approval, the proponent shall cease construction or operation of the project forthwith.

(4) Any action taken under this regulation shall be without prejudice to any other action that may be taken against the proponent under the Act or rules or regulations or any other law for the time being in force.

18. Registers of EC or IEE and EIA projects

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

19. Environmentally sensitive areas

(1) The Agency may designate an area to be an environmentally sensitive area,

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

20. Environmental assessment guidelines

(1) The Agency may from time to time issue guidelines to assist proponents and other persons involved in the preparation of environmental assessment.

(2) Where guidelines have been issued under sub-regulation (1), the projects shall be planned and prepared, to the extent practicable, in accordance therewith and any departure therefrom justified in the IEE/EIA pertaining to the project.

21. Environmental Assessment Advisory Committee. -

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

22. Repeal and Savings.

(1) The Sindh Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations 2014, shall, on commencement of these regulations, stand repealed.

(2) All orders made, notification issued, actions taken under the repealed Regulations shall remain in force until amended, altered or repealed by the provisions of these regulations.

DIRECTOR GENERAL
SINDH ENVIRONMENTAL PROTECTION AGENCY

SCHEDULE-I

(See Regulation 3)

List of projects requiring Environmental Screening (through check list)

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

Schedule-II

(See Regulation 4)

List of projects requiring an Initial Environmental Examination

A. Agriculture, Livestock and Fisheries

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

B. Energy

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

C. Oil and Gas projects:

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

D. Manufacturing and processing

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

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

E. Mining and mineral processing

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

F. Transport

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

G. Water management, dams, irrigation and flood protection

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

H. Water supply and filtration

Water supply schemes and filtration plants

I. Waste disposal and wastewater treatment

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

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

J. Urban development

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

K. Other projects

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

SCHEDULE III

(See Regulation 5)

List of projects requiring an EIA

A. Energy

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

B. Oil and Gas projects

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

C. Manufacturing and processing

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

D. Mining and mineral processing

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

E. Transport

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

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

F. Water management, dams, irrigation and flood protection

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

G. Water supply and filtration

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

H. Waste Disposal and treatment

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

I. Urban development and tourism

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

J. Environmentally Sensitive Areas

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

K. Other projects

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

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Schedule-IV

(See Regulation 8)

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

*

Note:

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

A/C Title: Sindh Sustainable Development Fund

Account Number: 03084572626100

Bank: Sindh Bank

Branch Code: 0308-Korangi Industrial Area

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SCHEDULE VI
[See Regulation 13(2)]

Decision on IEE/Environmental Check List

1. Name and address of proponent _____

2. Description of project _____

3. Location of project

4. Date of filing of IEE

5. After careful review of the IEE, the Agency has decided –

   (a) to accord its approval, subject to the following conditions:

   _____
   _____

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

   _____

   Dated _____

Tracking no.___

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

SCHEDULE VII

[See Regulation 13(2)]

Decision on EIA

1. Name and address of proponent _____

2. Description of project _____
   _____

3. Location of project _____

4. Date of filing of EIA _____

5. After careful review of the EIA, and all comments thereon, the Federation Agency has decided –

   (a) to accord its approval, subject to the following conditions:

   _____
   _____

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

   _____
   _____

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

   _____
   _____

   Dated

Tracking no.___

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

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SCHEDULE VIII
[See Regulation 14(2)]

Undertaking

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

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

Witnesses(full names and addresses)

_____

_____

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

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

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Annexure 3: The Sindh Environmental Quality Standards, 2016



EXTRAORDINARY Registered No. M324

The Sindh Government Gazette

Published by Authority

KARACHI THURSDAY JANUARY 28, 2016

PART-I

GOVERNMENT OF SINDH
SINDH ENVIRONMENT PROTECTION
AGENCY

NOTIFICATION

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

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

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

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

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

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

L iv-158 Ext -I-8 (23) Price Rs. 70.00

PART-I THE SINDH GOVT. GAZETTE EXT. JAN. 28, 2016 24

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

S. No.	Parameter	Standards		
		Into Inland Waters	Into Sewage Treatment [5]	Into Sea [ ]
1	2	3	4	5
1.	Temperature 40 ^{0}C or Temperature Increase *	≤3°C	≤3°C	≤3°C
2.	pH value (H^+)	6-9	6-9	6-9
3.	Biochemical Oxygen Demand (BOD)5 at 20^{0}C [1]	80	250	80**
4.	Chemical Oxygen Demand(COD) [1]	150	400	400
5.	Total Suspended Solids (TSS)	200	400	200
6.	Total Dissolved Solids (TDS)	3500	3500	3500
7.	Oil and Grease	10	10	10
8.	Phenolic compounds (as phenol)	0.1	0.3	0.3
9.	Chloride (as Cl^-)	1000	1000	SC***
10.	Fluoride (as F^-)	10	10	10
11.	Cyanide (as CN^-) total	1.0	1.0	1.0
12.	An-ionic detergents (as MBAS)[2]	20	20	20
13.	Sulphate (SO_4^{2-})	600	1000	SC***
14.	Sulphide (S^{2-})	1.0	1.0	1.0
15.	Ammonia (NH_3)	40	40	40
16.	Pesticides [3]	0.15	0.15	0.15
17.	Cadmium [4]	0.1	0.1	0.1
18.	Chromium (trivalent and hexavalent [4]	1.0	1.0	1.0
19.	Cooper [4]	1.0	1.0	1.0
20.	Lead [4]	0.5	0.5	0.5
21.	Mercury [4]	0.01	0.01	0.01
22.	Selenium [4]	0.5	0.5	0.5
23.	Nickel [4]	1.0	1.0	1.0
24.	Silver [4]	1.0	1.0	1.0
25.	Total toxic metals	2.0	2.0	2.0
26.	Zinc	5.0	5.0	5.0
27.	Arsenic [4]	1.0	1.0	1.0
28.	Barium [4]	1.5	1.5	1.5
29.	Iron	8.0	8.0	8.0
30.	Manganese	1.5	1.5	1.5
31.	Boron [4]	6.0	6.0	6.0
32.	Chlorine	1.0	1.0	1.0

Explanations:

1. Assuming minimum dilution 1:10 on discharge, lower ratio would attract progressively stringent standards to be determined by the Sindh Environmental Protection Agency. By 1:10 dilution means, for example that for each one cubic meter of treated effluent, the recipient water body should have 10 cubic meter of water for dilution of this effluent.
2. Methylene Blue Active Substances; assuming surfactant as biodegradable.
3. Pesticides include herbicides, fungicides, and insecticides.
4. Subject to total toxic metals discharge should not exceed level given at S. N. 25.
5. Applicable only when and where sewage treatment is operational and BOD5=80mg/l is achieved by the sewage treatment system.
6. Provided discharge is not at shore and not within 10 miles of mangrove or other important estuaries.

* The effluent should not result in temperature increase of more than 3^0C at the edge of the zone where initial mixing and dilution take place in the receiving body. In case zone is not defined, use 100 meters from the point of discharge.

** The value for industry is 200 mg/l

*** Discharge concentration at or below sea concentration (SC).

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

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

"SINDH ENVIRONMENTAL QUALITY STANDARDS FOR INDUSTRIAL GASEOUS EMISSION (mg/Nm^3, UNLESS OTHERWISE DEFINED)."

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

		(b) Grinding, crushing, Clinker coolers and Related processes, Metallurgical Processes, converter, blast furnaces and cupolas	500
3.	Hydrogen Chloride	Any	400
4.	Chlorine	Any	150
5.	Hydrogen Fluoride	Any	150
6.	Hydrogen Sulphide	Any	10
7.	Sulphur Oxides [1][2][3]	Sulfuric acid/ Sulphonic acid plants	
		Other Plants except power Plants operating on oil and coal	1700
8.	Carbon Monoxide	Any	800
9.	Lead	Any	50
10.	Mercury	Any	10
11.	Cadmium	Any	20
12.	Arsenic	Any	20
13.	Copper	Any	50
14.	Antimony	Any	20
15.	Zinc	Any	200
16.	Oxides of Nitrogen	Nitric acid Manufacturing unit.	3000
	(3)	Other plants except power plants operating on oil or coal:	
		Gas fired	400
		Oil fired	600
		Coal fired	1200

Explanations:-

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

A. **Sulphur Dioxide**

Sulphur Dioxide Background levels Micro-gram per cubic meter (ug/m^3) Standards.

Background Air Quality (SO_2 Basis)	Annual Average	Max. 24-hours Interval	Criterion I Max. SO_2 Emission (Tons per Day Per Plant)	Criterion II Max. ground level increment to ambient (One year Average)
Unpolluted	<50	<200	500	50
Moderately Polluted*				
Low	50	200	500	50
High	100	400	100	10
Very Polluted**	>100	>400	100	10

* For intermediate values between 50 and 100 ug/m^3 linear interpolations should be used.
** No projects with Sulphur dioxide emissions will be recommended.

B. Nitrogen Oxide

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

Annual Arithmetic Mean $100ug/m^3$ (0.05 ppm)

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

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

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

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

Sindh Environmental Quality Standards for Motor Vehicle Exhaust and Noise

(i) **For in-use Vehicles**

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

For new Vehicles

EMISSION STANDARDS FOR DIESEL VEHICLES

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

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

Parameter Standards (maximum permissible limit) Measuring method

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

(b) For Heavy Duty Diesel Engines and Large Goods Vehicles (g/Kwh)

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

Parameter Standards (maximum permissible limit) Measuring method

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

Emission Standards for Petrol Vehicles (g/km)

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

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

Parameter	Standards (maximum permissible limit)	Measuring method
Noise source	85 db (A)	Sound-meter at 7.5 meters from the

Explanations:

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

SINDH ENVIRONMENTAL QUALITY STANDARDS FOR AMBIENT AIR

Pollutants	Time-weight average	Concentration in Ambient Air	Method of measurement
Sulphur Dioxide(SO2)	Annual Average*	80 µg/m³	Ultraviolet Fluorescence method
	24 hours**	120 µg/m³	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m³	Gas Phase Chemiluminescence
	24 hours**	40 µg/m³	
Oxides of Nitrogen as (NO2)	Annual Average*	40 µg/m³	Gas Phase Chemiluminescence
	24 hours**	80 µg/m³	
O³	1 hour	130 µg/m³	Non dispersive UV absorption method
Suspended Particulate Matters(SPM)	Annual Average*	360 µg/m³	High Volume Sampling (Average flow rate not less than 1.1 in 3/minutes)
	24 hours**	500 µg/m³	
Respirable Particulate Matter PM10	Annual Average*	120 µg/m³	ß -Ray absorption method
	24 hours**	150 µg/m³	
Respirable Particulate Matter PM2.5	Annual Average*	40 µg/m³***	ß Ray absorption method
	24 hours**	75 µg/m³	
Lead Pb	Annual Average*	1 µg/m³	ASS Method after sampling using EPM 2000 or equivalent filter paper
	24 hours**	1.5 µg/m³	
Carbon Monoxide(CO)	8 hours**	5 mg/m³	Non Dispersive Infra Red(NDIR) method
	1 hours**	10 mg/m³	

*Annual arithmetic mean of minimum 104 measurements in a year taken twice a week, 24 hourly and at uniform interval.

** 24 hourly/8 hourly values should be met 98% in a year, 2% of the time. It may exceed but not on two consecutive days.

***Annual Average limit of 40µg/m³ or background annual average concentration plus allowable allowance of 9µg/m³, whichever is lower.

Sindh Standards for Drinking Water Quality

Properties / Parameters	Standard Values for Sindh	WHO Standards	Remarks
Bacterial			
All water intended for drinking (e.Coli or Thermo tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water in the distribution system (E.coli or thermo tolerant coliform and total coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period	Most Asian countries also follow WHO standards
Physical			
Colour	≤ 15 TCU	≤ 15 TCU	
Taste	Non objectionable/Acceptable	Non objectionable/Acceptable	
Odour	Non	Non	

	objectionable/Acceptable	objectionable/Accep table
Turbidity	(5 NTU	(5 NTU
Total hardness as $CaCO_3$	< 500 mg/l	---
TDS	(1000	(1000
pH	6.5 - 8.5	6.5 - 8.5
Chemical		
Essential Inorganic	***mg/Litre***	***mg/Litre***
Aluminium (Al) mg/l	≤ 0.2	0.2

Properties / Performance	Standard Values for Pakistan	Who Standards	Remarks
Antimony (Sb)	≤ 0.005 (P)	0.02	
Arsenic (As)	≤ 0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium(Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing countries
Chloride (Cl)	< 250	250	
Chromium (Cr)	≤ 0.05	0.05	
Copper (Cu)	2	2	
Toxic Inorganic	***mg/Liter***	***mg/Litre***	
Cyanide (CN)	≤ 0.05	0.07	Standard for Pakistan similar to Asian developing countries
Fluoride (F)*	≤ 1.5	1.5	
Lead (Pb)	≤ 0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	≤ 0.5	0.5	
Mercury (Hg)	≤ 0.001	0.001	
Nickel (Ni)	≤ 0.02	0.02	

Properties / Performance	Standard Values for Pakistan	Who Standards	Remarks
Nitrate (NO_3)	< 0.50	50	
Nitrite (NO_2)	≤ 3 (P)	3	
Selenium (SE)	0.01 (P)	0.01	
Residual chlorine	0.2-0.5 at consumer end 0.5-1.5 at source	---	
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries

Properties / Performance	Standard Values for Pakistan	Who Standards	Remarks
Organic			
Pesticides mg/L		PSQCA No. 4639-2004, Page No. 4 Table No. 3 Serial No. 20-58 may be consulted ***	Annex II
Phenolic compounds (as Phenols) mg/L		0.002	
Polynuclear aromatic hydrocarbons (as PAH g/L)		0.01 (By GC/MS method)	
Radioactive			
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

*** PSQCA: Pakistan Standards Quality Control Authority

Proviso:

The existing drinking water treatment infrastructure is not adequate to comply with WHO guidelines. The Arsenic concentrations in some parts of Sindh have been found high then Revised WHO guidelines. It will take some time to control arsenic through treatment process. Lead concentration in the proposed standards is higher than WHO Guidelines. As the piping system for supply of drinking water in urban centers are generally old and will take significant resources and time to get them replaced. In the recent past, Lead was completely phased out from petroleum

products to cut down Lead entering into environment. These steps will enable to achieve WHO guidelines for Arsenic, Lead, Cadmium and Zinc. However, for bottled water, WHO limits for Arsenic, Lead, Cadmium and Zinc will be applicable and PSQCA Standards for all the remaining parameters.

Sindh Environmental Quality Standards for Noise

S. No.	Category of Area / Zone	Effective from 1st Jan, 2015		Effective from 1st January, 2015	
		Limit in dB(A) Leq *			
		Day Time	Night Time	Day Time	Night Time
1.	Residential Area (A)	65	50	55	45
2.	Commercial Area (B)	70	60	65	55
3.	Industrial Area (C)	80	75	75	65
4.	Silence Zone (D)	55	45	50	45

Note: 1. Day time hours: 6:00 a.m to 10:00 p.m

2. Night time hours: 10:00 p.m to 6:00 a.m

3. Silence zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts

4. Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.

* dB(A) Leq: Time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

3. **Repeal and Savings.**

(1) The provisions of the Statutory Notification dated 10th August, 2000 and 18th October, 2010, issued by the Ministry of Environment, Government of Pakistan, to the extent of the Province of Sindh are hereby repealed.

(2) All actions taken, proceedings initiated shall be deemed to have been taken and initiated validly under the the provisions of these Rules.

DIRECTOR GENERAL
SINDH ENVIRONMENTAL PROTECTION AGENCY

Karachi: Printed at the Sindh Government Press
28-1-2016

Annexure 4: Copy of Lab Reports of Ambient Air Quality

CERL
Climate & Environmental Research Laboratory

EPA Certified
No.
EPA/LAB/CR-01/34/23

Job Ref No: CERL/KIPST /Feb-24/06
Lab Ref No: CERL/ KIPST/Feb-24/AA/06

Dated: 07-02-2024

Report to:

M/s. Karachi Industrial Park.
Proposed Location, Pakistan Steel Mills.
Karachi.

Sample ID:	Ambient Air Monitoring		
Sample Description	Ambient Air Quality @ Proposed Locating Pakistan Steel Mills Karachi.		
Coordinates Location	67°22'15.50"E, 24°49'25.45"N		
Sampling Date:	22-01-2024	Sampling Rec. Date:	22-01-2024
Sample Type	8 hrs	Analyzed By	CERL Representatives
Analysis Description:	Quality Parameter from SEQs for Ambient Air		

ANALYTICAL TEST REPORT

S#	Parameter	Method	Unit	Result	SEQs Limit
1	Carbon monoxide (Co)	EPA RFCA 098-054	mg/m3/hr	4.8	10
2	Ozone (O3)	EPA50270 1999	µg/m3/24hr	9.2	130
3	Nitrogen Oxide (NO)	EPA RFNA 1829-074	µg/m3/24hr	14.8	40
4	Nitrogen dioxide (NO2)	EPA RFNA 1829-074	µg/m3/24hr	28.4	80
5	Sulfurdioxide (SO2)	EPA EQSA0486-060	µg/m3/24hr	8.5	120
6	Suspended Particulate Matter (SPM)	EPA 40CFR50 App B	µg/m3/24hr	210.0	500
7	Particulate Matter PM10	EPA 40CFR50	µg/m3/24hr	124.0	150
8	Particulate Matter PM2.5	EPA 40CFR50	µg/m3/24hr	31.0	75
9	Lead (Pb)	EPA 40CFR50	µg/m3/24hr	<0.1	1.5

Abbreviations: NA= Not Available.
Method: ASTM = American Standard Testing Method, **EPA** = United State Environmental Protection Agency Methods
SEQs = Sindh Environmental Quality Standard for Ambient Air Quality, SEP Act Regulation 2014 No. EPA/TECH/739/2014.

Sample Analyzed by: _____
Chemist - CERL

Verified by: _____
Manager Lab - CERL

Note
:

1 Report is valid for current batch (Sample)
2 This Report is not valid for any other certification / Publication or Judicial Purposes.

Address: Plot No. 224-B, 2/2, P.E.C.H.S, Karachi-75400, Pakistan.
Cell No: 021-34303166, 0305-2529997
email: cerl.envlab@gmail.com

Annexure 5: Copy of Lab Reports of Ambient Noise

CERL
Climate & Environmental Research Laboratory

EPA Certified
No.
EPA/LAB/CR-01/34/23

Job Ref No: CERL/KIPST /Feb-24/07
Lab Ref No: CERL/KIPST /Feb-24/NM/09

Dated: 07-02-2024

Report to:
M/s. Karachi Industrial Park.
Proposed Location, Pakistan Steel Mills.
Karachi.

Sample ID:	Ambient Noise	Sampling Date:	22-01-2024
Category of Area/Zone	Industrial Area	Reporting Date	07/02/2024
Analyzed By	CERL Representatives	SEQs Limit	75 dBA
Method	ASTM E-1124		
Analysis Description:	Quality Parameter from SEQS for Ambient Noise		

ANALYTICAL TEST REPORT

S#	Sample Description (Proposed Location)	Unit	Noise Value		
			Mini	Max	Avg
1	Location 1 (67°22'34.54"E, 24°49'50.84"N)	dBA	42.8	46.6	44.7
2	Location 2 (67°23'4.11"E, 24°48'58.70"N)		44.2	50.4	47.3
3	Location 3 (67°21'47.74"E, 24°49'48.57"N)		44.3	48.8	46.55
4	Location 4 (67°20'48.19"E, 24°49'45.63"N)		48.2	54.8	51.5
5	Location 5 (67°21'12.84"E, 24°48'51.57"N)		52	56.4	54.2
6	Location 6 (67°21'46.74"E, 24°49'16.77"N)		49.4	53.2	51.3
7	Location 7 (67°22'30.92"E, 24°48'39.57"N)		48.2	56	52.1
8	Location 8 (67°23'10.97"E, 24°48'15.93"N)		54	56.2	55.1

Method: ASTM = American Standard Testing Method.
SEQS = Sindh Environmental Quality Standard for Noise, SEP Act Regulation 2014 No. EPA/TECH/739/2014.

Reading Measured by: _____
Chemist - CERL

Verified by: _____
Manager- Lab

Note:
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