EXECUTIVE SUMMARY

➢ INTRODUCTION

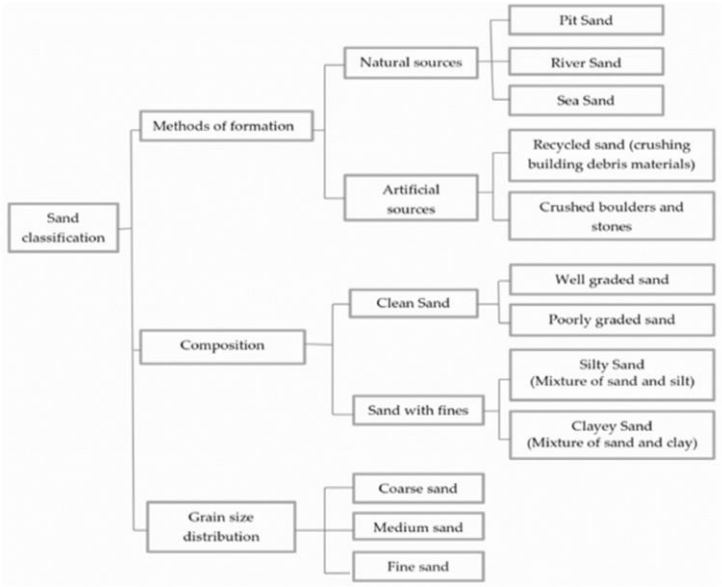
This executive summary presents an overview of the main findings of the Environmental Impact Assessment (EIA) report for the project "Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore". Sand is an indispensable natural resource for any society. Despite society's increasing dependence on sand, there are major challenges that this industry needs to deal with: limited sand resources. The purpose of this project is to present an overview of the sand market, highlighting the main trends and actors for production, and to review the main environmental impacts associated with sand exploitation with Dredger process. Based on these findings, we recommend different measures to be followed to reduce negative impacts. Sand mining with sand dredging should be done in a way that limits environmental damage during exploitation and restores the land after mining operations are completed. The objective of the project is excavation of the ordinary sand with Dredger to generate business for the proponent, keeping in view sustainable development and social soundness aspects of the surrounding society. additional objectives are creation of new job opportunities for locals.

➢ PROJECT OUTLINE

This report is related to the project "Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore." Total area of Proposed project is 306.58 Acre. Total cost of project will be 70 Million approximately.

➢ SALIENT FEATURES OF PROJECT:

Sr.#	CONSTITUENT	DESCRIPTION
1)	**Name of Project**	Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore
3)	**Project Location:**	Saggian District Lahore.

4)	**Project Description:**	The proposed project aims at mining of the sand from the river with dredging Machine that will use in deep water. According to the Environmental Protection Agency, Government of the Punjab, Lahore- "List of Projects Requiring an EIA", and the project under consideration categories falls under Schedule II category J for IEE/EIA, of PEPA, Regulations, 2000, requiring Environmental Impact Assessment (EIA).
5)	**Project Proponent & Contact Person**	Mr. Ghazali Saleem butt, S/o Muhammad Saleem butt, R/o House No. 605 mohallah Shadh Bagh, Lahore
6)	**Project Category:**	According to the Environmental Protection Agency, Government of the Punjab, Lahore- "List of Projects Requiring an EIA", and the project under consideration categories falls under Schedule II category C for IEE/EIA, of PEPA, Regulations, 2000, requiring Environmental Impact Assessment (EIA).
7)	**Project Process**	

8)	**Project Component**	This project includes water supply system, electricity network, telecommunication system, and network of roads, filter drinking water, Sewerage network and Sewage Septic tank. Project process diagram explain in chapter description of project.
Environmental Precise		
1)	**Project Environmental Consultant**	M/S Environmental Greentech Services (PVT) Ltd Office No. 10, 4th Floor, Tele Tower, Link Road, Model Town Lahore Contact#: +92 3057726621 Email: m.bilawalzafar@gmail.com
2)	**Water Requirement**	Water Requirement of proposed project is about 08 gallons per capita per day of water will be required for total population of about 15-20 workers
3)	**Electricity Requirement**	The design criterion for the electrical works will be in compliance with the requirements of WAPDA. Maintenance will be carried out by the management of the Project.
4)	**Solid Waste Management**	Solid waste will primarily consist of the domestic solid waste from the project. About 150 kg/day of domestic solid waste will be generated from the project. The garbage will be collected at a designated area within the area as an intermediate garbage disposal. From this place, garbage will be collected and transported to a suitable location for final disposal. The location for this final disposal will be decided in consultation with the City District Government Lahore.
5)	**Tree Plantation**	Trees will be planted in all open spaces and boundary of the Project Area. Green belts will also be developed

➢ MAJOR IMPACTS AND RECOMMENDED MITIGATION MEASURES:

Anticipated impacts associated with the construction phase include noise, air emissions from earthwork and construction machinery and vehicles, and soil contamination due to leakage from or accidents of the construction or transportation vehicles or during on-site refueling, solid waste from construction, municipal water used and safety of the workers and employment conflicts as the major adverse environmental impacts. Mitigation measures recommended to be incorporated into the project include running the machines and vehicles on good quality (low-sulfur fuels) in good working order ensuring regular maintenance, tuning and servicing, and providing them with emission control devices, such as mufflers and silencers, etc. Water suppression and covered transportation and storage of the construction materials and slow driving on unpaved roads will control dust emission. Solid waste of construction and demolition activities will be used for flooring, while the remaining solid waste will be managed as per area practices in the area. For community safety, irrelevant persons will not be allowed inside and boundary of the site will be fenced. Safety of the workers will be ensured by developing SOPs for all jobs, training the workers to follow SOPs, discouraging any careless attitude of workers and providing the workers with, and encouraging them to use PPEs.

Key impacts related to the operation phase include:

- Wastewater
- Solid Waste
- Energy Management
- Safety, Public Health & Nuisances

However, the magnitude of these impacts shall be very low and insignificant. Only municipal wastewater will be generated, which will be handled via Settling Tank and then will be discharged into the trunk sewer. Solid waste will also be municipal only. Solid waste will not be allowed to pile up and the municipal solid waste will be managed as per area practices. Air pollution will not be there in proposed project. High noise vehicles will not be allowed in proposed project. Detailed analysis is given in chapter 4.

Mitigation for Projects		
	DIRECT IMPACT	
1	Displacement of land uses	Ensure that due consideration is given to the proper trade-offs between land values and those of other uses, such as prime farmland, forests or other land uses or natural habitats of value to society as a whole. Investigate existing planning and design standards to ensure that they are suited to local conditions and not unnecessarily wasteful of land. Assist in drafting new regulations that are more appropriate.
2	Destruction of environmentally critical areas	Ensure that regionally critical environmental sites, such as major forested areas, major water bodies and wetlands, habitats containing rare and endangered species, etc., are identified and not threatened by project location.
3	Danger to residents from hazardous natural condition	Ensure that project site is not located in the following areas: ❖ major floodplain ❖ coastal zone inundation areas ❖ areas of unstable soil or subsurface conditions ❖ areas of highly saline soils ❖ areas subject to landslides ❖ seismically or volcanically active areas ❖ excessively steep or wet areas ❖ areas where significant risk from disease vectors exist or any other areas of significant natural hazard. Design accordingly if site cannot be moved.
4	Danger to residents from hazardous man-made conditions	Identify areas that have significant man-made hazards such as filled land, areas subject to subsidence from mining activity, groundwater, oil or other extractive process. Identify areas where solid or liquid or toxic wastes may be, or have been, dumped. Investigate site conditions with proper geo-technical or chemical testing procedures. Ensure that adequate funding and technical expertise are available to deal with the special conditions. Investigate alternate sites.

5	Hazard to residents from air, water or noise pollution from other adjacent or nearby land uses	Ensure that the site is located away from such pollution sources. Do not locate down-wind of significant point sources of air pollution such as smoke stacks. Identify noise sheds around airports, major roads, etc. Provide buffers of other compatible uses of adequate width between areas and sources of pollution. Take measures to abate pollution at source, if feasible; such as noise barriers along expressways are an example. Investigate alternate sites.
6	Hazard to residents from air pollution due to site location being in an area subject to frequent temperature inversions	Seek alternate site locations if pollution is from existing sources that are difficult to abate. Otherwise design project with low densities
7	Dislocation of existing resident populations	Ensure that any involuntary resettlement is done in accordance with proper standards or consider alternate sites.
8	Destruction of historic or cultural resources	Consider alternate sites or make provision to set aside and zone historic and culturally significant areas.
9	Coordinate with other planning goals and objectives for region. Upgrade existing infrastructure and services, if feasible. Consider alternate sites.	Coordinate with other planning goals and objectives for region. Upgrade existing infrastructure and services, if feasible. Consider alternate sites.
10	Excessive depletion of resources such as lumber or fuel or overtaxing of traditional industries, such as brickmaking	Review capacity of local resources and industries to provide for large-scale construction and upgrade if feasible. Select materials and design criteria according to local conditions and availability of resources. Design for maximum efficiency in material and energy use. Encourage the study of indigenous customs and techniques for building and incorporate in project design
LOCAL AND SITE SCALE IMPACTS		

11	Damage to sites and their immediate surroundings resulting from the disruption of the natural environment, in particular the soil, vegetation and drainage network (see below for more detailed comments)	Identify the basic natural systems of a site and its immediate surroundings and protect with set-asides for open space, easements and buffer areas etc. Adapt layouts to fit natural patterns rather than imposing rigid geometries.
12	Degradation of habitats caused by fragmentation	Maintain and/or design open space networks to follow natural site features, such as stream corridors, and connect the site and local and regional open space systems.
13	More extreme flood/drought cycles, increased erosion and siltation and degradation of stream biota and riparian vegetation etc. caused by increased runoff from developed sites	Preserve existing vegetation, particularly intact natural habitats. Institute a storm water management plan including strategies such as: ❖ minimizing impervious area ❖ increasing infiltration to soil by use of recharge areas ❖ use of natural vegetated swales instead of pipes or ❖ Installing detention or retention facilities with graduated outlet control structures. Use 'soft engineering' techniques for soil and bank stabilization such as vegetative stabilization (soil bio-engineering), in preference to build structures.
14	Depletion and/or pollution of local groundwater resources	Ensure that projected use of groundwater is within the capacity of natural system to replenish itself. Avoid 'mining' groundwater particularly in drier climates. Use indigenous vegetation that requires less water, drip irrigation or shaded plantings. Ensure that soils are suitable for septic tank or other on-site treatment. Design storm water management systems as suggested above, in particular use vegetation to retain recharge and purify storm water.

15	Degradation of soil cover from erosion, removal, or loss of soil structure due to compaction	Have both temporary (during construction) and permanent erosion control plans. Temporary control plans should include ❖ silt fencing ❖ temporary silt trap basins ❖ short-term seeding or mulching of exposed soil areas (particularly on slopes) ❖ Limitations on access for heavy machinery and the storage of materials to avoid soil compaction. Permanent erosion control plans should focus on the establishment of stable native vegetation communities. Ensure that topsoil in construction areas is stripped and stored for future use and not illegally removed from site.
16	Loss or degradation of vegetation from unnecessary removal or mechanical damage	Identify important stands of vegetation, large contiguous stands of forest or other habitat, vegetation on steep slopes, and stream corridors or swales. Incorporate these areas into design layout or open space system. Protect such areas during construction by temporary fencing and limitations on access for heavy machinery and materials storage.
17	Degradation of habitat from inappropriate management or introduction of invasive exotic species	Protect natural habitat from destructive management or maintenance practices, such as the removal of understory vegetation from woodlands, or excessive clearance of vegetation from stream banks. Do not use invasive exotic species for landscaping or reforestation.

➢ **ENVIRONMENTAL MANAGEMENT & MONITORING PLANS:**

During construction, ambient air quality for dust level in particular, vehicle and equipment exhaust, noise level (tests), solid waste management and soil contamination, and community and workers 'safety (visual) need to be monitored. During operation solid waste management, sewerage lines will be monitored. Plan has been included in **Chapter-5.**

Contents

LIST OF FIGURES

LIST OF TABLES

CHAPTER # 1,

1.1 INTRODUCTION

This Section of the report provides an overview of the rational of the Project, objective of project, requirement of the project, purpose of the report and approach adopted to conduct the EIA.

Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore. The friendly team of employees provides quality and professional services for clients and is dedicated to their care and wellbeing. Project planning is the process of making decisions on the development and use of land. It is a tool for guiding and facilitating development and regeneration in a way that also preserves the best features of our environment. Planning deals with the land-use related merits of development and only these can be considered when making planning decisions. The Building Regulations control the physical construction of buildings through setting the minimum building standards required.

The planning of Project will assist communities, companies and governments to integrate the environmental, economic and social aspects of development from site, up to regional scales. It will cover land-use planning, urban design, transport and infrastructure planning, use and extension of information technology, heritage and conservation, resource management, environmental monitoring, planning law and practice, commercial and industrial development, and policy making and implementation. Planning of this project deals with strategic work (long-range planning) as well as structural and statutory components. The latter include the current development of the built and natural environments and the legislative framework controlling land use. Accordingly, planning is closely allied with commerce, economics, government, sociology and the ecology disciplines.

1.2 Purpose of the report

Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab, in compliance with the legal requirement for Punjab Environment Protection Act-1997 (Amended 2022), Section 12- for obtaining No Objection Certificate (NOC) before starting and construction activity at the project site. The other relevant regulations and guidelines considered while preparing this EIA report include:

- Policy and procedures for filing, review and approval of environmental assessments.
- Guidelines for the preparation and review of environmental reports.
- Guidelines for public participation.
- Guidelines for sensitive and critical areas.
- Detailed sectorial guidelines

Various aspects like environmental, social, physical and other aspects of the project both during construction and its regular occupancy are highlighted in this EIA report. Measures necessary to be adopted to mitigate any environmental impacts on any part of the environment around are also described. All the important information is also provided as described under the format used to help decision makers, EPA Punjab in the present case, before issuing the desired Environmental Approval.

1.3 Scope of the study

The scope of study includes baseline survey of the proposed project, collect relevant data from primary and secondary sources, assess the impacts related to the subject project, suggest the mitigation measures to control the anticipated impacts, formulate the environmental monitoring program to check the environmental parameters at PEQS, prepare an Environmental Management plan to implement the recommended mitigation measures, consultation with the stakeholder or nearby community to know their concerns regarding the subject project.

1.4 Identification of the project

According to the Environmental Protection Agency, Government of the Punjab, Lahore- "List of Projects Requiring an EIA", and the project under consideration categories falls under Schedule II category C for IEE/EIA of PEPA, Regulations, 2000, requiring Environmental impact assessment (EIA). Further, the client is required to fulfill the legal requirements of the Section-12 of the Punjab Environment Protection Act 1997 (Amended 2022).

1.5 Project Proponent

Mr. Ghazali Saleem butt, S/o Muhammad Saleem butt, R/o House No. 605 mohallah Shadh Bagh, Lahore. CNIC & other related documents are attached with the application file for the Environmental Approval.

1.6 Details of Consultant

For the preparation of the IEE Report of this Proposed Project, the proponent has hired the services of the environmental consultants; **M/S Greentech Environmental Consultants** Team comprising of environmental scientists, environmental economists and sociologists has worked on this report. The following table lists the names of those experts:

Table 1: List of Experts

Sr. No.	Team Member	Position Held	Qualifications
1.	Hassan Waqas	Team Lead, Principal Environmentalist	MS Environmental Sciences University of Gujrat (UOG)
2.	Bilawal Zafar	Environmentalist-I	BS (Hons.) Environmental Sciences University of Lahore
3.	Saddat Mazhar	Ecologist	MS Forestry & Environment University of Viterbo "La Tuscia", Italy BS Environmental Sciences University Of Gujrat (UOG)
4.	Anam Imtiaz Zaidi	Environmentalist-II	Mphil Environmental Sciences The University of Lahore BS (Hons.) Environmental Sciences

			The University of Lahore
5.	Waqas Ahmed	Environmental Geologist	Mphil Environmental Sciences The University of Lahore BS (Hons.) Environmental Sciences University of Gujrat
6.	Zain Abbas	Environmentalist-III	MS Environmental Sciences, National University of Science and Technology (NUST), Islamabad BS Environmental Sciences University of Gujrat
7.	Rizwan Saeed	Field Engineer	BS Environmental Sciences, University of Gujrat

1.7 Nature, Size and Location of the Proposed Project

The proposed project is construction Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore over a total land area of 306.58 Acres. The project will be facilitated with all above said facilities. The land prices are low in some area due to less development. So, the capital cost of the whole project is about 70 million rupees.

1.8 Property Proposed Options for All

Sand Excavation through dredger Over an area of 306.58 Acres Situated Saggian District Lahore the proposed site is suitable for the said project

1.9 Methodology for Environmental impact Assessment (EIA) Report

For the purpose of this report, environmental and social baseline data and conditions at/around the project site has been undertaken. The methodology adopted to conduct the EIA Study includes Review of Layout Plan, detail meetings with the client, orientation session, development of data acquisition plan, Analysis of Data, review of existing data, primary & secondary data collection survey, Screening of Potential Environmental Impacts and Mitigation Measures and also interviews with people near the project area has been conducted to collect their opinion regarding the proposed project and after findings it has been concluded that the project will not have any major adverse impacts on the socio-economic environment of the existing community.

Executive Summary

- Chapter 1: *Introduction of the Project*
- Chapter 2: *deals with the project Description*
- Chapter 3: *covers the Description of the Environment*
- Chapter 4: *Deals with the Environmental impacts and Mitigation measures*
- Chapter 5: *describes the Environmental Management Plan & Monitoring Program*
- Chapter 6*: covers the Impact Assessment Methodology*
- Chapter 7: *involves the conclusion & Recommendation*

CHAPTER NO # 2,

DESCRIPTION OF THE PROJECT

2.1 Type and Category of the Project:

The proposed project is a project under the name Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore As per the statutory notification of Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2000 made under Section 12 of Punjab Environmental Protection Act, 1997 (Amended 2022), According to the Environmental Protection Agency, Government of the Punjab, Lahore- "List of Projects Requiring an EIA", and the project under consideration categories falls under Schedule II category C for IEE/EIA of PEPA, Regulations, 2000, requiring Environmental impact assessment (EIA). Further, the client is required to fulfill the legal requirements of the Section-12 of the Punjab Environment Protection Act 1997 (Amended 2022).

2.2 Objectives of the Project

The objective of the project is excavation of the ordinary sand with Dredger to generate business for the proponent, keeping in view sustainable development and social soundness aspects of the surrounding society

2.3 Project Benefit

Project will create jobs for the indigenous people, will engage local people with construction of the project, and improve their living standards. Project is environmentally friendly in all aspects.

2.4 ALTERNATIVES

2.4.1 Site Alternatives

The main consideration for the selection of site for the development of a project was availability of suitable land at the prime commodious place as well as at reasonable price. The site is easily accessible through road. Availability of access roads, communication facilities, electricity, gas, basic infrastructure, sewer etc. was the necessary requirement. Neat and clean environment was the main consideration.

Keeping in view the basic requirements and their availability, the present site is best suited for the construction of the project. All basic infrastructural requirements are available at the selected site. Accordingly, the selected site is ideally suited for construction of project and no other site was considered.

2.5 LOCATION AND LAYOUT OF PROJECT

2.5.1 Layout of the Project

The layout map of the project site is attached with the report.

2.5.2 Master Plan of the Project

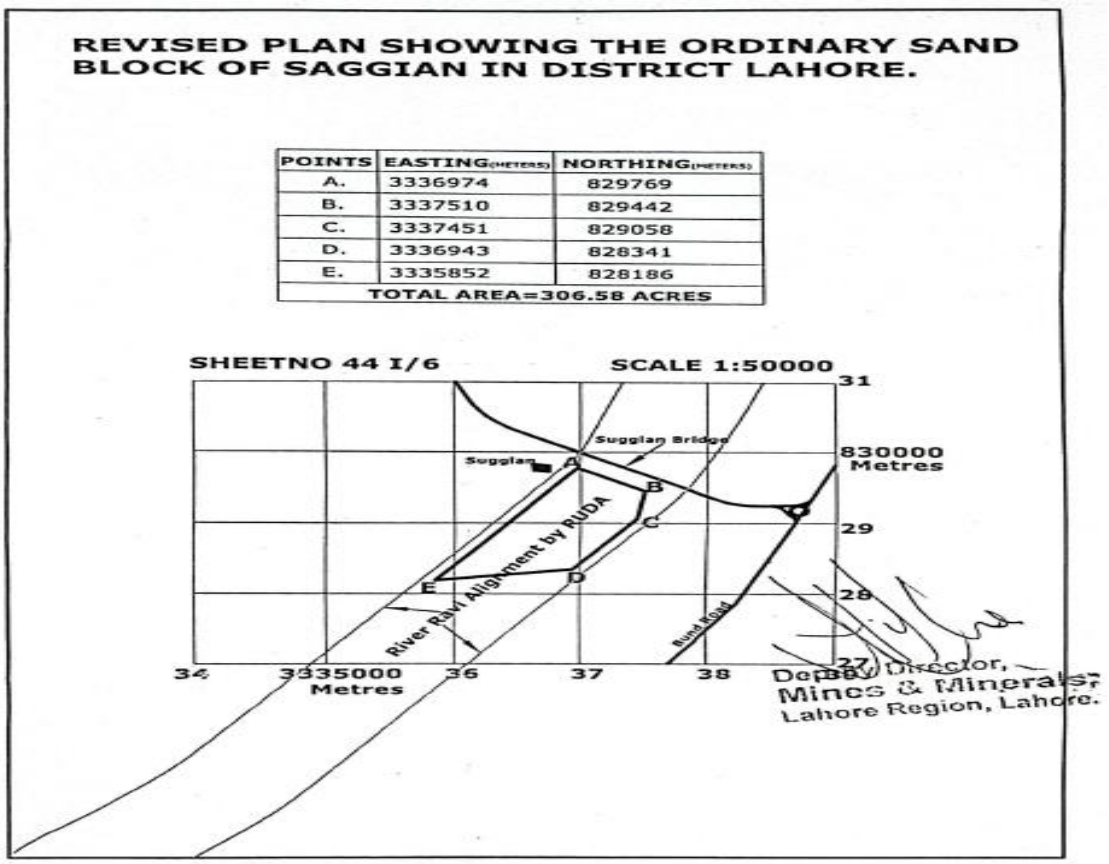


Figure 1 Project Plan

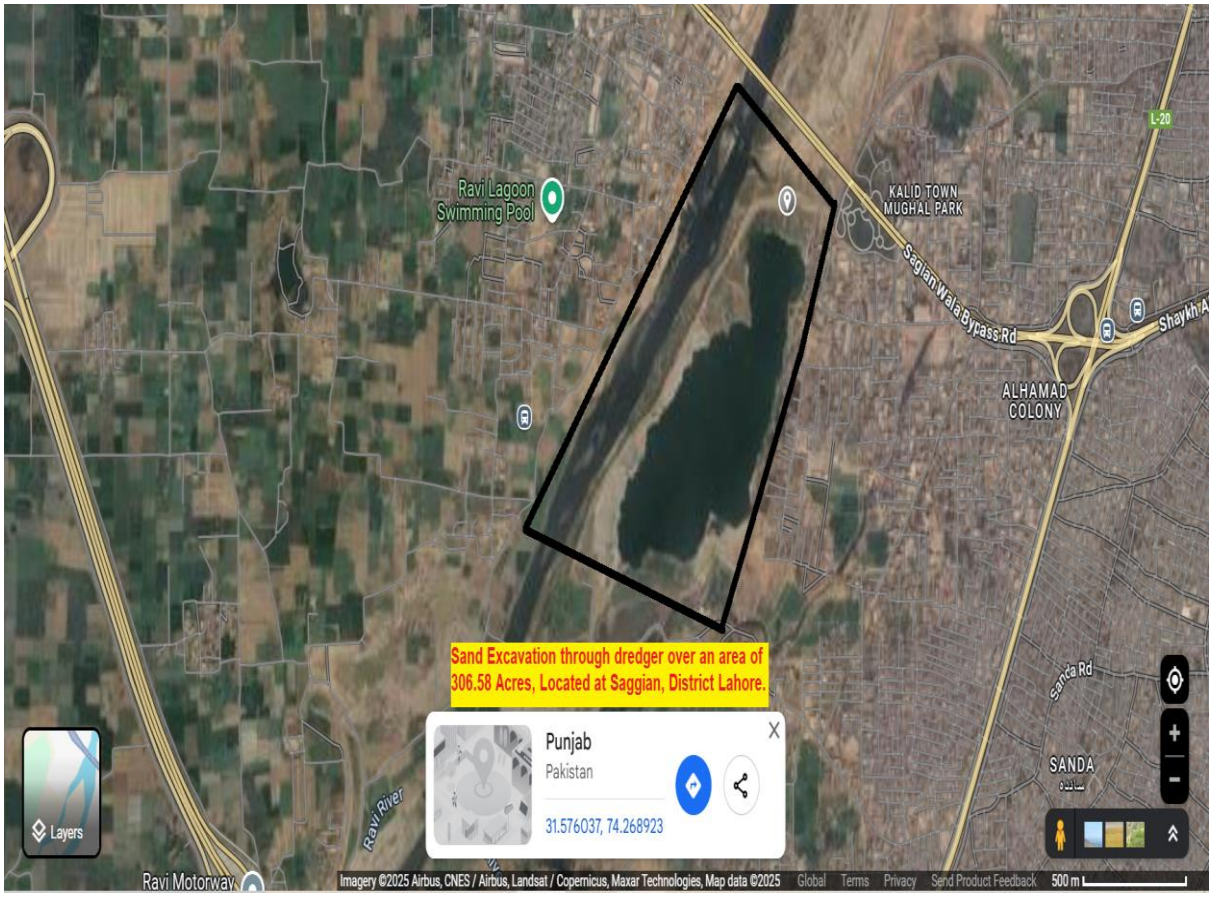


Figure 2 Location of Project

2.6 Land use planning

The project site is situated near to river**.** According to the planning, no trees will be cut at the time of construction. 500 plants will be planted after landscaping. All laws and by laws of the government are applicable to any land planning and use as well.

2.7 Road Access

The subject project situated in the area of District Lahore with main access roads named Saggian wala Bypass road linked the subject project to the other main roads.

2.8 Vegetation features of the project

The project site has few and scattered amount of vegetation, no tree will be cut during project. Project site is open land that will help to avoid land clearing, mainly shrubs, weeds and grasses are present over there in scattered quantity.

2.9 Magnitude of the operation including capital cost, and associated activities

This project is Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore with all above mentioned facilities. Total area of the project is 306.58 Acres the total cost of the subject proposed project will be 70 million for land development.

2.10 Time Schedule

The initial project planning which includes layout plan and broad scale design of Sand Excavation through dredger Over an area of 306.58 Acres Situated at at Saggian District Lahore New job opportunities will arise especially for the locals during construction.

Detailed feasibility studies and designing of the project have been completed. Necessary legal, administrative and financial formalities are being finalized. The project is expected to be completed within 11-12 months from the date of environmental approval. Subsequently the operational and maintenance aspects of the project will be undertaken by the proponent.

2.11 Project Process

The proposed project aims at mining of the ordinary sand from the river with dredging Machine that will use in deep water. According to the Environmental Protection Agency, Government of the Punjab, Lahore- "List of Projects Requiring an EIA", and the project under consideration categories falls under Schedule II category C for IEE/EIA, of PEPA, Regulations, 2000, requiring Environmental Impact Assessment (EIA).

Sand is an indispensable natural resource for any society. Despite society's increasing dependence on sand, there are major challenges that this industry needs to deal with: limited sand resources, illegal mining, and environmental impact of sand mining. The purpose of this project is to present an overview of the sand market, highlighting the main trends and actors for production, export and import, and to review the main environmental impacts associated with **sand exploitation** process. Based on these findings, we recommend different measures to be followed to reduce negative impacts. Sand mining with dredging Machine should be done in a way that limits environmental damage during exploitation and restores the land after mining operations are completed.

All processed material and machine will be stockpiled on site. Haulage of material to will only take place when a barge is being loaded

Sand is a natural aggregate formed by rock erosion over thousands of years. Evidence of sand use as an aggregate material for different civil constructions dates from ancient times. The mortar used for bounding Egyptian pyramids blocks was a mixture of clay and sand or a mixture of mud, lime and sand. consider that the mortar produced by romans 2000 years ago (as a combination of limestone and volcanic sand) had an essential role for preserving the buildings over centuries. The situation is not completely different today, as sand is still used intensively in the construction industry, but currently there are also many other industries that use this natural resource. Thus, sand is used as a main

Component in various construction materials such as cement, mortar, tile, brick, glass, adhesives, ceramics, etc.; and it has an important role in water filtration, in chemicals and metals processing and in plastic industry. These multiple utilizations led to an exponential consumption growth and this trend is expected to continue due to population growth and increasing standards of living. The importance of this natural resource is given by the fact that, nowadays, after fresh water, sand is considered to be the second most consumed natural resource on Earth. United Nations Environment Programme (UNEP) stipulates that "Sand and gravel represent the highest volume of raw material used on earth after water "but also sounded the alarm over the fact that "their use greatly exceeds their natural renewal rates.

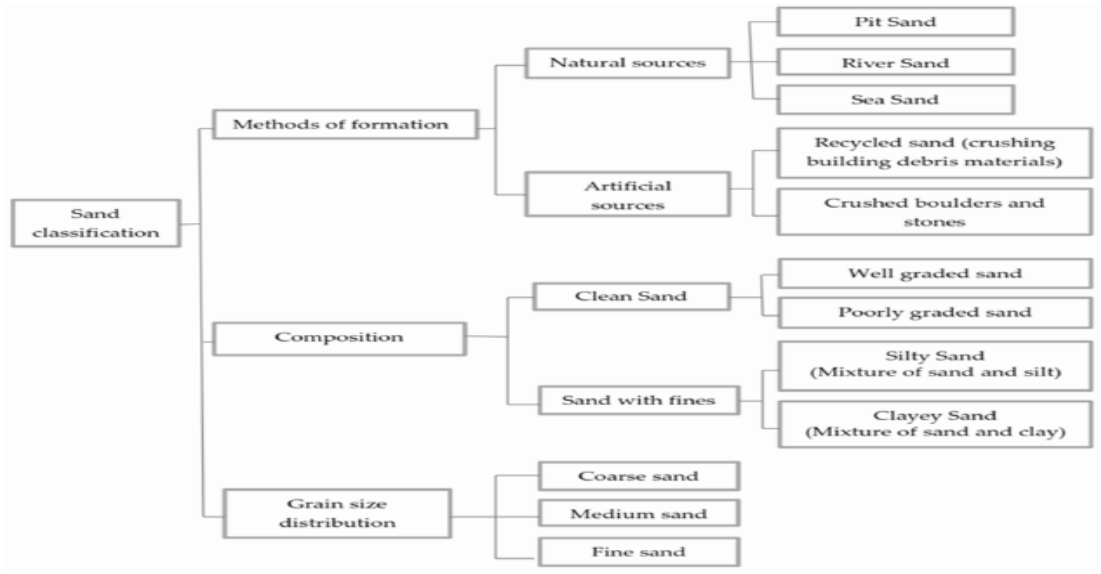


Figure 3 Project Process

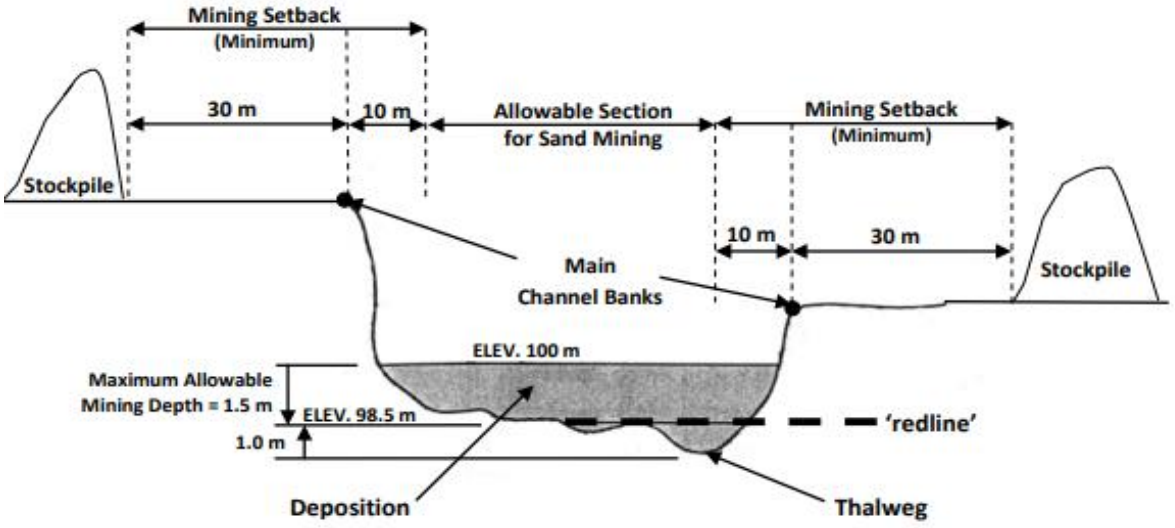


Figure 4 Technical Design I

A marine Vassel fitted with the device to scrap or suck the sediment deposition over the sea bed knownas dredger

As the system is the deepest digging one-truck transportable ladder pump dredge available at 9.1m (30 ft.)

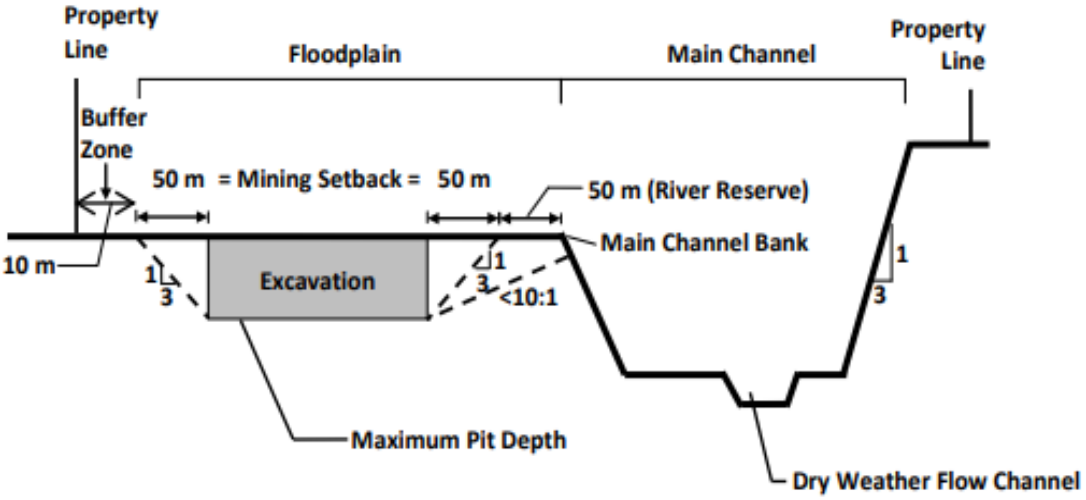


Figure 5 Technical Design II

Excavation of sand through Dredger

Dredging is the form of excavation carried out underwater or partially underwater, in shallow waters or ocean waters. It keeps waterways and ports navigable, and assists coastal protection, land reclamation and coastal redevelopment, by gathering up bottom sediments and transporting it elsewhere. Dredging can be done to recover materials of commercial value; these may be high value minerals or sediments such as sand and gravel that are used by the construction industry. Dredging is a four-part process: loosening the material, bringing the material to the surface (together extraction), transportation and disposal.

The extract can be disposed of locally or transported by barge or in a liquid suspension in kilometer long pipelines. Disposal can be to infill sites, or the material can be used constructively to replenish eroded sand that has been lost to coastal erosion, or constructively create sea-walls, building land or whole new landforms such as viable islands in coral atolls. It has been agreed by the proponent that no excavation of sand will be allowed to take place track which connects the site. It has also been agreed by proponent that, in the interests of workforce safety, the present exclusion zone boundary within the valley. The miners do not have designated individual excavation areas within their joint broad concession areas.

Following movement of surface boulders out of the way by either a tracked excavator or a wheeled loading shovel, sand is excavated to a temporary stockpile adjacent to the excavation site and then loaded into trucks for haulage to the processing site

Waste products of Project process

Water requirement

Main sources of water consumption are domestic & project related sources as sprinkling purpose. About 08 gallons of water per capita per day will be used during Establishment phase for sprinkling and domestic purposes Waste water treatment

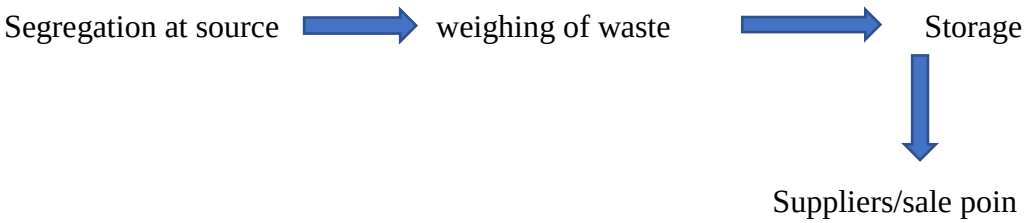
No waste water will be generated during the project

2.11.1 Atmospheric Emissions

Air emissions from standby generator will be kept within PEQs by proper tuning and maintenance work. The air quality assessment report will be submitted to EPA prior to environmental approval for the operation phase of the subject project.

2.11.2 Solid waste

A comprehensive solid waste management plan will be developed to improve the aesthetic look of Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore Following process will be utilized for waste management



2.12 Design Criteria for Development

All the construction activities Sand Excavation through dredger Over an area of 306.58 Acres Situated at at Saggian District Lahore will be carried out according to the schedule and will be completed in time. The utility services that will be provided at the Sand Excavation through dredger Over an area of 306.58 Acres Situated at at Saggian District Lahore include water supply system, electricity network, telecommunication system, network of Roads &, filter drinking water, Sewerage network and Sewage Treatment Plant.

Following design criteria is being followed by proponent for operation of the project:

2.13 Water Requirement:

After the Completion of project, about 08 gallons per capita per day of water will be required for total population of about 15-20 workers/employee of Project. Bore will be installed to meet the water requirements.

Design Population	Per Capita Consumption Per day (Inclusive and unaccounted for water)
700-2000	**8 glns**
2000-5000	10 glns
5000-10000	15 glns
10000-25000	20 glns
1000-25000	30 glns (with sewerage facilities)
25000-1 lac	40 glns (with sewerage facilities)
Above 1 lac	50 glns (with sewerage facilities)

(water supply, sewerage and drainage scheme, Punjab public health and engineering department)

Table 2.1 Water Requirement Parameter

S. No.	Parameter	Unit	Value
1	Design avg flow rate	m^3/d	109.4
2	pH	-	7 to 8
3	TSS	mg/l	220
4	BOD5	mg/l	220
5	COD	mg/l	500

2.14 Sources of Water

Underground water at the project site is available at the depth of 50-60 feet and source of water for the project will be the pumps. According to the chemical analysis report water is fit for the drinking.

2.15 Sanitary Sewerage System

Sanitary sewerage system has been designed by approximated speed of water as 1.5 ft. /sec. After treatment in septic tank water will be discharge into drain on the left side of the project side.

The Sewage of the building will be treated in septic tanks. sewer lines will be connected septic tanks. As in septic tank multiple septic tanks has been installed at a place and these tanks are connected to plot sewer lines separately. All waste will be reached in the septic tank and

anaerobic digestion will be occur to treat the wastewater. After the design detention time the treated waste will be discharge in to main sewer line. And sludge will be dispose-off as per agreement with TMA.

Location of septic tanks will be selected following the design of sewerage design. As all the sewage will be flow under the action of gravity so septic tank will be located accordingly.

Treatment begins when the domestic wastewater flows from the building to the septic tank through the sewer pipe. A baffle (an internal flap) or tee (a T-shaped pipe) at the inlet slows the flow of wastewater going into the tank and directs it downward toward the middle of the tank. The wastewater is then retained for a day or more in the tank to allow the solids in the wastewater to separate from the liquids. Inside the tank, solids lighter than water—such as greases, oils, and, sometimes, other solid materials like toilet paper—float to the top forming a layer of scum. Solids heavier than water settle at the bottom of the tank forming a layer of sludge. This leaves a middle layer of partially clarified wastewater. An outlet baffle in the septic tank is positioned to allow only the partially treated liquid waste in the middle layer to flow out of the tank for further treatment. The layers of scum and sludge remain in the septic tank where bacteria found naturally in the wastewater work to break the solids down.

2.16 Waste water Treatment Specification:

No waste water will produce during the proposed project.

2.17 Solid Waste Management

No solid waste will be produced during Proposed Project.

2.18 Atmospheric Emissions:

Dust and particulate matter will be generated during the construction & Operational activities. Sprinkling of water will be done on dust tracks, stock piles; raw material will be covered by plastic sheets, loading and unloading of raw material will be done at night etc.

2.19 Roads

Inside roads would be available at the project site near river ravi

2.20 Electrical Works

The design criterion for the electrical works will be in compliance with the requirements of WAPDA. Maintenance will be carried out by the management of the project, District Lahore.

2.21 Telecommunication

Telephone facility will be provided by the PTCL. An underground cable will also be provided for electronic media.

2.22 Plantation

Planation will be done outside of the proposed project.

No. of trees to be planted:

Total 1000 trees will be planted according to the following schedule:

2.23 Fire Protection System

An addressable fire protection system with detection and alarm annunciation and other installations etc. would be provided to protect against any fire hazards. Fire buckets and fire extinguishers will be placed at all sensitive places within the proposed project.

There will be two security guards round the clock who improve the security of the project site and also in its vicinity.

2.24 Restoration / Rehabilitation Plan

All possible precaution will be taken to prevent an untoward incident in terms of life and property losses. The demolition materials will possibly be reused and recycled. All excavated surfaces will be termite proofed.

One completion of the project, the debris will be removed from the site in order to maintain aesthetics of the project. All measures will be undertaken for ensuring occupational safety, security and clean environment in the project area. Ornamental trees and flower plants will be planted on inside peripheral of the unit premises to restore the land.

Government approvals required by the project:

Project proponent has obtained approval for others concerned departments are in process.

Chapter # 3,

DESCRIPTION OF THE ENVIRONMENT

This section describes the baseline conditions, which cover the existing Physical, ecological and socio-economic environment of the project as well as study area.

Data was collected by reviewing secondary source and field survey and previous similar studies for the subject project in the Lahore city

3.1 Physical resources

The study examines the physical resources, topography, soil, climate, surface and ground water and geology is of not only the project site but also the city as whole to assess whether the project under review can or does impact on any of these parameters

3.1.1. Topography and soil

These are river transported deposits (alluvium), which are quite thick and fairly homogeneous in extent. The top soil consists of brown, soft to firm clayey silt / silty clay having slight plasticity and contents of dissolved salts. The top layer is likely to extend about 3 to 6 meter below natural ground, where it is underlain by silty fine sand/fine sand. This layer generally continues to deeper depths. These layers of silty clay and sandy gravel may also exist below 10-meter depth.

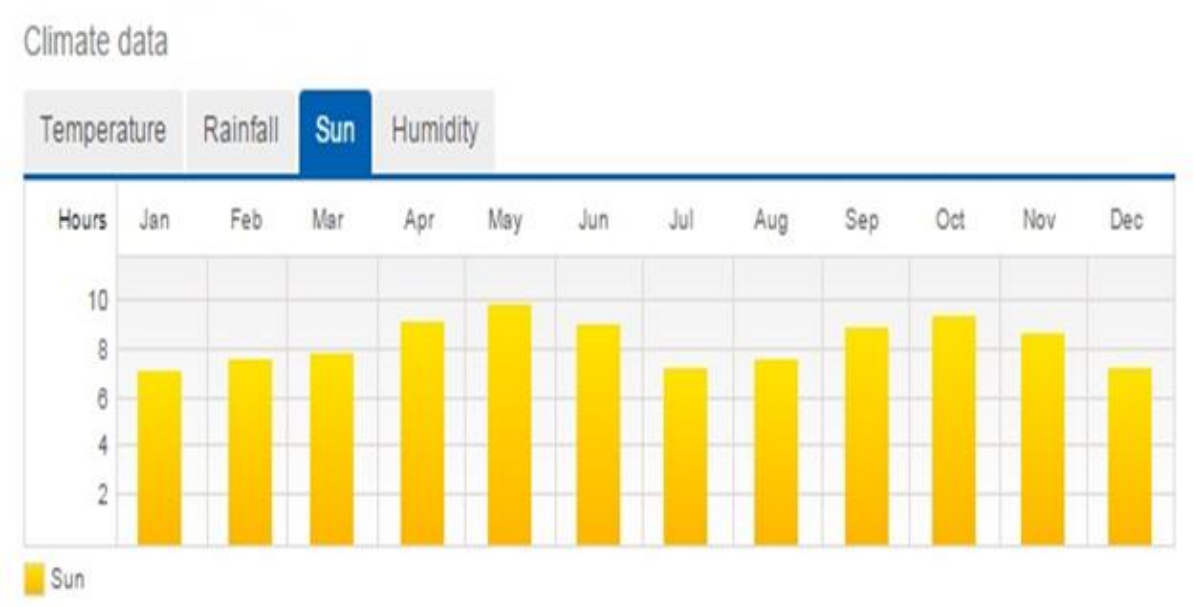
3.1.2. Climate and rainfall

Lahore has extremes of climate; the summer season begins from April and continues till September. June is the hottest month. The mean maximum and minimum temperature for this month are about 45 and 27 degrees Celsius respectively. The winter seasons lasts from November to February. January is the coldest month. The mean maximum and minimum temperatures for the coldest month are 22 and 0 degree Celsius respectively. Rainfall Towards the end of June monsoon conditions appear and during the following two and a half months the rainy season alternates with sultry weather. The winter rain falls during January, February and March ranging from 23 to 31 millimeters.

The probability that precipitation will be observed at this location varies throughout the year. Precipitation is most likely around July and September and. Precipitation is least likely around May and October.

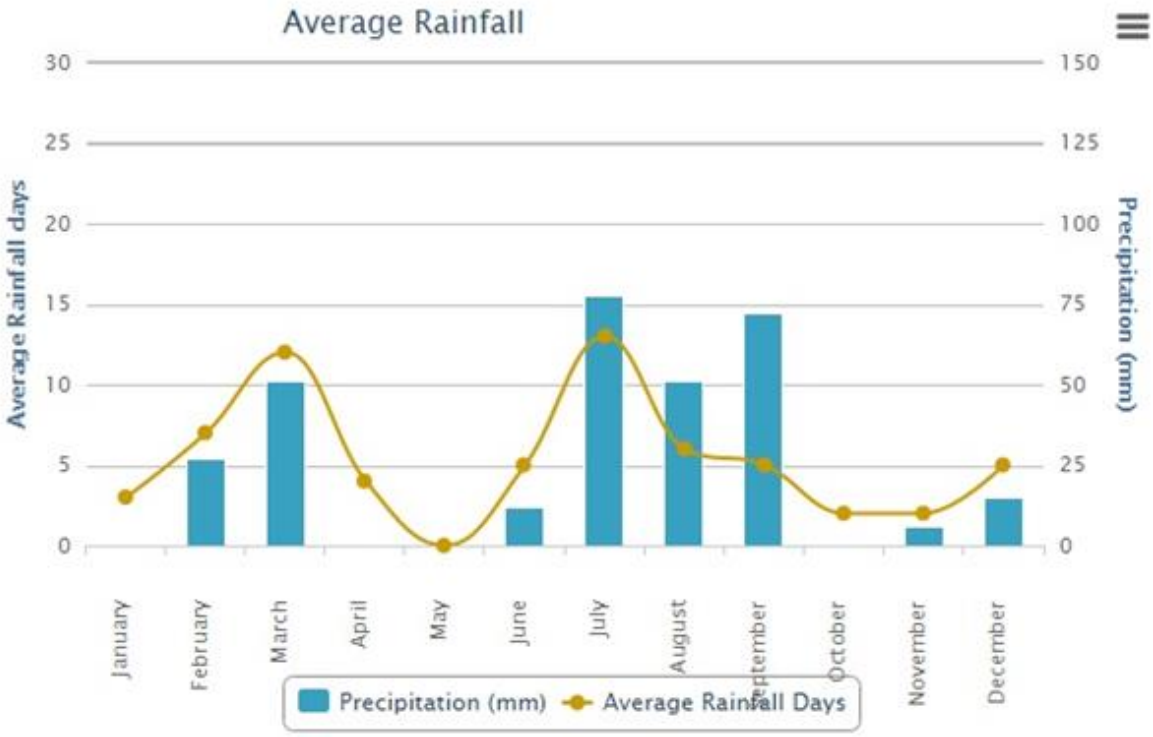
3.1.4 Temperature

Over the course of a year, the temperature typically varies from 5°C to 30°C and is rarely below 2°Cor above 44°C.



3.1.5 Precipitation

The probability that precipitation will be observed at this location varies throughout the year. Precipitation is most likely around July and September and. Precipitation is least likely around May and October.



3.1.6 Humidity:

Maximum average humidity of district Lahore is in month of July and minimum humidity is observed in April as shown in graph below;

3.2 Ambient Air Quality:

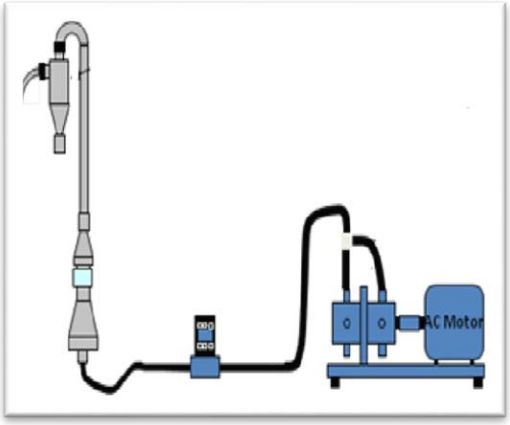
The project is located in commercial area of District Lahore. The major sources of air pollution in the area are surrounding industrial activities and transportation or vehicular traffic.

To record the baseline ambient air quality of the project area, monitoring was conducted at advised locations to assess the concentration of priority pollutants (Carbon monoxide, Nitrogen dioxide, Sulphur dioxide and PM10) in the air.

Instruments used for monitoring Ambient Air Quality.

Ambient air monitoring was conducted by using Lamotte Kit.

3.2.1 Particulate Matter (PM10)



For PM10 mini volume air sampler was used. In PM10 Sampler air is drawn into the omnidirectional inlet head at a flow rate of 20 LPM. The air is then accelerated toward the first impaction stage where particulate with aerodynamic diameters greater than 10 µm are collected (filtered out). The air stream, carrying particulate 10 microns and smaller, continues down the inlet toward the second impaction stage where particles larger than 2.5 microns are collected. Finally, particulate 2.5mm and smaller continue down the inlet where they are collected on a 46.2 mm diameter, ring supported filter media disc.

Lab results for Ambient Air Quality

PEQS: Punjab Environmental Quality Standards

3.2.2 Discussion of Results

The ambient air result was within the PEQS Limits during the monitoring hours. The ambient air quality was monitored before construction, the market business, industrial processes and traffic was operational.

Noise Level Monitoring:

Basic Environmental conditions:

During the measurement following conditions were prevailed on site

Metrological Conditions:

During the noise level monitoring weather was dry and sky was clear. Air was blowing at high speed

Monitoring Instrument:

The description of the instrument used for the noise level monitoring is given below:

Name: Digital sound level meter

Model: AR824

Company: Intel Instruments plus

Features:

- ✓ +/-1.5 dB accuracy with 0.1 dB resolution
- ✓ A&C weighting
- ✓ Four Measurement Level Ranges
- ✓ Overall range: 30-130 dB
- ✓ Frequency Range: 31.5 Hz to 8 kHz
- ✓ AC and DC output
- ✓ Record Max values over time
- ✓ Over range indication
- ✓ Auto power off and Max Hold functions
- ✓ Utilizes 0.5"(12.7mm) condenser microphone

Calibration:

Self-calibration time: 10 sec (every turn on)

Specification:

- ✓ Display: Large 5 Digit LCD
- ✓ Resolution: 0.1 dB
- ✓ Overall Range: 30 to 130 dB "A", 35 to 130 dB "C"
- ✓ Sound Level Ranges: 30-80 dB, 50-100 dB, 60-110 dB, 80-130 dB
- ✓ Basic Accuracy: +/-1.5 dB
- ✓ Time Weighting: Fast or Slow
- ✓ Sampling Frequency: 2/sec

Methodology adopted:

Noise level measurements were carried out in a way that monitoring round was completed in one go.

Sources of Noise Pollution

Major sources of noise generation are industrial activities and vehicular traffic along the main road. Noise levels were monitored within and outside of boundary walls of the project site. Noise profile of the project site near the main road is shown in sub-section.

Lab Results for Noise level

Discussion of Results

Noise level at west boundary was higher the PEQS Limits during the monitoring hours due to link road present at that side and traffic was flowing. At the time of monitoring the surrounding industries and traffic was operational.

3.3 Water Quality:

The surface water is of good for irrigation.

3.3.1 Ground water:

Underground water is available and its quality is not enough good for drinking at lesser depths. The residents of area mostly use ground water for drinking which is contaminated due to industrial activities in the area. Water is continuously being contaminated by the injection of industrial wastewater through injection well in the study area.

Lab analysis results of ground water in the area:

3.3.2 Wastewater/ surface water:

Proper sewerage system is not available in the area; there is no drain for the disposal of industrial wastewater as well. Mostly industries are injecting water in ground or may use in their own land for irrigation. It is highly recommended that water from the industries must be treated before use in irrigation. Govt. must take steps to provide proper industrial and domestic sewerage system in the area.

Surface water of the area is good for irrigation

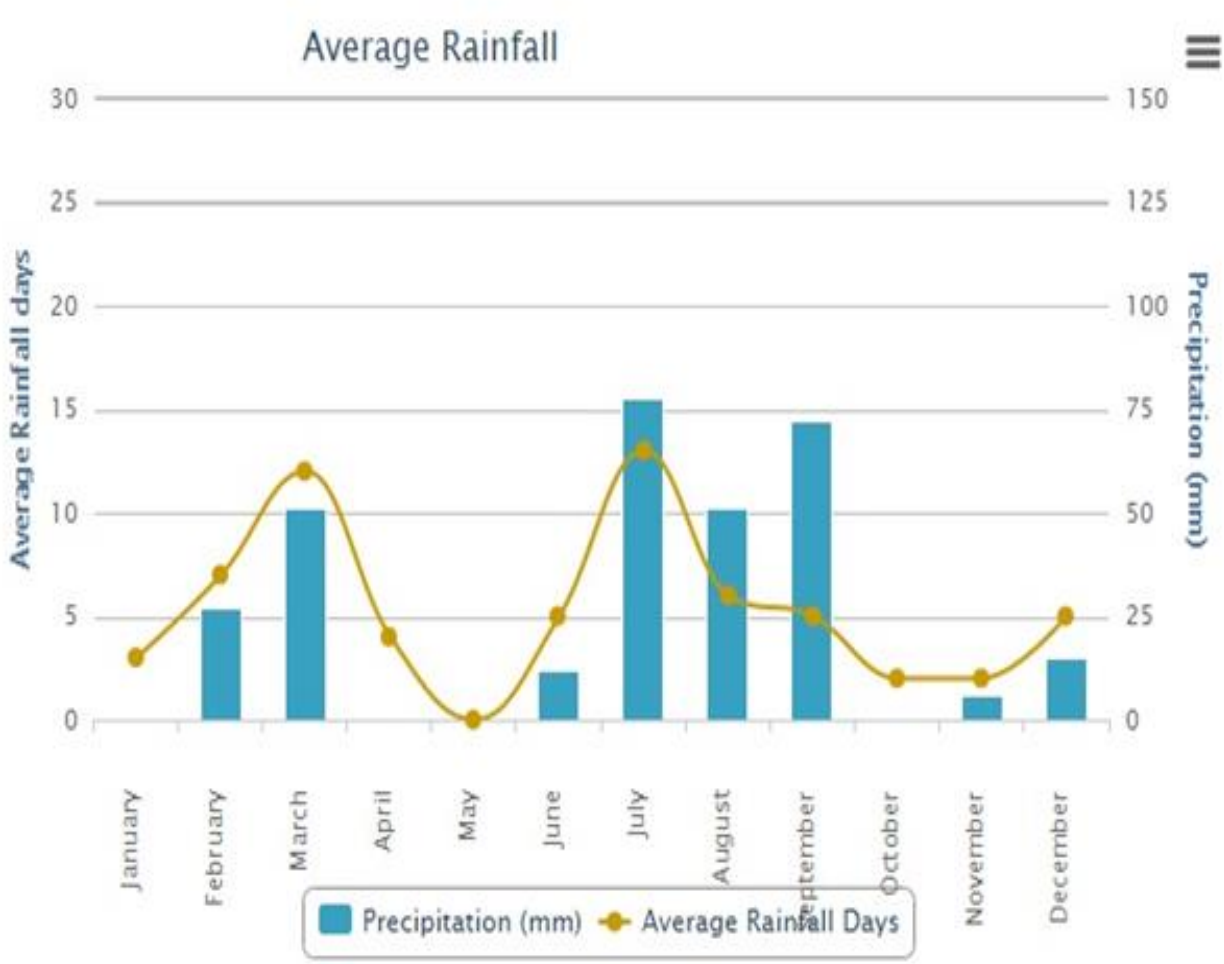

Average Rainfall
Average Rainfall days
Precipitation (mm)
30
25
20
15
10
5
0
150
125
100
75
50
25
0
January
February
March
April
May
June
July
August
September
October
November
December
Precipitation (mm)
Average Rainfall Days

Figure 3.1: Climate of Pakistan, Regions of Minimum Temperature

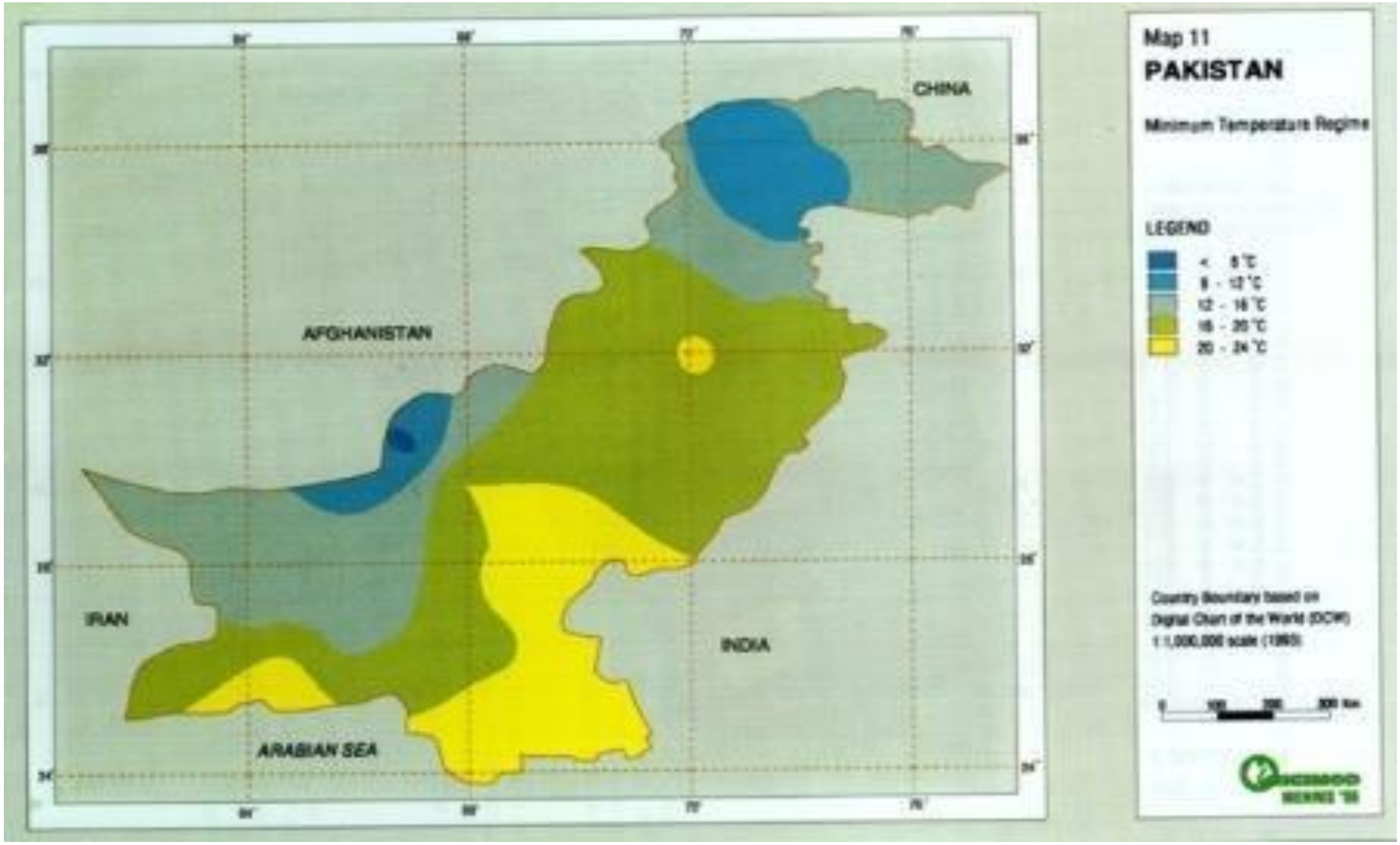


Figure 3.2: Climate of Pakistan, Regions of Maximum Temperature

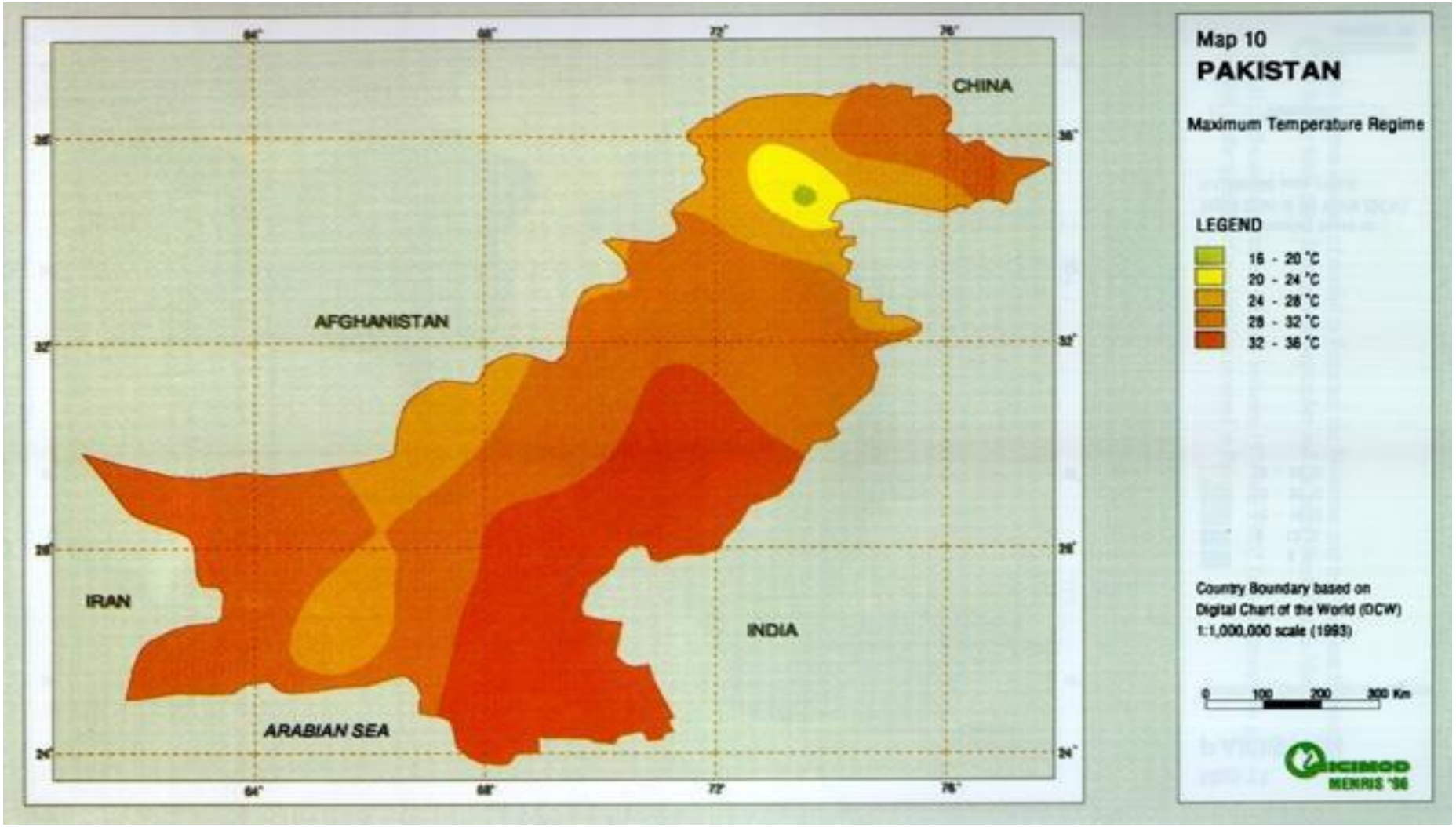
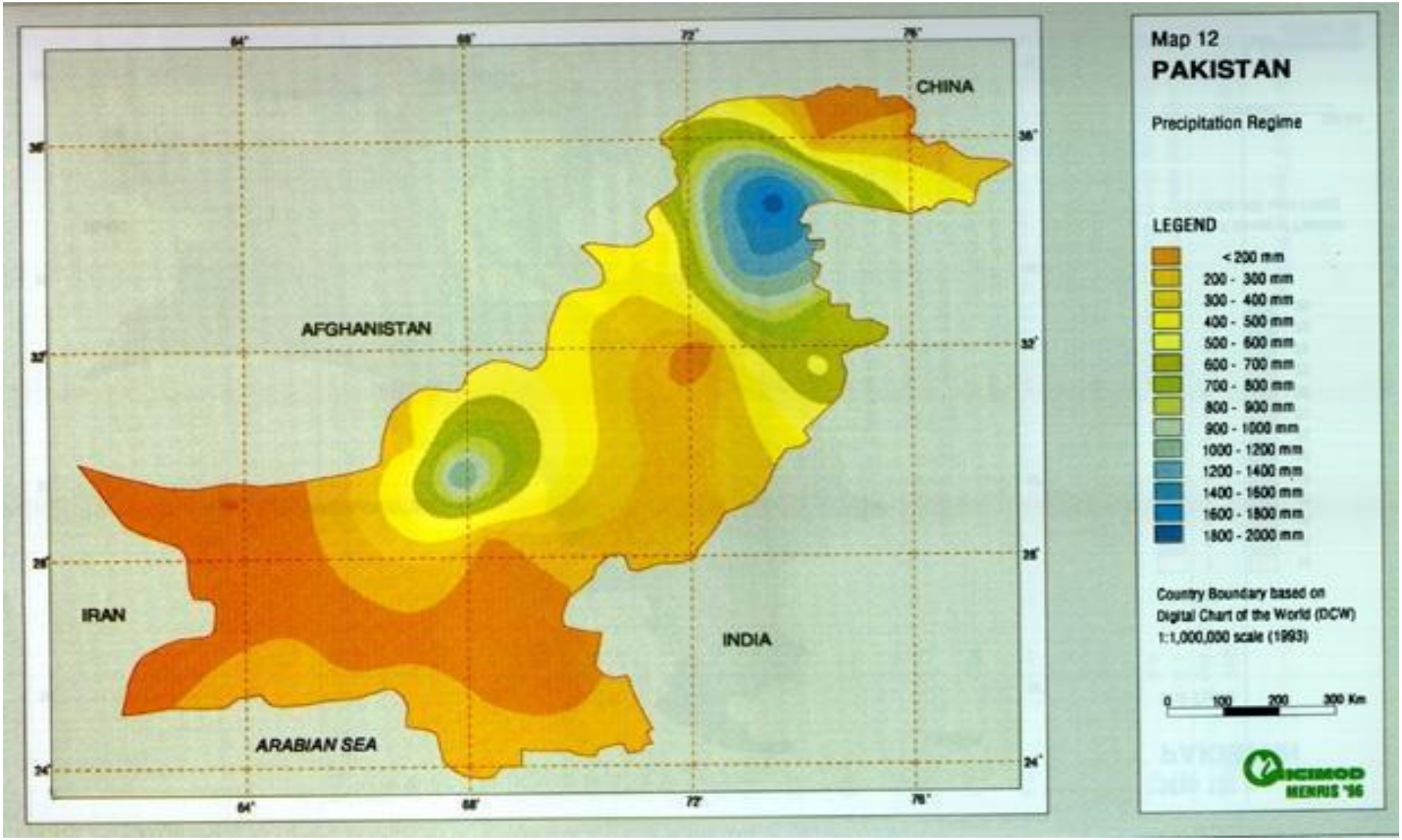
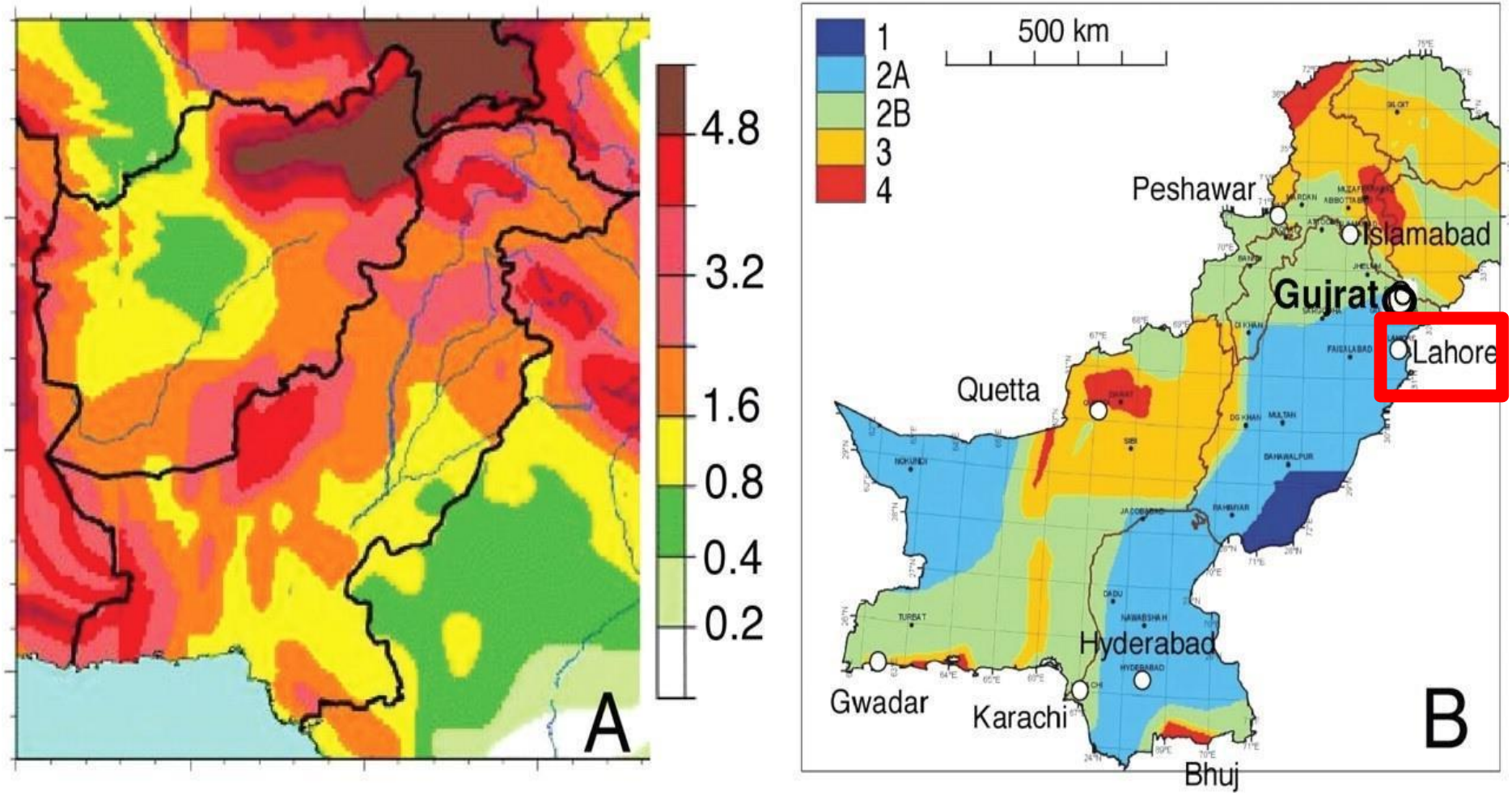


Figure 3.3: Precipitation Map of Pakistan




4.8
3.2
1.6
0.8
0.4
0.2
A
1
2A
2B
3
4
500 km
Peshawar
Islamabad
Gujrat
Lahore
Quetta
Hyderabad
Gwadar
Karachi
Bhuj
B

3.2 Description of the biological environment

Natural capital of a country mainly includes all of the country's wilderness areas and scenic landscapes, including also with their associated flora and fauna. Pakistan has a total of nine major ecological zones. The contribution of the "Natural Capital" is recognized at three distinct levels: species, genera, and communities (habitat and ecosystem) both collectively and within each level, the range or variety of the resources are referred to as the "Biological Diversity". The term has relevance for each of Pakistan's administrative units district, province, and particularly country. The more the number of species, genera, and habitats and ecosystems present within these units, the greater is said to be the Biodiversity. The biodiversity of the area, with this background, is discussed as under.

3.2.1 Flora

Project site is free from any protected plant species. Flora of the district has been greatly modified by human agency of the old open forests of small trees and shrubs; there remains only a few Rakhs or portions of forest which are kept as gazing ground for cattle etc. Amongst trees the most important are Kikar (Acacia arbica), Shisham or Tahli (Dalbergia sissoo), Beri (Zizyphus jajaba), Toot (Morus marlaccae), Sharin (Albizzia lebbek, Dharek (Malia azerdaracb), Phulahi (Acacia modesta), and Nim (Melia indica), Piple (Ficus indica) are planted for shade.The growth in Rakhs is composed mainly of three kinds of trees Jand (Prosopis spicigera), Karril (Capparis aphylla), and van or Jal (Salvadora obeoides). Occasionally pelu (acacia Loucophhloea) and Farash (Tamarix articulate) are also found. Pilchi (Tamarix gallio) is found on moist sandy soil along the rivers and is used for wicker-work, basket making etc.

3.2.2 Fauna

Wolf and jackal are the only wild animals of any importance. Some birds and few animals like Buffaloes, cows, goats, donkeys, hens' rats, cats, and dogs are present in the vicinity. Some reptiles like lizards are also present. The only amphibian seen the project area is frog. No threatened or endangered species are found in the project site. Similarly, no wildlife is present

3.3 Socioeconomic resources and quality of life values

Social change is the consequence of almost any intrusion into the community life of any society. The intrusion can be in the form of any developmental projects or nonspecific, less tangible forms such as increased exposure to other cultures, technological changes and so on. The social change that results from intrusion into community life can also be beneficial, but can have undesirable or negative outcomes. Even that change in the long run may have positive effect on the social well-being of a community.

Social Impact Assessment is a methodology used for examining social change due to external sources, especially specific developmental projects, but also government policies, technological changes and social processes or anything that has a social impact.

The objectives of the given study are outlined as follow:

- To carry out the assessment of social impact.
- Acquire socioeconomic data to evaluate and identify the project interventions.
- Assess needs of community related environmental concerns.
- To assess adverse and beneficial socioeconomic and health impacts of the activity.
- To suggest remedial measures and solutions to improve socio economic conditions.

To analyze socio economic conditions of community, with special reference to environment and conservation of natural resources.

3.3.1 Culture

It is also known for the wide variety of culture reflecting the traditions and customs of the area. Melas (fairs) in the month of 'Saawan' are notable among these traditions where different types of games are played on the drum-beat and shops of sweets and toys are decorated. The population mostly relies on agriculture as their main source of livelihood, although a number of people work in factories and offices as well.

3.3.2 Health Facilities

Lahore has some of the largest hospitals in the area which include the Asaaf hospital in the area. One such nearby hospital is the shaukat khanam hospital, doctor's hospital and many other big hospitals and clinics.

3.3.3 Educational Facilities

Lahore is having a higher literacy rate when it is compared with other cities of the country. Nearby Educational institute is LGS Senior boys Campus. It is made possible due to its prolific educational institutions.

3.3.4 Transportation

Lahore is one of the modern districts headquarter cities in Punjab. Although the city seems a far-off place to those living in Karachi or Islamabad, but the city has very good civic facilities. Today Lahore City is the District Headquarter. It is linked by air the other parts of the country. It is situated on the main Railway line and national highway linking Karachi & Peshawar. Now Daewoo also links Lahore to other cities.

3.3.5 Power Sources and Transmission

Electricity services are provided electric power company WAPDA to the area and it shall provide same services to the proposed project as it is the only authority which deals with the electric power sources and their availability to the expected area.

3.3.6 Industries

Lahore is an industrial center many important industries are based in Lahore. This city is known as one of the largest producers of Textile and many more industries.

3.3.7 Dress:

The local dress consists of a Kurta without collar covered by a waist-coat or Kurti and a loose loin cloth or trousers. A long piece of cloth called Chaddar is usually thrown over the willers. Achkan and Sherwani are worn on formal occasions by most people, but quite a large number of Muhajirs (refugees) wear these as normal dresses. In the villages, a Kurta with Tehband (sheet round of legs) and Safa on willers is the most common dress. The Pagri still carries a sign of respectability and some people in the cities while most people in the villages have this as the sole head-dress. The women's clothes are generally more colorful with popular shades

of red and yellow. Women clothing consists of Shalwar, Kamiz and Dopatta or Chaddar to cover their heads and upper part of the body. Phulkari is a silk embroidered shawl often fancied by the rural women-folks. Saree is only worn by women in towns and cities on formal occasions. The most common footwear for men in the villages is shoes of rough leather usually made by the village shoemaker. Boots are worn by those living in the cities and towns while women folk-wear sandal or slippers. Purdah is very common amongst the lower, middle and upper middle-class women but rare amongst women of upper class.

3.3.8 Languages and Major Casts

Punjabi, and Urdu are major language in the city. Main castes are chishty, Rehmani, LAK, Chadhar, Jut, Tagga, Ansari, Butt, Dulu, Sayal, Kamboh, Bhadru, Mughal, Dogar, Sanpal, Gujjar, Arain, Rajput, Tajra, Hiraj and Shaikh Awan.

3.3.9 Power sources and transmission

Electricity services are provided by WAPDA to the area and it shall provide same services to the proposed project as it is the only authority which deals with the electric power sources and their availability to the expected area.

3.3.10 Agriculture

Major crops of the town are wheat, grain, peas, barley are the important crops of Rabi season, while Kharif crops are cotton, sugarcane, potato, bajra, oil seeds which are shipped by rail and road to other parts of the country.

3.4 AESTHETIC VALUES:

Like the general trend among the citizens of area, most of the people have low awareness about environment. Even then, some people take cleanliness and neatness of the environment lightly. Some people throw municipal solid wastes (MSWs) on the streets. Sense of personal responsibility to keep the environment clean as good citizens is even now lacking among a few people.

CHAPTER # 4

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & THEIR MITIGATION MEASURES

The following chapter describes the overall possible impacts of said project on the physical, biological and socioeconomic environment due to the location, design, during construction phase, during operation phase of the project and mitigation measures to minimize the significance of the possible impacts. The anticipated impacts related to propose project M/S Sand Excavation through dredger Situated Saggian District Lahore have been assessed and mitigation measures provided accordingly.

4.1 Assessment of Potential Impacts

4.1.1 Assessment Criteria

The impacts were assessed in the light of criteria given as under: -

- Magnitude or degree of impact
- Time and duration of impact
- Likelihood of impact occurrence
- Sensitivity of impact
- Risk related to impact

4.2 Environmental impacts due to the project location

4.2.1 Project Location:

The subject proposed Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore Open land is present.

4.3 Impact

The proposed project is present in the urban area of the district Lahore. According to the Lahore this area is suitable for the project. There is no industrial area present in the area. So, if the proponent/Developer fulfills all the HSE conditions and project development laws and rules than this project will not cause any adverse environmental impacts on the community. Overall, the impacts of this development due to the location are positive on the local community of District Lahore and country.

Nature of impact: indirect

Duration: Long-term

Timing: Operation phase

Reversibility: NA

Likelihood: Low (unlikely),

Consequences: very low or may be positive

4.3.1 Mitigation measures

- Project proponent/Developer should build the boundary wall all around the project.
- Proponent/developers should enhance the road infrastructure within the project and main link road.
- Proponent/Developers should place all the safety and location signs and maps at the specific indemnified place.
- Proper parking arrangements should be maintained during the construction and operational phase of the development
- Location can be considered as positive impact on the community due to the facilities provided to the community.

4.4 Environmental Impacts due to the project design

Subject construction of Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore Proposed project consists of Sand Dredger, that are design on the306.58 Acres the main things are;

- Garden inside the project for plantation
- Solid waste and waste water treatment facility
- Security guard rooms
- Main office
- Separate water storage taken for the firefighting and domestic purposes
- Firefighting instrument room

Following are the major Environmental impacts due to the development related to the design:

4.4.1 Impacts

- Structural stability
- Soil structure and soil bearing capacity
- Emergency exit in emergency situations
- Firefighting system
- Wastewater disposal system design
- Rain water harvesting capacity of the drainage system
- Electricity hazardous

Impact significance: moderate to high or may be negative

Nature of impact: direct

Duration: Long-term

Timing: Constructional phase & Operation phase

Reversibility: NA

Likelihood: moderate to high

Consequences: moderate to high or may be negative

Mitigation measures and recommendations

Following are the mitigation measures and recommendation to minimize the anticipated impacts

- Design and map of the building is approved from the District level. Copy of approved map is annexed.
- Road infrastructure should be according to the laws and regulations
- Emergency exist should be design during the designing phase.
- Firefighting system should be design for the emergency situations
- Waste water drainage should be design vast to bear the rain water capacity of the society.
- Electricity system should be design safe and sound, electricity wires should be covered by thick plastic/electricity resistant covers.

- All the design should be approved from the district to minimize the impacts due to the designing.

4.5 Environmental impacts during the construction phase

Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore has environmental impacts during the constructional phase which are following:

Construction Stage Impacts

Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore During the construction phase may cause the following anticipated impacts/vulnerabilities on the environment:

Impacts on Physical Environments

- Grubbing and stripping
- Leveling and compaction of the land
- Demarcation of project building and other facilities
- Generation of dust during loading and unloading of construction materials.
- Generation of noise on account of vehicular use and construction activities.
- Gaseous emission due to the vehicles and stand by generator (if any)
- Local flooding due to over-use of water and leakage of pipes.
- Safety of construction workers, people in the surroundings and passersby.
- Any outbreak of fire due to electrical and other failures.
- Solid waste generation due to domestic and construction activities.
- Wastewater generation from the domestic and constructional activities
- Ground water quality affects due to the development

4.6 Impacts on Biological Environments

- The project site is devoid of any significant vegetative cover. Only few plants are present. Nil impact is envisaged.

- The fauna including wildlife species do not exist at the project site. The impact will be nil.

4.7 Impacts on Socio-economic Environments

- Because of presence of security guards round the clock the security at the project site will improve as well as in its vicinity. Impact will be moderate positive.
- Land value in the surrounding area will increase due to completion of the present project. Impact will be moderate positive.
- The project does not involve dislocation of the people. There is no requirement of resettling a single person. Impact is nil.
- No movable or immovable property and infrastructure of public and private sectors will be lost or damaged during construction and operation stages. Impact will be nil.

4.8 Operation Stage

Following points must be implemented during the operation stage.

- Keep water supply, sewerage disposal and electric supply in working condition.
- Wastewater will pass through Septic tanks Then it will be disposed in existing nearby sewer drain
- Solid wastes and sweepings will be stored in properly placed bins and handed over to contractors.
- Keeps the firefighting arrangements in working condition at all times at oil storage area. Contacts of fire brigades are displayed at prominent places in the project's building.

4.9 Potential Environmental Enhancement Measures

The proposed project will be installed with all precautionary measures to enhance and safe the environment. Following necessary measures will be adopted during construction and operation:

- Sprinkling of water will be done on dusty road and tracks
- PPEs will be provided during construction activity

- Constructional waste and domestic solid waste will be disposed-off or utilized properly
- Local people will be informed in advance when work is about to start in an area
- Machinery will never be left unattended
- Efforts should also be made to discuss traffic conditions so that regular traffic is not disturbed. Transporters engaged for the project would be forced to adhere to the load specifications of the access road. No overloading would be allowed in any case.
- Safety signs and boards will be placed during construction
- Air pollution controlling devices will be installed within the project during operation
- Machinery will be kept maintained
- Proper SOPs will be followed with proper schedule along with the HSE conditions
- Area will be restored with native plants. A proper tree plantation plan will be formulated to save the environment
- Solid waste will be handed over to contractors and agreement will be made.
- Noise will be controlled by adopting proper measures
- PPEs will be provided to workers during working
- Firefighting equipment's and system will be installed
- Safety signs will be placed at all locations where required
- Hygienic conditions will be ensured and proper quality will be maintained by quality control testing.
- First aid facilities will be made available
- Any possible measure will be adopted to make the project safe and environmentally friendly.

4.10 Planning, Site Selection and Design Stage

4.10.1 Land Use Planning

The present plot was empty for long time. Construction of the project will provide the optimum use of this resource.

4.10.2 Presence of Hazardous Conditions

The site is free of any natural and man-made hazardous conditions to cause any negative impact.

4.10.3 Environmentally Sensitive Areas

The area is essentially barren land. Therefore, environmentally sensitive localities do not exist.

4.10.4 Disturbance to other Site Users

The site is not used by others as it is the property of Construction of Project.

4.10.5 Availability of Essential Services

Water supply, drainage and sewerage disposal systems are present at proposed site.

4.10.6 Water Supply

Water is needed for cleaning, fire protection and for drinking purpose. Minimum one day's reserve will be kept at the project site. Water will be tested for chemical and bacterial contamination.

4.10.7 Storm Water Drainage

Storm water run of will be directed into drains.

4.10.8 Waste Water

Waste water will be treated in septic tanks and then directed to drains.

4.10.9 Communication Infrastructure

The project site is well served by road network.

4.10.10 Availability of Construction Materials

The contractors either provide the construction materials like cement, steel and bricks at the site on as required basis or these are procured by the proponent. All the construction materials are locally available.

4.10.11 Skilled and Unskilled Labor

These workers are available at economical rates all the time. The project provides the jobs to the local residents as well as to those from the suburban areas.

Extensive operational & maintenance training will be imparted to staff through well-defined training program before and during system commissioning.

4.10.12 Extraction of Ground Water

The water requirement will be fulfilled by the project proponent.

4.10.13 Traffic Issues

Vehicle access is required especially for transportation. The site is well served with the road network. Heavy traffic will be allowed only during tight time during construction phase. The traffic issues at any stage of project life cycle will not arise.

- 4.11 Operation Stage
- About 10-15 persons will occupy the project site. The projects' operations will be kept in working condition so that the workers may give their input in environment friendly conditions.
- Management Committee will supervise the smooth functioning of the project site. All the activities will be managed by the qualified and experienced engineers.

4.11.1 Types of Negative Impacts

4.11.2 Minor Impacts

These are of minor intensity. For mitigation of the minor impacts routine and limited actions are required.

4.11.3 Moderate Impacts

These impacts need specific and additional mitigation measures.

4.11.4 Major Impacts

These impacts have severe adverse impact. These are intolerable. All possible preventive and multiple control measures are adopted to minimize their intensity and duration.

4.11.5 Groundwater Quality and Level

The proposed project would not affect the quality and level of groundwater. Projected impact is nil.

4.11.6 Land Utility

It will increase significantly since the project has been planned to be constructed on the existing unused area.

4.12 Purpose of Mitigation measures

Purpose of mitigation measures should include:

- What is the problem i.e., in terms of "major environmental impacts" which may arise by the subject project activity?
- When the problem will occur and when it should be addressed
- Where the problem should be addressed
- And how the problem should be addressed

The major impacts may arise by the subject project, particulate matter, dust, noise, solid waste, and waste water. Other impacts are of minor importance. These impacts will arise during construction and operation but precautionary measures will be adopted prior to start the activity, during the activity and post activity.

Any impact that would arise due to the subject project activity will be addressed on site. Trainings will be conducted on site prior to start work while other precautionary measures will also be adopted to make the project safe and environmentally friendly.

HSE manager/environmental manager along with site manager will be appointed to assess any impact that could be arisen during both phases. He would be responsible to address the problem and to mitigate it.

4.13 Ways of achieving mitigation measure

By adopting proper mitigation measures, any anticipated major or minor environmental impacts could be controlled or mitigated. The detail of impacts and mitigation measures have been discussed previous chapters.

Management of Construction of project shall take appropriate measures to provide pollution free and safe environment during the proposed project activity by implementing improved management practices and monitoring techniques suggested in EMP.

Construction of the project will adopt such plan that will assure the minimum impact on the environment and health by implementing proper mitigation measures. Design of the plant will assure the structure stability and plant life in a long run.

Project will develop Restoration/ reclamation or tree planation plan to restore the project area. Maximum Plantation will be done with native species within the unit, along the boundary wall and along the road side if directed by EPA. Also, in-front of main area, horticulture plan will be formulated and area for this will be kept reserved.

4.14 Undertaking

The proponent has committed to comply with the relevant construction by-laws/ safeguards and the environmental enactments for the environmental preservation. Project proponent has given Undertaking and Affidavit a respectively

CHAPTER # 5

ENVIRONMENTAL MANAGEMENT PLAN & MONITORING PROGRAM

5.1 Purpose and Objectives of the EMP:

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified in the EIA
- Define the responsibilities of the project proponent.
- Define a monitoring mechanism and identify monitoring parameters in order to:
- Ensure the complete implementation of all mitigation measures
- Ensure the effectiveness of the mitigation measures
- Provide a mechanism for taking timely action in the face of unanticipated
- Identify training requirements at various levels.

5.2 Management Approach:

The overall responsibility for compliance with the environmental management plan rests with the project proponent.

A certain degree of redundancy is inevitable across all management levels, but this is in order to ensure that compliance with the environmental management plan is crosschecked.

5.3 Institutional capacity

Following functionaries will be involved in the implementation of EMP:

- Project Proponent
- HSE/Project Manager
- In-Charge Administration
- Supervisor of project
- Environmental Engineer

Training for the management/contractors/engineers and workers on environmental aspects of the project will be arranged. It will be imparted by a team of experienced trainers.

5.3.1 Training of building contractor

Training of building contractor & workers will be the part of the TORs regarding the construction of the project. The provisions given in Environmental impact Assessment (EIA) Report *Chapter 5 Screening of Potential Environmental Impacts & Their Mitigation Measures* will be followed.

TORs will be including the training and submission of reports in the following area:

1. Handling of Machineries in a safe way
2. Use of PPEs
3. Maintenance of vehicles and submission of Environmental Monitoring Reports
4. Maintenance of Water Consumption records
5. Testing of water and waste water and submission of Environmental Monitoring Reports
6. Placement of safety signs/boards during construction
7. Sprinkling of water on the roads and dusty tracks
8. Monitoring of generator emissions

Training regarding all other aspects of HSE will be ensured by the contractor during the construction phase.

5.4 Responsibility of EMP

Overall responsibility for implementation of EMP will be that of project proponent. He will appoint an HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage the all HSE condition at the PEQS.

Sr#	Concerned Persons	Duties
1	The Project Manager	Following will be the responsibilities of the Project Manager • Ensure that the contractor is aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regards to environment • Ensure that all stipulations within the EMMP are communicated and adhered to by contractor(s) • Monitor the implementation of the EMMP throughout the project by means of site inspections and meetings. This will be documented as part of the minutes of the site meeting documents • Ensuring project execution within defined budget and timelines

		• Conducting regular check of the project status and meetings with project team • Provide support and guidance to project team as and when needed • Project Manager is expected to continually monitor and improve the overall performance of their operation
3	Site Engineer	Following will be the responsibilities of the Site Engineer during the construction and operational activities: • Be fully conversant with the EIA and conditions of its approval • Be fully conversant with the EMMP • Be fully conversant with all relevant environmental legislation, policies and procedures, and ensure compliance with PEQS • Have overall responsibility for the implementation of EMMP • Conduct audits to ensure compliance to the EMMP • Liaise with the Project Manager or his delegate, the Environmental Officer and relevant discipline Engineers on matters concerning the environment • Prevent actions that will harm or may cause harm to the environment, and take steps to prevent pollution on the site • Confirm activities to the demarcated construction site
4	HSE Manager	In addition to the health and safety responsibilities held by staff, managers and supervisors must do whatever is reasonably practical to ensure that both the workplace and the work itself are safe. This includes: • Ensuring that staff are appropriately trained and supervised • Identifying, assessing and managing health and safety risks • Consulting with workers (including staff, affiliates and contractors): i. Health and safety risk assessments ii. Decisions are made about the measures to be taken to eliminate or control these risks iii. Health and safety risk assessments • Implementing health and safety risk management programs relevant to their operations, teaching, research and consulting functions and work environment • Reporting (to the Human Resources Unit), investigating and responding to all hazards, accidents, incidents and taking action to control the risk • Assisting with the development, implementation and maintenance of a return-to-work program for injured staff. • Be fully conversant with the EIA and conditions of its approval • Be fully conversant with the EMMP • Be fully conversant with all relevant environmental legislation, policies and procedures, and ensure compliance

		• Convey the contents of this document to the contractor site staff and discuss the contents in detail with the Project Manager and Contractor • Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMMP • Take appropriate action if the specifications contained in the EMMP are not followed • Monitor and verify that environmental impacts are kept to a minimum, as far as possible • Review and approve construction methods, with input from the Site Manager, where necessary • Ensure that activities on site comply with all relevant environmental legislation • Compile progress reports on regular basis, with input from the Site Manager, for submission to the Project Manager, including a final post excavation audit • Liaise with the Site Manager regarding the monitoring of the site • Report any non-compliance or remedial measures that need to be applied • All environmental problems arising on the construction area will be reported to the Site Manager by the Environmental Manager. Reports on such problems will be submitted to the Project Manager by the Site Manager
6	Contractors and Service Providers	• Environmental management is part of on-site quality management. Under the environmental management plan, the contractor • Shall propose measures to minimize environmental impacts during construction and submit them to the HSE Officer • Comply with the environmental management specifications • In case of having impacts on the environment, the contractor will inform them to the concerned person in time to get instructions and then take next step • Adhering to any instructions issued by the Engineer/Project Manager on the advice of the HSE Manager • Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting • Maintaining a public complaint register • Arrange that all his employees and those of his subcontractors receive training before the commencement of construction

Table 5.1 – Mitigation Measures

Environmental Management Plan of M/S Sand Excavation through dredger Situated at Saggian District Lahore

Environmental and social aspects	Measures	Responsibility
Construction and noise control plan	Periodic surveys will be conducted for the control of noise level from the construction equipment's, operational machinery and vehicles. Noise control measures will be implemented	Administration
Dust emission control	Water will be sprinkled on all the exposed sites to suppress the emission of dust.	Administration
Vehicle and equipment exhaust control	All vehicles and other equipment used during the construction will be tuned and maintained in good working condition in order to minimize the emission of pollutants.	Administration
Water conservation plan	Groundwater being extracted for construction activities would be recorded, where possible, water would be recycled.	Administration
Community safety plan	The said project is nowhere within the vicinity of river area but still fence surrounding the site will be put in on during the construction to prevent assesses. All entry points into the construction site will be staffed 24 hours a day. No machinery will be left unattended, particularly in the running condition. Night time driving of the project vehicle will be limited.	Administration
Soil contamination	Spills trays will be provided and used at refueling locations. Emergency plan for the spill management will be prepared and inducted to the staff for any incident of spill. Fuel, lubricants and chemicals will be stored in the covered bounded area.	Administration

Sr. #	Project Component or Impact	Target	Action	Responsibility
01	Overall environmental impacts	To reduce overall negative impact of the project and structures on the environment and conserve natural resources.	• Should take all possible measures to ensure that operation of the project does not harm the environment	Proponents/ Management
02	Noise & Vibration	To ensure that the noise levels do not exceed the limits.	• Put silencers on the machines. • Isolators should be made for the absorption of vibrations. • Workers should be told and encouraged to use PPE's (ear plugs or ear muffs).	Proponents/ Management
03	Water Conservation	To conserve water	• Workers should be regularly advised on importance of water conservation so as to preserve water	Proponent/ Management Committee
04	Air Quality	To ensure that the pollution levels do not exceed the limits	• No waste should be burnt at the premises. • Workers should be advised to keep their vehicles and machines in good working order to minimize emissions. • Scrubbers will be installed to minimize the pollution produced from un-burnt gases.	Management
05	Traffic congestion	To mitigate the traffic problem	• There should be prohibition on roadside parking. • Parking spaces would be provided within the area.	Proponent/ Management

06	Energy Conservation	Conservation of energy and use of environmental-friendly energy sources	• Efforts should be made to ensure that energy is conserved and that environment-friendly techniques are adopted too.	Proponent/ Management
07	Solid Waste Management	To manage waste in an environment friendly manner.	• The solid waste from the project should not be allowed to pile up at the temporary storage site. • Generated solid waste should be disposed-off according to TMA facilities.	Proponents/ Management
08	Security	To secure the lives of employees and nearby area.	• All possible measures should be taken to maintain security at all times.	Proponents/ Management
09	Emergency Response	To deal with any emergency efficiently.	• You should have an emergency escape plan in place.	Proponents/ Management
10	Environmental Monitoring	To ensure that periodic reports on environment at the project site are furnished to EPA in pursuance of conditions of the environmental approval.	• A mechanism should be employed for Environmental Monitoring at the project when it comes into operation	Proponents/ Management

5.5 Environmental Technical Assistance and Training Plan

In order to raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. HSE/Project Manager should play a key role in this respect and arrange the training programs.

HSE/Project Manager will provide training to staff and workers about the best environmental management practices at the construction site and affective implementation of the EMP.

The training modules will include air, noise and water pollution monitoring, social awareness, Environmental Laws, Punjab Environmental Quality Standards (PEQS),

Usage of personal protection equipment's, and health and safety related issues on the construction site.

The HSE/Project Manager will train all workers & staff in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of Sexually Transmitted Infections (STI) HIV/AIDS and in general health and safety matters, and on the specific hazards of their work. Training should also consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation.

HSE/Project Manager will arrange Training on monthly or quarterly basis regarding health & safety, hygiene, firefighting and first aid.

Table 5.2 – Training and Capacity Building Plan

Training and Capacity Building Plan		
Potential Impacts	**Construction Phase**	**Operation Phase**
	Due to construction phase, following issued will occur: • Noise Pollution from Vehicles • Fugitive Dust Emissions • Solid Waste • Air Emissions • HSE • First Aid Training	During operational phase, nearby society will face problems like: • Air Pollution • Noise Pollution • By-products • HSE • First Aid Training
Mitigation	**Training and Capacity Building Plan**	
Management Plan	**Training and Capacity Building Plan** Project will ensure in-house training for the project staff, labour and the supervisory staff of the Proponent/EA through the provision of one day basic training and one day advanced training, covering environmental and social aspects of the projects in general, and implementation requirements will emphasis on the development projects in general, and implementation requirements with emphasis on the roles and responsibilities of the staff and the labour while executing the	

	environmental monitoring plan in particular. The training protocols will include the following aspects: • Procedures for monitoring the air quality parameters and measures to be adopted for avoiding or minimizing air pollution, particularly from the transportation, handling of the by-products, biological, chemical and physical hazards • Procedures for monitoring water quality parameters and measures to be adopted for avoiding or minimizing water pollution, particularly from the wastewater effluent generated from municipal uses and in the process activity • Safe waste disposal practices • Safety measures against hazards for workforce and the local communities arising from the construction activities • Use of safety gadgets by the workforce • Training for the use of PPEs		
Monitoring	**Responsibility**	**Responsible**	**Monitoring Duration**
	Training of staff, vehicle operators and labour	Project Manager / HSE Manager	1 day training once a year

Summary of Environmental Impacts and Mitigation measures is present in following table in term of Environmental Management Plan:

Table 5.3- Air Quality Management and Monitoring Plan

Air Quality Management and Monitoring Plan		
	Construction Phase	**Operational Phase**
Potential Impacts	Emissions resulting from construction activities are vehicular emissions and diesel emissions from generators. It includes: • Carbon Monoxide • Nitrogen Oxides • Particulates • Fugitive Dust	The odour will be the most significant form of air pollution in the processing unit. Major processes that generate odour includes; from storage areas, wastewater treatment and rendering.
Mitigation	Regular water sprinkling, proper tuning and maintenance of equipment/vehicles used and	Although the odour is considered to be negligible as the loader will carry the waste once a day and waste will be carried in closed containers. It will be ensured that the

	implementation of best management practices.	waste material is kept in the closed containers and will regularly move from the site.
Plan	• Regular sprinkling of water will be done to control the suspended dust particles during the construction phase • The transporting vehicles and generators will be maintained on the regular basis • Enforce speed limits to reduce airborne fugitive dust from vehicular traffic • Re-vegetate disturbed areas as soon as possible after disturbance • Regular water sprinkling to suppress the fugitive dust emissions • Cover dump trucks before travelling on public roads • Train workers to handle loose materials and debris to reduce fugitive emissions • Water sprinkling will be done on the regular basis during the construction phase • Good quality (low-sulphur) fuel will be used for vehicle and machinery • Visual inspections to detect air pollution generated during the construction phase will be carried out on the regular basis • Minimize the land disturbance as much as possible • Do not alter existing drainage systems • Frequent maintenance of refrigeration lines to prevent ammonia leaks • Ammonia leak detection system should be installed to monitor the ammonia gas leakage. • Evacuation procedures must be carried out to prevent dangerous exposures of ammonia • Indigenous tress around the facility will be planted to control the odour and air pollution • Bio-filters can be installed to control the odour • Odour monitoring should be under-taken on the regular basis • All screw conveyors use in the process will be covered with bolt on covers • The covers are removed only to allow maintenance to be carried out • Avoid movement of the vehicles during peak traffic hours • Regular water sprinkling will be done in order to control fugitive dust emissions, that may become cause the deterioration of the water resource • Rehabilitation of areas outside of the site security fence will be undertaken by the successful implementation of the landscaping plan • Tree species like Dalbergiasissoo, Cassia seamea, Acacciamangiumand Peltaphorum can be planted in areas as they have high growing rate as well, they will help in noise, dust and pollution reductions.	
Monitoring	**Responsibility**	**Responsible**	**Monitoring Duration**
	Preparation of required or requested information for submission to the	Project Manager/Contractor	As & when required

	Project Manager including air quality monitoring data Liaising with the Project Manager with respect to all significant air quality matters		

Table 5.4 – Health and Safety Management and Monitoring Plan

Health and Safety Plan Management and Monitoring Plan	
Physical Hazards	The health and safety risks to workers include but are not limited to: • Proper training will be provided for the proper use of the cutting equipment and personal protective equipment (PPE) will be provided which will include metallic gloves and leather aprons for cutting related activities • It will be ensured that operation is carried out by the individuals who have received the correct training and have subsequently been approved • Floor will be kept dry through regular housekeeping practices • Journey management plan will be developed • Measure to reduce the exposure to heat and cold from the cold store will include the usage of the strip curtains to avoid extensive wind drafts • Proper radiation shielding may be provided • The time of exposure to the extreme cold temperature will be cut down and reduce significantly • Dry boots and insulation gloves will be provided to the workers in addition to the other PPEs
Chemical Hazards	Following mitigation measures will be adopted: • Personal Protective Equipment (PPEs) should be given to workers including protection and impermeable clothing for use during disinfection • Wearing of the PPEs should be regulated strictly by the concerned authority • Chemical spillage will be avoided by developing proper SOPs for the handling of the chemicals • Chemicals and detergents will be stored properly and all precautionary measures will be adopted
Biological Hazards	To control biological hazards following mitigation measures will be adopted: • Proper ventilation system will be designed to avoid the accumulation of the dust and aerosol in the working area • Humidity will be maintained in the facility • All the waste/by-products will be stored in the closed containers to eliminate the chances of vector production

	• Workers personal hygiene will be ensured by the segregating work and welfare facilities • Appropriate Personal Protective Equipment (PPEs) will be provided to the workers which will include protective clothing, gloves and masks • All waste material will be properly managed and will be removed on the daily basis to avoid the exposure of the hazard
Security Risks	To eliminate the security issues following mitigation measures will be adopted: • Proper Security will be provided to the workers • Security guards will be appointed • Before hiring any worker and his criminal record may be checked • CNIC of all the workers will be kept by the Proponent • Strict law will be enforced to control the crime at site

5.6 Biodiversity Management and Monitoring Plans

As far as the management plans are concerned, they will protect the environment and mitigate the adverse impacts but, in order to keep in check, the whole biodiversity of the project and study area a bio-diversity plan is required. During construction and operational phase there would be a removal of flora from the designated areas. The biodiversity plan is designed to mitigate the immediate as well as after effects. The detailed bio-diversity management plan includes the following sub-plans:

Table 5.5 – Biodiversity and Invasive Plants Management and Monitoring Plan

Procedure for Prevention/Mitigation of Impact from Invasive Plants	
Potential Impacts	If suitable controls are not adopted in vasive species could colonize the site, reducing biodiversity and threatening the ecology of the area. It would largely impact flora and fauna of the area. Although Lahore District is not rich in biodiversity. The remnants of the native vegetation will be at the verge of disturbance and removal.
Management Plan	• Sowing/planting will be undertaken as soon as possible following the closure of the exhausted pit, to reduce the likelihood of the exposed areas being colonized by invasive and non-native species which are of lower ecological values

	• Reasonable precautions will be taken during operational phase to avoid the spreading of soil borne pests and diseases, animal and crop diseases and invasive species. • The ecological; verification walkover of the whole site will check the status of known stands of alien/invasive plants and record any new stands
Monitoring	Monitoring will be undertaken by HSE Manager throughout project life.
Emergency Measures	• Environmental Coordinator to be informed immediately if any new stands of alien or invasive weeds are found. • Where invasive species are found, an environmental exclusion zone will be created. This will entail a physical fence and proper signage. • A liaison with local to check the specific arrangements they require for the disposal of constructional waste arising, which may be treated as hazardous waste

5.7 Decommissioning Plans

Following management plans will be adopted to manage habitat during operational as well as at the end of the operational phase to reduce the envisaged impacts. At the end of the operational phase following practices will be adopted to reclaim and restore the site:

Table 5.6 – Habitat Management Plan

Habitat Management Plan	
Potential Impacts	If suitable mitigation was not implemented chance of loss or damage of valuable local habitats could arise. This would reduce local biodiversity and the rate of soil erosion will increase many times.
Management Plan	• If required by the HSE Manager will be constrained to a prescribed working corridor thereby reducing damage to habitats, potential direct mortality and disturbance to species • Existing trees and vegetation will be retained wherever practicable and incorporated with new planting proposals • Vegetation buffer strips will be maintained where practically possible. • Vegetation clearance will involve the removal of the shrubs and grasses be agreed with the HSE Manager and Contractor, if required • An environmentalist will perform a pre-clearance site visit to advise the contractors on which trees can be retained as they are which can be retained with some remedial works and which need to be removed • Where the removal of dead standing is necessary, the material will be relocated into areas of existing and newly created green zone within the limits of the site where practicable.

- Sowing/planting will be undertaken as soon as possible to reduce the likelihood of the areas being colonized by invasive species which are of lower ecological value.
- During the operational phase, management and maintenance of roadside verges is to be undertaken to maintain and enhance floral diversity
- Appropriate management will be undertaken of existing bound habitats such as hedges for the conservation concern for; tree sparrow (Passer montanus), House Sparrows (*Passer domesticus*), House Crow (*Corvussplendens)*, Domestic Pigeon (*Columba liviadomestica)*, Parrot (*Psittaciformes*), Quail (Coturnixcoturnix), teetar (*Francolinuspondicerianus)*, Doveand Humming Bird.
- Planting will be undertaken to enhance biodiversity and conserve the integrity of existing habitats.

Topsoil Management

- Appropriate sediment controls will be installed at the base of stockpiles to prevent soil loss
- Weed growth will be monitored and subsequently controlled, if necessary.
- Prior to re-spreading, weed growth will be scalped from the top of the stockpiles to minimize the transport of weeds into rehabilitated areas

Management of Remnant Vegetation

- The remnant vegetation present within the consent area will be managed during the life of the project to maintain its ecological values and promote biodiversity
- Strategies include management of grazing impacts, weeds, feral animal control, erosion, sediment control and encouragement of natural regeneration
- One of the aims of remnant vegetation management is to improve connectivity of remnant vegetation patches within the consent area to provide improved habitat corridor function
- Annual inspections of remnant areas will be undertaken by qualified persons to identify any weed or feral animal issues, identify any areas affected by erosion and to assess the extent of natural regeneration occurring. Actions will be taken to address any issues identified

Landscape Management

- The site is to be maintained in a weed free condition and any newly planted trees or shrubs which die, or are destroyed, within 24 months of mine closure shall be replaced in the appropriate season with plants of the same species
- Existing mature trees are to be inspected once annually by a suitably qualified contractor and any arboricultural works are to be carried out accordingly

	• Shrub bed areas shall be maintained as bare earth and kept free from weed growth, litter and rubbish at all times. Any shrubs overhanging pedestrian routes or adjacent grassed areas are to be pruned back. • Pruning of ornamental shrubs should be done to encourage healthy and bushy growth and promote desirable ornamental features, e.g. flowers, fruit, autumn color, stem color. • Smooth flowing curves of edges with adjacent shrub areas to be left neat and well defined.
Monitoring	Monitoring will be undertaken by the HSE Manager throughout the project life. Monitoring of planting and seeding will be undertaken for 5 years after completion of project.
EmergencyMeasures	Environmental Coordinator to be informed immediately if any adverse impact to habitat occurs in the project proximity which is setaside for operation of the project

5.8 Monitoring Plan

Proponent will ensure overall monitoring the project so that all intended activities may take place in accordance with environmental assessment.

5.9 Impacts and their Mitigation Summary

Environmental and social impacts have been identified for the process of project; their impacts had been mitigation by adopting required measures as recommended in EMMP of this EIA Report within the Project Area of Influence. The major impacts on physical, biological and social environment are described as under:

Impacts Summary of Sand Excavation through dredger Over an area of 306.58 Acres Situated Saggian District Lahore

Table 5.7 – Impacts Summary of M/S Sand Excavation through dredger Situated Saggian District Lahore

Environmental Parameters	Impact Assessment during Different Phases	
	Construction	Operational
A: Physical		
Land Resources		
Soil Erosion and Contamination	-2p	0
Transportation	-1t	-1t
Solid Waste and By-Products	-2t	-2p
Land Use	-2p	NA
Organic Fertilizers	NA	+1p

Air Resources		
Noise Pollution	-1t	-1t
Air Emission	-2t	-2t
Dust	-1t	-1t
Odor	NA	-2t
Water Resources		
Ground Water	-1p	-1p
Surface Water	NA	NA
Wastewater	-1p	-2p
B : Ecological		
Flora		
Tree Cutting	-1p	+1p
Fauna		
Terrestrial Fauna	-1p	+1p
C: Socio-Economic		
Food Insecurity	NA	+2p
Employment Opportunities	+1t	+1p
Land Value Appreciation	+1t	+2t
D: Hazards		
Biological Hazards	NA	-1p
Physical Hazards	-1t	-1p
Chemical Hazards	0	-1p
Health and Safety	-1t	-1p
Legends: 1= Low; 2= Medium; 3= High; 4= Extremely High; NA= Not Applicable; t= Temporary; p= Permanent; app= Applicable; 0= Negligible		

5.10 Need for Disaster Management and Emergency Response System

In order to cope up with the possible hazards it is imperative to prepare the Disaster Management Plan and rehearse it frequently. To evaluate effectiveness of the system preparedness exercises and drills should be undertaken frequently. Small courses should be run to train the relevant persons about their actions during emergency. The administration staff need be familiar with the firefighting procedures and equipment.

5.11 Components of Fire Management Plan

5.11.1 Background Information

The likely causes of the breakout of fire are short-circuiting of electricity, throwing of cigarette, combustible materials catching fire and damaged gas pipes.

5.11.2 Immediate / First Line Actions

The occupants must evacuate the using the stairs, ramps & lobby and emergency exits. Evacuation plan should be hoisted at many places. Evacuation of building should be completed within 2/3 minutes time.

5.11.3 Calling the Fire Brigades

The contacts (telephones, call and fax numbers) of local fire brigades should be boldly written at each floor on the notice boards so that any person may call them for immediate assistance. Information about the firefighting facilities in the nearby urban centers should also be handy all the time.

5.11.4 Medical Aid

Information be immediately passed to the nearby medical hospitals and centers for recovery of the wounded persons. First aid boxes should be kept at suitable places. Some of the employees should obtain formal training about medical first aid

5.11.5 Fire Fighting Procedures

- To ensure availability of adequate water for firefighting purpose dedicated water tank should be earmarked.
- It should be ensured that during firefighting operation enough space is available for movement of vehicles and personnel.
- In addition to the above the firefighting personnel from Fire Brigade Department should be in possession of the required pieces of equipment like fire man suit, fire blankets, Fire torch special for looking in smoke, gloves (rubber & canvas), goggles, helmets plastic, gum boots, gasmasks, Oxygen cylinder/breathing apparatus, fireman axe, shovel, first aid box (complete), ladder, metal detector.

Regular monitoring of all the significant environmental issues is essential to check the compliance status of EMP. The main objective of the monitoring will be;

- To verify the results of the environmental study with respects to the proposed project.
- To estimate the trends of concentrated values of the issues, which have been identified as critical and then planning the mitigating measures.
- To assess the efficiency of pollution control mechanism.

To ensure that any additional parameters, other than those identified in the EIA report, do not turn critical after the commissioning of said project.

5.12 Aim of Monitoring

The aim of monitoring is to oversee the environmental performance of the project through its lifecycle enforcing the PEQS. Timely implementation of mitigation measures leads to sustainable environmental management of the project.

5.12.1 Environmental Monitoring Plan

- The monitoring will be carried out in accordance with PEQS.
- Monitoring program will be undertaken for compliance of mitigation measures.
- Monitoring for various parameters will be done during construction, commissioning and operation stages.

5.13 Performance Indicators

The performance indicators / parameters having significant impact on physical, biological and socio-economic environments will be evaluated. These are given below:

- **Ambient Air Quality**
  PM10, CO, NOx, HC and SO2
- **Water Quality**
  TDS, TSS, COD, oil and grease, chloride, lead, zinc and cadmium
- **Noise Levels**
- **Soil Quality**
  Lead, chromium, cadmium hydrocarbons
- **Tree plantation**

5.14 Environmental Monitoring Cell (EMC)

EMC of this project will undertake monitoring of the Safety, Health and Environmental Aspects. It will ensure implementation of EIA report and apprise the General management of the project on fortnightly basis.

5.15 Environmental Technical Assistance and Training Plan

In order to raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. Environment/HSE/Project Manager should play a key role in this respect and arrange the training programs.

Environment/HSE/Project Manager will provide training to staff and workers about the best environmental management practices at the construction site and affective implementation of the EMP.

The training modules will include air, noise and water pollution monitoring, social awareness, Environmental Laws, PUNJAB Environmental Quality Standards (PEQS), Usage of personal protection equipment's, and health and safety related issues on the construction site.

The Environment/HSE/Project Manager will train all workers & staff in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of Sexually Transmitted Infections (STI) HIV/AIDS and in general health and safety matters, and on the specific hazards of their work. Training should also consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation.

Environment/HSE/Project Manager will arrange Training on monthly or quarterly basis regarding health & safety, hygiene, firefighting and first aid.

5.16 Monitoring of Quality

The EMC will arrange monitoring of the quality of air, water, noise and waste water on quarterly or monthly basis from any EPA Certified/approved laboratory if required.

5.16.1 Monitoring Stages/Plan

Monitoring Stages

Monitoring of environmental parameters need to be carried out during the following stages in addition to post-project period:

- Construction Stage
- Operation Stage

5.17 Monitoring Plan

Following aspects need to be monitored during construction and operation stages:

- Air quality
- Water quality
- Noise level
- Management of utility services including water supply, sewerage disposal, electric supply and solid wastes.

EPA Certified conducted the monitoring for environmental parameters for Noise level at proposed building at different locations, and Ambient Air, Waste water and results for those are incorporated within this report.

Table 5.8 – Summary of Impacts and their mitigation measures

Serial	Environmental Issues/ Impacts	Mitigation Measures
PLANNING, SITE SELECTION AND DESIGN STAGE		
1	Observance of administrative and legal formalities	It is recommended for obtaining of approval from other relevant departments
2	Acquisition of land	The proposed land is the property of the project proponent.
3	Loss of environmentally sensitive areas	There is no any sensitive area near the project site however the project proponent will achieve the PEQS at the boundary wall of the subject project to avoid the environmental impacts on the nearby industrial unit
4	Changes in traffic pattern	There is no need to change the traffic pattern due the development of the subject project because no. of industries has been developed at the same link road only few vehicles will visit the project on daily basis.
5	Potential conflicts with stakeholders	There is no any conflict at the current stage of the project. Neighboring industries were visited regarding their concerns. They have no any objection regarding development of the subject project as per proposed design.

		It is recommended to Settle the issues through scoping and specific group discussions.
6	Resettlement issues	No resettlement issues
7	Project Design	Structure Stability Assessment of soil has been done, as per building design i.e., total area of building. (Annexure- B) Provision of Emergency Exits, Assembly Points, firefighting arrangements, water storage for firefighting should be incorporated in the design. Installation of Dust/flue gases/odor controlling devices should be incorporated in the design. Project proponent is committed to provide all these provision in the design of the project.
SITE DEVELOPMENT STAGE		
1	Erosion due to stripping and site clearance	Sprinkling of water on road side or dusty tracks
2	Generation of dust	• Careful loading and unloading of materials are recommended. • Sprinkling of water on site and surrounding areas is recommended.
3	Generation of noise	• Avoid suing forbidden horns at the site. • Do not throw heavy equipment and construction materials in haphazard manner.
4	Local flooding/ponding	Immediate repair and maintenance of water supply pipes and sewers in case of any defect will be undertaken.
5	Outbreak of fire	Firefighting equipment must be maintained at the site in good working condition.

6	Safety	• Safety of the workers and others must be ensured. • Privacy of the neighbors must not be disturbed.
7	Labor issues	Employ the local labor as far as possible Wages of the labor should be as per Government policy
ESTABLISHMENT STAGE		
1	Contamination of land and water	Hazardous substances like oil, fuel, etc. should be kept on concreted surface. Essential services like water supply, sewerage disposal and solid waste management must be in working condition.
2	Impacts of dust, noise and flue gases on neighbors	Sprinkle water on dusty tracks is recommended Avoid suing forbidden horns at the site. Do not throw heavy equipment and construction materials in haphazard manner. Proper tunings of vehicles and machinery must be ensured. Schedule construction timings should be implemented for minimum disturbance to neighbors. Continuous Environmental monitoring must be ensured as per proposed monitoring plan.
OPERATION STAGE		
1	Contamination of land and water sources	Continuous vigilance on maintenance of services Tarpaulin sheets must be placed to avoid leaching of oil into ground
2	Fire breakouts	Training of workers regarding flammable substances will be ensured. SOPs of fire prevention will be adopted like forbidden of smoking, regular testing of electricity

		infrastructures and regular testing of gas supply system to UNIT Firefighting equipment must be kept in working condition at site
3	Safety/security concerns	Safety of the workers and others will be ensured. Privacy of the neighbors will not be disturbed.
4	Malfunction of utilities	It is proposed to appoint maintenance engineer with technicians like plumber and electrician for smooth operation of utility services.
5	Occupational Health, Safety and Environment	• Regular medical check-ups must be ensured to improve the working condition and efficiency of workers. • Relevant safety devices like belts, gloves and testers must be strictly used by the operators at the work site. • Safety of management, workers and visitors must be ensured. • Observance construction and safety codes must be ensured. • Provision of emergency exits must be ensured.
6	Production of Solid Waste	• Area for solid waste must be reserved within the subject project. • The solid waste must be managed on regular basis. • The domestic waste will be disposed-off in environment friendly way.

5.19 Equipment Maintenance Detail

The subject project is Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore the proponent of the subject project will maintain records for Health Safety & Environment and will hire Environment/HSE manager to check and deal with the HSE issues. The subject project will maintain medical facilities, firefighting Equipment's as

fire buckets, fire hydrants and fire extinguishers and records for their periodic fillings or replacement and will ensure proper housekeeping and essentials facilities.

5.20 Environmental Budget

The cost required to effectively implement the mitigation measures is important for the sustainability of the Project both in the construction and operation stages of the Project. Project proponent will allocate the Environmental Budget for the Training, maintenance and management of Environment is 50,000/- quarterly that will include filling and maintenance of equipment's, restoration, plantation, and strategic planning to cope with any emergency situation and formulate the disaster management plan to cope with natural disaster. Any equipment or devices failure or replacement will not be included in this budget.

Chapter 7

Stakeholder Consideration

STAKEHOLDER CONSULTATION & DISCLOSURE

7.1 EIA and Public Consultation Process

Stakeholder participation in planning and management of the social and environmental issues assists in reducing the concerns of stakeholders and hence increases public acceptance towards development programs. Consultation process entitles the stakeholders with opportunities to participate in key decisions that will affect their lives. Therefore, detailed public consultation meetings were arranged at different levels of the planning process. For this purpose, periodic consultation meetings were held with various project stakeholders. Different aspects and impacts of the proposed project were highlighted regarding their impacts on the physical, biological, and socio-economic environment of the project area. Stakeholders' trepidations regarding various aspects like existing environment, and impacts of the project on the surrounding environment were emphasized and have been added to this EIA report.

Objectives of the Public/Stakeholders Consultation

Public consultation plays a vital role in studying stakeholders' perspectives regarding the project and henceforth the successful implementation and execution of the proposed project. Public involvement is a compulsory feature of Environmental Impact Assessment, which leads to improved and acceptable decision-making. The primary objective of the stakeholders' consultations was to learn and know the apprehensions, concerns, and opinions of the key stakeholders over environmental implications of the project activities from public perception. The consultation sessions also served as a source of firsthand information about the users and the beneficiaries' expectations from the project. Dialogue with the stakeholders and recording their concerns at appropriate stages of the project would help to tailor the project in line with stakeholders' aspirations and so increases the likelihood for public acceptance of the project and its subcomponents. It also helps to develop and maintain communication links between the project proponents and stakeholders, providing opportunities to the public to influence the project design in a positive manner. This ensures that the views and concerns of the stakeholders are incorporated into the project design and implementation with the objectives of reducing or offsetting negative impacts and enhancing benefits of the proposed project.

7.3 Methodology

7.3.1 Identification of Major Stakeholders

The consultation process began with the identification of the most pertinent stakeholders. Identification of the stakeholders for the proposed project plays a crucial role in development and also assists in quantifying the role of different stakeholders involved. Impacts identified by the stakeholders are measured through matrix method and mitigation measures are proposed according to the intensity of the identified impacts. Efforts were made to identify the relevant stakeholders through a systematic process based on the nature and degree of their actual and perceived stakes related to the project.

7.3.2 Issues Discussed with the stakeholders

Following issues were discussed during the stakeholder consultation meetings:

- Concerns, apprehensions, and views of the community and the stakeholders over the project activities relating to design, construction and operational aspects.
- Probable adverse impacts of the project activities on various components of the environment i.e., physical, biological, and social components
- Possible remedies for the concerns and apprehensions, how the concerns can be effectively addressed?

Identification of any specific personal or site related concerns

- How the project operations can happen in accordance with user/beneficiaries' expectations?
- Beneficial factors and involvement opportunities of the local people in the set of activities of project during construction and operational phases.
- Material's transport management during construction and operational phase of the project.
- Management of water, wastewater and solid waste during construction and operational phase of the project.
- Natural hazards, associated risks and precautionary measures.
- Traffic issues subjected to activities during different phases of the project.

7.4 Public Disclosure

According to the EIA rules and regulations this report will be compiled and submitted to the Environment Protection Department (EPD) and after the review on the report this report will be disseminated to the public. This dissemination and information sharing exercise will then be followed by public participation through print media in which the public will be requested for their reviews. The copies of the report will be placed in the EPA for comments from the public which will be incorporated in the report. As per rules and regulations, Environment Protection Department will hold a public hearing at the proposed project site.

CHAPTER # 8

IMPACT ASSESSMENT METHODOLOGY

8.1 What is the problem?

The proposed project is the establishment of Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore in addition, to the noise and fugitive dust emissions during the development phase solid waste management and disposal issues may arise along with wastewater disposal issues. The major impact associated with the Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore includes the management of the solid waste and domestic wastewater, biological hazards, chemical and physical hazards during process.

8.2 When problem will occur and when it should be addressed?

The impacts from the Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore will occur during the development and operation due to the civil work involved and the people residing in the project area. These issues included; noise generation, fugitive dust emissions, solid waste management, wastewater disposal, top-soil removal, Health and Safety issues and change in the geographic features of the area. These all problems should be addressed on-site where they are being generated, to avoid the residual or adverse impacts.

8.3 Where problem should be addressed?

The problem will be generated from site development and operation. So, it should be addressed on source i.e., at site within the same timeframe.

8.4 How the problem should be addressed?

Proper mitigations measures will be provided according to the nature of the impacts/problems. For example, against dust emissions sprinkling of water may be done on regular basis, for solid waste proper solid waste management and disposal practices may be adopted, to manage liquid waste proper treatment may be made before discharging into the receiving body.

8.5 Ways of Achieving Mitigation Measures?

Following ways will be adopted to reduce the impacts of the quarrying:

8.5.1 Changing in Planning Design

The Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore, are the controlled system where physical, biological and chemical hazards are controlled or managed effectively the chances of the biological contamination are reduced significantly? There is no endangered and threatened species present in the project area that could be impacted due to the installation of the facility. Moreover, there isn‘t any human settlement or infra-structure that will be dislocated or dismantled due to the proposed project development. No adverse impact is therefore being envisaged due to the installation of the facility in the proposed location as the process employed is controlled as for the management of the wastewater a septic tank will be installed and for the management of the solid waste and by-products a proper waste management plan will be formulated. Hence, there is no need to change the design of project.

8.5.2 Improved Management and Monitoring Practices

The anticipated impacts had been reduced significantly by adopting better management activities, as it will be carried out for betterment of the environment. While environmental monitoring will be conducted on the regular basis to keep the sources of the wastewater generation, solid waste management, by-product management, noise and public nuisances in check. Following practices that need to be adopted to reduce the impact significantly:

a. Compensation in Money Terms

Due to the construction of the facility, the vegetation present on-site will be removed and the geography/landscape of the area will be slightly changed on the permanent basis, however, there is no protected or environmentally sensitive area present within 10.0 km vicinity of the project that could be impacted due to Construction Phase. Hence, no compensation in the monetary terms will be required. However, for the removal of the one tree from the leased area 3-5 trees will be planted as the compensation along the facility boundary.

b. Replacement/Relocation/Rehabilitation

The proposed project is located in river. There is no sensitive, industrial area is present which could be impacted due to the Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore No replacement, relocation and rehabilitation are required because construction and operation of project.

8.6 Prepare Environmental Management Plan

Management plan is already discussed in chapter 6 (Environmental Management and Monitoring plan)

CHAPTER # 9

CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSIONS

The present report presents the Environmental Impact Assessment (EIA). The Proposed project is Sand Excavation through dredger Over an area of 306.58 Acres Situated at Saggian District Lahore. The objective of the project is excavation of the ordinary sand to generate business for the proponent, keeping in view sustainable development and social soundness aspects of the surrounding society. The project will create employment opportunities and improve income earnings. The report highlights all anticipated positive and negative impacts. The project does not pose any serious negative environmental impacts. Adequate mitigation measures have been proposed to address negative impacts arising from the project. During the preparation of Environmental Impact Assessment (EIA) report for the proposed project it is observed and established that the negative environmental impacts are having low to moderate intense ratings or temporary. No depletion, deterioration or exploitation of local natural resources is expected to be caused by the proposed project. It is accordingly recommended that the Environmental Approval for the project may be issued by the Punjab Environmental Protection Agency, subjected to the payment of requisite scrutiny fee by the proponent of the project.

9.2 RECOMMENDATIONS

The Environmental Impact Assessment (EIA)as well as survey results are finally evaluated to recommend the following:

- Adherence to the Environmental Management Plan (EMP) as proposed in this report is mandatory.
- During the construction phase of this project, all the required PPEs should be provided to the workers.
- Proper housekeeping in and around the site must be given consideration.
- Proper plantation must be done as corporate social responsibility (CSR).
- The fire safety precautions must be considered to prevent or reduce the likelihood of fire.
- Placing and maintaining fire extinguishers at easily accessible points.

- Proper safety and information sign boards must be placed at required places.
- Adequate training of workers must be done to deal with the situations.

ANNEXURES

Terms of Reference for Environmental Impact Analysis

1.0 Introduction

Environmental Greentech Services Pvt. Ltd. has been asked to submit the technical proposal for this project to fulfill the legal requirements under Pakistan Environmental Protection Act 1997 (amended 2012).

Part A- Completion of EIA

2. Environmental Impact Analysis

The proponent is required to prepare an environmental assessment study and get approval from EPA prior to commencement of the project.

3. Responsibility of Consultant

The consultant would undertake surveys, conduct studies, consult with the community and compile the EIA report. The EIA should cover all likely construction and operation activities and will include, but not to be limited to, an assessment of the environmental and social impacts relating to the land.

The following tasks shall be conducted for the completion of work.

1) **Procedure of Environmental Assessment**

After the award of work of Environmental Assessment study, consultant will carry out following activities:

a. Kick of meeting with client to collect the requisite information regarding project i.e. Design reports, drawings, feasibility study, topographic survey etc. Site topographical surveys and underground reservoir survey reports will be shared by client.
b. Site survey and environmental monitoring of groundwater, noise, wastewater and ambient air quality.
c. Socioeconomic survey of the area.

d. Secondary data collection from district department (Forest, drainage, meteorological)
e. Assessment of environmental and socioeconomic project and mitigation measures
f. Preparation of environmental management and monitoring plan.
g. Environmental assessment report preparation and submission to client for review and comments if any.
h. Follow up of case in EPA till its final Environmental Approval Responsibilities of the Client

Responsibilities of the Client

I. Provision of necessary documents and studies about the features and description of the project.
II. Provision of copy of the geotechnical study including seismic study.
III. Site topographical surveys and underground reservoir survey reports.
IV. Basic data for quantification of solid waste, water use, wastewater and its safe disposal.
V. Detail of each commercial activity and its expected magnitude. VI. Provision of review fee for EPD.
VI. Health and safety plan. B) Securing NOC and Approval from Govt. Departments.

B) Securing NOC and Approval from Govt. Departments

a. Consultant will prepare and submit a complete final Environmental Assessment report to the client along with requisite documents provided by the proponent for onward submission to EPA Punjab securing NOC.
b. Consultant, as required by environmental law, will submit the report along with bank draft of review fee in the name DG EPA, application, affidavit and undertaking provided by the client.
c. EPA Punjab raises queries on EIA report and sends to the client. At this stage, consultant will reply all the queries raised by EPA. Client will submit the reply to EPA.
d. After the approval of Environmental report, a notice for the committee of experts for the proposed project will be issued by EPA Punjab to the client. Consultant will

prepare and deliver presentation before committee of experts. All the questions raised by committee of experts will be responded by the consultant.

e. After committee of experts, NOC is issued to the client.
f. Consultant will facilitate the client till the issuance of NOC by concerned Government Department from EPA Punjab.

Glossary

- **Ambient:** relating to the immediate surroundings of something
- **Base line:** Conditions prevailing at the time of study or before initiation of any project
- **Baseline:** Conditions prevailing at the time of study or before initiation of any project
- **Discharge:** means spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping
- **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 vapor
- **Environment budget**: Monitory assets reserve for environmental activity.
- **Environment:** means air, water and land; all layers of the atmosphere; all organic and inorganic matter and living organisms; the ecosystem and ecological relationships; buildings, structures, roads, facilities and works; all social and economic conditions affecting community life; and the inter-relationships between any of the factors mentioned
- **Environmental Impact Assessment:** means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, migratory 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
- **Fauna:** Animal life occurring in particular region or time.
- **Flora:** plant life occurring in particular region or time.
- **Human Settlement:** A cluster of at least 50 houses.
- **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 environmental effect for requiring preparation of an environmental impact assessment
- **National Environmental Quality Standards:** means the permissible standards for emission of air pollutants and noise and for discharge of effluent and waste
- **Nuisance:** A person, thing or circumstances causing inconvenience or annoyance.
- **pH:** negative log of hydrogen concentration:

- **Poultry Project:** means poultry related activities like hatcheries, poultry farm, poultry control shed, poultry premises or any other poultry project notified as such.
- **Poultry:** including the species such as chicken, turkey, quail, and pheasant.
- **Proponent:** the person who intends to carry-out a proposed project.
- **Sustainability:** means such developments that meet the needs of the present generation without compromising the ability of future generations to meet their needs
- **Waste:** means any material, substance, or by-product eliminated or discarded as no longer useful or required after the completion of a process

Abbreviation

❖ **EIA**	Environmental Impact Assessment
❖ **EMP**	Environmental Management Plan
❖ **EMMP**	Environmental Management and Monitoring Plan
❖ **EPA**	Environmental Protection Agency
❖ **EPO**	Environmental Protection Ordinance
❖ **ESMF**	Environmental & Social Management Framework
❖ **GOP**	Government Of Pakistan
❖ **IEE**	Initial Environmental Examination
❖ **Km**	Kilo Meter
❖ **Kmp/h**	Kilo Meter Per Hour
❖ **NEQS**	National Environmental Quality Standards
❖ **NOC**	No Objection Certificate
❖ **NWFP**	North West Frontier Province
❖ **PEPA**	Pakistan Environmental Protection Act
❖ **PCGIP**	Punjab Cities Of Governance Improvement Project
❖ **EMMP**	Environmental Mitigation & Monitoring Plan
❖ **WAPDA**	Water And Power Development Authority
❖ **TMA**	Tehsil Municipal Administration

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viii. Bureau of Statistics, Government of Pakistan, Islamabad, *Population Census of Pakistan, 1998*

ix. Pakistan Meteorological Department, Government of Pakistan, Islamabad, *Published Data*

x. Guidelines for Preparation and Review of Environmental Report

xi. Guidelines for Public Consultation

xii. Labor Laws

xiii. Meteorology Department Data (From Website)

xiv. National Environmental Policy

xv. National Environmental Quality Standards (Self- Monitoring and Reporting by Rules, 2001)

xvi. OSHAS 1800 for Health and Safety

xvii. AJK Environmental Protection Act, 2000

xviii. AJK Environmental Protection Agency (Review of IEE/EIA) Regulations 2009

xix. Sectoral Guide Lines for Environmental Reports, Industrial States

xx. The Land Acquisition Act 1894

List of team members

Sr. No.	Team Member	Position Held	Qualifications
1.	Hassan Waqas	Principal Environmentalist	MS Environmental Sciences University of Gujrat (UOG)
2.	Bilawal Zafar	Environmentalist-I	BS (Hons.) Environmental Sciences University of Lahore
3.	Saddat Mazhar	Ecologist	MS Forestry & Environment University of Viterbo "La Tuscia", Italy BS Environmental Sciences University Of Gujrat (UOG)
4.	Anam Imtiaz Zaidi	Environmentalist-II	Mphil Environmental Sciences The University of Lahore BS (Hons.) Environmental Sciences The University of Lahore
5.	Waqas Ahmed	Environmental Geologist	Mphil Environmental Sciences The University of Lahore BS (Hons.) Environmental Sciences University of Gujrat

6.	Zain Abbas	Environmentalist-III	MS Environmental Sciences, National University of Science and Technology (NUST), Islamabad BS Environmental Sciences University of Gujrat
7.	Rizwan Saeed	Field Engineer	BS Environmental Sciences, University of Gujrat