

Environmental Impact Assessment Report



M/s Suriya Aslam Paper Mills (Pvt.) Limited

**Plot No. 11-A, Multan Industrial Estate,
Phase-I, Multan**

October, 2023

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Disclaimer

The data was based on the originality of project site shown by the project proponent / stakeholders / promoters, provided maps, verbal communications and all other related documents. The authenticity of supra-mentioned relies with the proponent / stakeholders/ promoters, not with the environmental consultant. The EIA report can't be negotiated in any court of law.

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EIA Team

Table of Contents

Executive Summary	9
CHAPTER – 1	15
Introduction	15
Purpose of the report	15
Identification of the Project	15
The Proponent	15
The Consultant	16
Brief Description of Project	16
Nature & Size of Project	16
Location of the Project	16
Methodology of EIA Report	16
CHAPTER – 2	18
Policy, Institutional and Legal Framework for Environmental Assessment Report	18
POLICY FRAMEWORK	18
Institutional Setup	18
Environmental Protection Councils	18
Environmental Protection Agencies	18
Environmental Legal Framework	18
Environmental Legislation of Pakistan	18
National Environmental Quality Standards	19
Sector – wise Legislation	19
CHAPTER – 3	22
Description of Project	22
Type & Category of the Project	22
Objective of Project	22
Location & Site Layout of Project	22
Land Use & Vegetation Features on Site	23
Road Access	23
Cost & Magnitude of the Project	23
Schedule of Implementation	23
Project Description	24
Raw Materials	24
Project Process	24
Preparation of the Fiber	25
Pulping	25
Refining	25
Forming	25
Pressing	26
Drying	26
Cutting and Packaging	27

Wastewater	27
Air Emissions	28
Solid Waste	28
Health and Safety	28
Safety Signs/Safety Boards	29
Fire Protection System	29
Restoration and Rehabilitation Plans	29
Details of Restoration and Rehabilitation at the End of the Project Life	29
Government Approvals	29
CHAPTER – 4	30
Stakeholders & Public Consultation	30
Objectives of Consultation	30
Consultative Aspect	30
Identification of main stakeholders	31
Meetings with stakeholders	31
Analysis of Stakeholder Consultation	32
Sample Size	32
Statistical Analysis	32
Result and Discussion	32
Summary of Issues Raised by Stakeholders	32
Reasons for Rejection	32
Chapter - 5	35
Description of Environmental and Social Baseline Conditions	35
Baseline Conditions	35
Physical Environment	35
Topography & Geography	35
Soil	36
Climate	36
Factors	36
Smog	37
Fog	37
Dust Storm	37
Heat Waves	37
South West Monsoon	37
Wind Speed & Direction	39
Hydrology	39
Surface Water	39
Ground Water	42
Ambient Air	43
Ecological Environment	43
Fishries	43
Flora	43
Fauna	43

History & Archeology	44
Socioeconomic Environment	45
Demography	45
Population	45
Language	45
Religion	45
Education	45
Transportation	46
Motorways	46
Rails	46
Bus Rapid Transit	47
Air	47
Culture & Festival	47
Chapter - 6	48
Potential Environmental Impacts & Mitigation Measures	48
Methodology for Impact Evaluation	48
Leopold Matrix	49
Impact analysis and prediction	51
Consultations/ Case Studies	51
Meetings	51
Characteristics of Impacts	52
Impact Asses Criteria	52
Analysis of Impacts and Recommended Mitigation	53
Impacts during Operational Phase	53
Impacts on Physical Environment	53
Wastewater	53
Gaseous Emissions	54
Requirement	54
Noise Level	55
Health and Safety	55
Impact on Biological Environment	55
Natural Vegetation	56
Fauna	56
Potential Environmental Enhancement Measures	56
Purpose of Mitigation Measures	57
When the problem will occur and when it should be addressed?	57
Where and how the problem should be addressed?	57
Ways of Achieving Mitigation Measures	57
Changing in planning and design	57
Improved monitoring and management practices	57
Replacement, relocation and rehabilitation	58
Schedule of Implementation and Environmental Budget	58
EMP implementation stages	58

Stage I. Environmental Planning	59
Stage II. Implementation and operation	59
Stage III. Checking and corrective action	59
Stage IV. Management analysis	59
Environmental Management Cost / Environmental Budget	60
Chapter - 7	61
Environmental Management & Monitoring Plan	61
Institutional Capacity	61
Training Schedule	61
Training of Building Contractor	62
Summary of Impacts and their mitigation measures	62
Environmental Management Plan	68
Proposed Environmental Monitoring	70
CHAPTER – 8	71
Conclusion & Recommendations	71
Conclusion	71
Recommendations	71

LIST OF ABBREVIATIONS

PEPA	Punjab Environmental Protection Act
NEQS	National Environmental Quality Standards
PEQS	Punjab Environmental Quality Standards
WAPDA	Water And Power Development Authority
EMP	Environmental Management plan
WWTF	Waste Water Treatment Facility
Pak-EPA	Pakistan Environmental Protection Agency
WHO	World Health Organization
PET	Punjab Environmental Tribunal
SWM	Solid Waste Management
CSR	Corporate Social Responsibility
MSW	Municipal Solid Wastes
TMA	Town Municipal Authority
KVA	Kilo Volt Ampere
PPEs	Personal protective equipment's
PM	Particulate matter

REPORT STRUCTURE

In accordance with guidelines for preparation and review of environmental reports checklist, this report has been compiled and structured in seven chapters outlined as follows:

Executive Summary

Chapter 1: Introduction

Chapter 2: Description of Project

Chapter 3: Analysis of Alternatives

Chapter 4: Stakeholder & Public Consultation

Chapter 5: Description of Environmental and Social Baseline Conditions

Chapter 6: Potential Environmental Impacts & Mitigation Measures

Chapter 7: Environmental Management & Monitoring Program

Chapter 8: Conclusion & Recommendation

EXECUTIVE SUMMARY

The project for which this Environmental Impact Assessment (EIA) Study has been conducted is the establishment of Lead Smelting unit with the capacity of 160 tons/day under the name of "M/s Suriya Aslam Paper Mills (Pvt.) Limited " at Plot No. 11-A, Multan Industrial Estate, Phase-I, Multan.

Project Proponent

Mr. Naveed Iqbal s/o Muhammad Iqbal r/o House No. 59, Sahar Villas, Opposite Multan Public School, Multan is proponent of the project, who intends to get Environmental Approval of the said unit by submitting Environmental Impact Assessment Report, in compliance with provisions of section 12 of the Punjab Environmental Protection Act, 1997.

Details of Project Proponent

Mr. Naveed Iqbal s/o Muhammad Iqbal r/o House No. 59, Sahar Villas, Opposite Multan Public School, Multan

The EIA Study Consultant

M/s Chems Consultants, as independent consultants, has been appointed by the proponent to conduct Environmental Impact Assessment (EIA). Company office address is House No. 76, Gulshan-e-Sardar Housing Colony, MA Jinnah Road, Multan

Positioning of the Project

According to the IEE and EIA Regulations, 2022, the project falls under Schedule II (List of projects requiring an EIA), Category B (manufacturing and Processing), and Clause 5 (Paper and Paper Board, paper pulping, paints and Dyes).

Brief Description of the Project

Table 1: Description of Project

Title	M/s Suriya Aslam Paper Mills (Private) Limited
Location	Plot No. 11-A, Multan Industrial Estate, Phase-I, Multan
Google coordinates	30.134635, 71.392777
Total Cost	Rs. 75-Million
Project area	(8-kanal 43560 sq.ft)
Electricity Requirements	400-KVa
Standby Power Generator	100-KVa
Process	Paper board manufacturing for ultimate consumption in packaging and cone making units
Production	40 MT

Capacity

BRIEF OUTLINE OF PROJECT

The project is to be located at Multan Industrial Estate, Phase-I, Multan. The project in its vicinity has infrastructure like roads, transport, electricity, telephone, land and even the environment is of ideal conditions for establishment of Paper board manufacturing unit. It will recycle waste paper alongwith wheat straw as raw material. Component of the project involved construction of building and installation of machinery etc. The proponent intends to file this Environmental Impact Assessment Report with an object to meet with legal requirement as envisaged under Section 12 of the Punjab Environmental Protection Act, 1997.

Location

Land coordinates are given below:

West	Conimpex hatchery
East	Road/ Nestle Godown
North	United Flour Mills
Right	Food & Feed

Environmental Conditions of the Site

Average temperature and precipitation data and wind pattern of the project site i.e. M/s Suriya Aslam Paper (Pvt.) Limited has been reflected in Figure 1 and Figure 2 respectively:

Figure 1: Average temperature and precipitation data

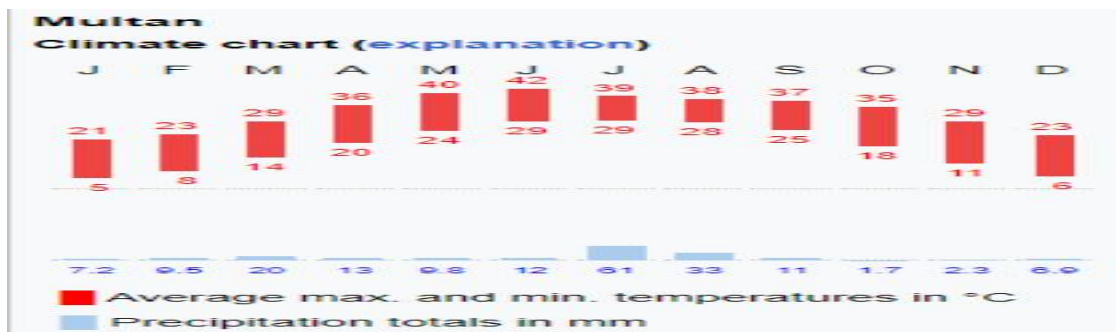
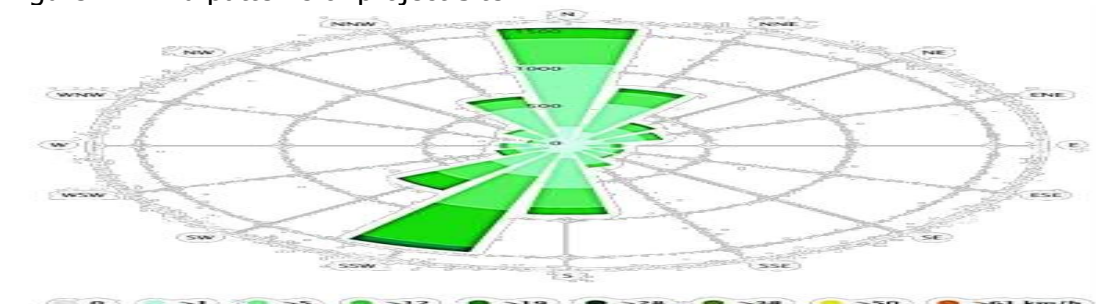


Figure 2: Wind patterns of project Site



Major Impacts & their Mitigation

In order to identify all the activities associated with the project during construction & operation phase, having potential of causing significant environmental impacts and harm, a thorough review of the process has been conducted by the consulting firm. As the project site is located within Industrial Estate, Multan, Project will not have significant negative impacts on the nearby community and environment. The project will have a positive impact on economy of the local community by providing direct and indirect job opportunities for the and contribution in national economy. Moreover, the company will do its level best by investing in plantation drive in the area besides pollution abatement technologies as environmental enhancement measures.

Table 1: **Summary of Major Impacts during Construction & Operation Phase**

Pollutant	Constructional Phase	Operational phase
Particulate matter (PM)/dust	Particulate matter will be generated during activities related to Construction and transportation of the Materials and loading/unloading etc.	During the operational phase dust will only be generated due to transportation and that impact will be outside the building on the unpaved or non-concreted roads.
Gaseous emissions	Flue gases will be generated from boiler, site generators and vehicles	Flue gases will be generated from the coal/ wood/ saw dust fired boiler, standby power generators and plying of vehicles
Noise	Noise will be generated due to construction, installation of machinery and vehicles transporting materials	Noise can be generated from operation of the machinery, generator and vehicles involved in transportation
Odour	Nil	Nil
Impacts on flora and fauna	No significant impact on Flora and Fauna	No significant impact on Flora and Fauna
Solid Waste	Solid waste will be generated due to construction and domestic sources and sludge from Septic Tank	Solid waste will be generated from domestic sources, burnt ashes and sludge from septic tank and treatment facility
Soil Contamination	Soil will be contaminated due to leaching of oil, fuel or any other stored oil & acid	Soil will be contaminated due to leaching of oil, fuel or any other stored oil & acid
Waste water	Waste water will be	Waste water will be generated

	generated from construction and domestic sources	during manufacturing process, Wet Scrubber and domestic sources
Health and safety issues	Health and safety issues will arise due to machinery handling and constructional activities	Health and safety issues can arise if flue gases exceed the permissible limits of PEQS, and improper practice of work during storage, handling and transportation of fuel.
Socioeconomic	Disturbance to neighbors by constructional activities	Employment opportunity

Recommendation for Mitigation Measures

Table 2: **Mitigation Measures during Construction & Operation Phase**

Pollutants	Recommendations during Construction	Recommendations during Operation phase
Particulate matter (PM)/dust	Sprinkling of water and covering of building material.	Proper compaction of access roads, Avoid off road travel and maintain vehicle speeds
Gaseous emissions	Constructional machinery and vehicles should be tuned & maintained properly. All project vehicles should be checked regularly	Canopies should be installed over generators to avoid noise pollution. PPEs should be provided to workers. Generators should be maintained properly. places within the unit should be paved to avoid any dust emissions during loading/ unloading and transportation. Dry and wet scrubbers will be installed to control emissions from Smelting Furnace
Noise	Vehicles to carry raw materials should be operated during night time as far as possible. Ear plugs should be provided in case of heavy noise	Ear plugs/muffs should be provided to workers in case the noise exceeds the PEQS during working hours. There should not be unnecessary applying horn of the involved machinery. Training for safe driving practices & HSE training of the employees and workers is recommended. Horns should be prohibited during working hours and speed limit of 15 km/hr should be permissible. Monitoring should be conducted on annually basis as per PEQS.
Odour	Nil	Nil

Impacts on flora and fauna	Plantation will be done within and outside premises of the unit, which will not only enhance the species enrichment but also serve as a sink of greenhouse gases.	Plantation will be done within the premises of unit, which will enhance the species enrichment at the facility/unit
Solid Waste	Constructional waste should be utilized for road filling and maintenance	Domestic waste should be properly disposed of beside environment friendly disposal of hazardous waste. Project related waste should be handed over to contractor for safe disposal/ recycling.
Soil Contamination	Impermeable material should be placed under generator and construction machinery.	Impermeable material should be placed under generator and waste batteries segregation sites to avoid leaching. Soil contamination will be controlled by maintaining leakage record of vehicles, and by regular inspection.
Waste water	Minor construction activities will be carried out and every effort shall be made to control wastewater generation. It will be confined within a concreted pit and shall be utilized in construction activities.	Generation of process water is involved in operational activities of the unit. Process wastewater alongwith discharges of Wet Scrubber will be confined within separate concreted pits and it will be recycled. Sediments shall be removed from the pit and be reintroduced into the furnace for its recycling.
Health and safety issues	PPEs should be provided to workers during construction activities. First aid should be provided to project related employees specially the worker dealing with loading and unloading of Fuel	Training of workers should be conducted regarding health safety & Use of PPEs should be implemented at workplace. First aid measures/ medical facility should be provided to project related employees. Adequate firefighting system & Equipment should be installed. Safety signs Board (Fire, Naked Flame, Smoking Prohibited Signs, Danger Area, Security Notice, Remove Helmet etc.) should be placed at all sensitive areas. Equipment should be marked and

		tagged properly.
Socioeconomic	People should be informed in advance when work is about to start at the site.	Job opportunity should be provided to local people of the Area. Community well being should be considered and neighbor's privacy should not be disturbed. Local people should be preferred for the employment.

Proposed Environmental Monitoring

To oversee the environmental performance of the project through its life cycle enforcing the PEQS an Environmental Monitoring Program should be formulated which ensures effective surveillance of the environmental parameters at various stages of the project development and compliance with PEQS and legal obligations. Monitoring for following Environmental Parameters is recommended:

Ambient Air

Monitoring for ambient air should be conducted during Construction & Operational activities of the project and report should be submitted to EPA Punjab.

Noise

Regular monitoring for noise level should be periodically conducted during Construction & Operational phases of the project and report should be submitted to EPA Punjab as per rule.

Water Quality

Regular monitoring of water quality should be conducted during Construction & Operational phases of the project and report should be submitted to EPA Punjab. Record should be maintained regarding the underground water pump and consumption.

Schedule of Proposed Monitoring:

Sr. No.	Parameters	Monitoring Schedules
1.	Ambient Air Monitoring (NO _x , CO, SO _x , VOCs, PM ₁₀)	Regularly
2.	Noise Level	Regularly
3.	Water quality	Regularly

Note: Environmental Monitoring data log book should be maintained by the project proponent.

CHAPTER – 1

INTRODUCTION

The development of any Project brings about changes, both positive and negative, in the environmental and social settings of the Project Area. The intensity and level of change, however, depends upon the nature of the Project and the baseline environmental conditions of the area.

Purpose of the report

Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab, Lahore in compliance with provisions of Section 12 of the Punjab Environment Protection Act-1997 for obtaining Environmental Approval / No Objection Certificate (NOC) from the competent authority. The other relevant considered regulations and guidelines, while preparing this EIA report, include:

- ◆ Policy and procedures for filing, review and approval of environmental assessment report.
- ◆ Guidelines for the preparation and review of environmental reports.
- ◆ Guidelines for public participation.
- ◆ Guidelines for sensitive and critical areas.
- ◆ Detailed sectoral guidelines

Various aspects like environmental, social, physical and other aspects of the project both during construction and its regular operation 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 are also provided as described under the format used to help decision makers, EPA Punjab in the present case, before issuing the desired Environmental Approval.

Identification of the Project

According to Review of IEE and EIA Regulations, 2022, the supra-mentioned project is fall under Schedule II (List of projects requiring an EIA), Category B (manufacturing and Processing), and Clause 5 (Paper and Paper Board, paper pulping, paints and Dyes).

Project Proponent

Mr. Naveed Iqbal s/o Muhammad Iqbal r/o House No. 59, Sahar Villas, Opposite Multan Public School, Multan is proponent of the project, who intends to get Environmental Approval of the said unit by submitting Environmental Impact Assessment Report, in compliance with provisions of section 12 of the Punjab Environmental Protection Act, 1997.

Details of Project Proponent

Mr. Naveed Iqbal s/o Muhammad Iqbal r/o House No. 59, Sahar Villas, opposite Multan Public School, Multan. TORs of the study between Proponent & Consultant under clause 5 (f) of policy and procedure for the filing, review and approval of environmental assessment are annexed as **Annex-A**.

The Consultant

M/s Chemsal Consultants, as independent consultants, has been appointed by the proponent to conduct Environmental Impact Assessment (EIA). Company office address is House No. 76, Gulshan-e-Sardar Housing Scheme, MA Jinnah Road, Multan

Brief Description of Project

Nature & Size of Project

The project for which this Environmental Impact Assessment (EIA) Study has been conducted is the establishment of Paper Cone manufacturing unit under the title of M/s Suriya Aslam Paper Mills (Pvt.) Limited to be located at Plot No. 11-A, Multan Industrial Estate, Phase-I, Multan. Total area for the instant project is One Acre (8-kanal 43560 sq.ft). Production capacity could be varied according to the demand. However, installed capacity is 40 ton per day and total cost of the project is approx. 75 Million. Photocopies of Land ownership documents are attached as **Annex-B**.

Location

Land coordinates are given below:

West	Conimpex hatchery
East	Road/ Nestle Godown
North	United Flour Mills
Right	Food & Feed

Methodology of EIA Report

EIA Study comprises of Executive Summary following eight chapters as detailed below;

Chapter 1: Introduction; gives rationale and overview of the Project, need for Environmental Impact Assessment study, its objectives and finally structure of the report.

Chapter 2: Project Description; gives a rather detailed account of the Project particularly emphasizing those Project components which are of importance in relation with environmental and social aspects.

Chapter 3: Analysis of Alternatives; describes the analysis of alternatives, which could be site alternative, design or technology alternatives.

Chapter 4: Stakeholders and Public Consultations; deals with the outcome of the consultation carried out with the local communities, knowledgeable people, public representatives, etc. It discusses the concern of various types of the people and provides an outline how these have been addressed within the study of the Project.

Chapter 5: Description of Environmental and Social Baseline Conditions; provides information about the environmental and social settings of the Project Area including geology, climate, flora, fauna, water resources, socioeconomic conditions etc.

Chapter 6: Environmental and Social Impacts and Mitigation Measures; identifies the potential impacts due to the implementation of Project on the physical, biological and social environment of the Project Area.

Chapter 7: Environmental Management and Monitoring Plan; outlines the environmental management plan, identifies the roles and responsibilities to implement EMMP, suggest monitoring frequencies of various parameters and EMMP costs etc.

Chapter 8: Conclusion and Recommendations; sums up the report and conclusions and recommendations resulting from the study

CHAPTER 2

POLICY, INSTITUTIONAL AND LEGAL FRAMEWORK FOR ENVIRONMENTAL ASSESSMENT REPORT

POLICY FRAMEWORK

The 1973 Constitution of Pakistan included the subject of **Environmental Pollution and Ecology** in the Concurrent legislative list. However after 18th Amendment in constitution, subject of environment became provincial consequently all legislation has either to be adopted as such by making necessary changes by provincial government. the Parliament and Provincial Governments are empowered to formulate necessary laws under Article 142.

Institutional Setup

Environmental Protection Council

The Punjab Environmental Protection Council (PEPC) is the apex decision-making body in the province of Punjab. It has been established under the provisions of Punjab Environmental Protection Act (PEPA) 1997. Chief Minister of the Punjab heads it with 35 members. Provincial Environment Minister and Provincial Secretary are the members.

Environmental Protection Agencies

Pakistan Environmental Protection Agency (Pak EPA) has been established at the Federal level and provincial EPAs at province levels. After eighteenth amendment in constitution of Pakistan, Provincial level legislation has been developed as per provincial requirements. In case of Punjab Province an independent Environment Protection Department (EPD) has been constituted while Director General heads EPA.

Environmental Legal Framework

Environmental Legislation of Pakistan

- Pakistan Environmental Protection Ordinance was promulgated in the year 1983. A comprehensive enactment entitled PEPA, 1997 was promulgated on 6th December 1997.

- **National Environmental Quality Standards**

Pak EPA with prior approval of the PEPC, established and issued NEQS vide Gazette of Pakistan Notification SRO 742 (1) 93 dated 24 August 1993. These early NEQS were related to municipal and liquid industrial effluents, industrial gaseous emissions and motor vehicle exhaust and noise. These were revised and new standards were established in the Gazette of Pakistan as Notification SRO 549/(1)/2000 of 8 August 2000 National Environmental Quality Standards (NEQS), 2000 and Self Monitoring and Reporting by Industry Rules, 2001. Almost the same with minor amendments these NEQS have been adopted by the Provincial Government in Punjab and accordingly notified as Punjab Environmental Quality Standards (PEQS).

- **Sector – wise Legislation**

Sector-wise legislation applicable in Pakistan is given in Table 3

Table 3 – Sector – wise Legislation

Serial	Sector	Legislation
1.	Environmental Protection	The Pakistan Penal Code (1860) Pakistan Environmental Protection Act, 1997 Punjab Environmental Protection Act, 1997
2.	Land use	The Land Improvement Loans Act (1883) The West Pakistan Agricultural Pests Ordinance (1959) and Rules 1960 The Punjab Local Government Act 2022 The Punjab Salinity Control and Reclamation Act, 1988 The Regulation of Mines and Oil Fields and Mineral Development (Government Control) Act, 1946
3.	Water Quality and Resources	The Pakistan Penal Code (1860) Pakistan Environmental Protection Act, 1997 Punjab Environmental Protection Act, 1997 The Canal and Drainage Act, 1873 The Factories Act, 1934 The Punjab Local Government Act 2022 On Farm Water Management and Water Users Association Ordinance, 1981 Indus River Water Apportionment Accord, 1991
4.	Air pollution	The Pakistan Penal Code (1860) Pakistan Environmental Protection Act, 1997 Punjab Environmental Protection Act, 1997 The Factories Act, 1934

		The Punjab Local Government Act 2022 The Motor Vehicles Ordinance 1965 and Rules 1969
5.	Noise	The West Pakistan Regulation and Control of Loudspeaker and Sound Amplifiers Ordinance, 1965 The Motor Vehicles Ordinance 1965 and Rules 1969 NEQS, 2000 Punjab Environmental Quality Standards for noise
6.	Toxic or hazardous substances	The Pakistan Penal Code (1860) Pakistan Environmental Protection Act, 1997 Punjab Environmental Protection Act, 1997 Draft Hazardous Substances Rules, 2021 The Explosive Act, 1927 The Factories Act, 1934 The Agricultural Pesticides Ordinance 1971 and Rules, 1973
7.	Solid wastes and effluents	The Factories Act, 1934 Pakistan Environmental Protection Act, 1997 Punjab Environmental Protection Act, 1997 The Punjab Local Government Act 2022
8.	Forest conservation	The Forest Act, 1927 The Punjab Hazara Forest Act, 1936 The West Pakistan Firewood and Charcoal (Restrictions) Act 1964 The Cutting of Trees (Prohibition) Act, 1975 The Punjab Management of Protected Forests Rules, 1975 The Punjab Local Government Act 2022 The NWFP (Conservation and Exploitation of Certain Forests in Hazara Division) Ordinance, 1980 The Punjab Forest Development Corporation Ordinance, 1980
9.	Parks and wildlife conservation and protection	The West Pakistan Ordinance, 1959 The Kohat Marzi Control Act, 1954 The Punjab Wildlife (Protection Preservation Conservation and Management) Act, 1975 and Rules, 1976 The NWFP Local Government Ordinance, 1979 Export and Control Order, 1982
10.	Cultural environment	The Antiquities Act, 1975
11.	Livestock	West Pakistan Goats (Restriction) Ordinance, 1959 The Grazing of Cattle in the Protected Forests (Rangelands) Rules, 1978 Pakistan Animal Quarantine (Import and Export of Animals and Animal Products) Ordinance, 1979 The Punjab Local Government Act 2022
12.	Public health and safety	The Pakistan Penal Code, 1860 The Boiler Act, 1923

		The Public Health (Emergency Provisions) Ordinance, 1944 The West Pakistan Factories Canteen Rules, 1959 The Punjab Local Government Act 2022 The West Pakistan Epidemic Disease Act, 1979
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Source: Pakistan National Conservation Strategy, 1992

CHAPTER – 3

DESCRIPTION OF THE PROJECT

This chapter presents all aspects of the project. It details the nature of the project, its location, designs and site layout/plan. It presents the activities that will be involved during all stages of project; how product will form, detail of process and machinery as well as details on supportive resources i.e. man power and utility requirements.

Type & Category of the Project

The instant project is the establishment of Paper Cone manufacturing unit. According to nature of project, cost of project and by also reviewing the IEE / EIA Regulation 2022, project is fall under Schedule II (List of projects requiring an EIA), Category B (manufacturing and Processing), and Clause 5 (Paper and Paper Board, paper pulping, paints and Dyes).

Objective of Project

Following are the main objectives of the project:

- Established business for the proponent
- Proper use of waste paper and wheat straw
- Reduce the import

Location & Site Layout of Project

To fulfill the Industrial aspects of the project under reference of this EIA Report, it is to be sited at a place where Industrial processing activity is either already going on or there are bright prospects of the same. Concurrently, it must also meet the legal requirements of the Punjab Environmental Protection Act, 1997. Availability of land at the best convenient place is equally important among other considerations for the site selection. Availability of access roads, communication facilities, electricity, basic infrastructure, sewerage etc. is yet the other necessary requirements. Obviously, environmentally sound, neat and clean environment are the other considerations for site selection. The project will also facilitate the people of the area with increasing the opportunity of employment, and other related facilities. The site selected on the following reasons:

- Easy access to road
- Site is safe from any kind of flood
- Site is away from residential areas
- No issue regarding this project to all adjacent land owners
- Area of land availability was enough.

Land coordinates of the selected location are given below:

West	Conimpex hatchery
East	Road/ Nestle Godown
North	United Flour Mills
Right	Food & Feed

Land Use & Vegetation Features on Site

The land is barren, free from any type of vegetation. Small grasses and weeds are present in small amount around the site and there is no need to clear any vegetation because they are out of vicinity of the project.

Following species can be seen in the vicinity of the project

Shisham (*Dalbergia sissoo*)

Kikker (*Acacia Karoo*)

Van or Jal (*Salvadora obeoides*).

Road Access

The project site is adjacently located at Multan Industrial Estate and it is accessible through road infrastructure laid by Board of Management of Multan Industrial Estate.

Cost & Magnitude of the Project

Total cost of the project is Pakistani Rupees 75 Million. Cost include all type of expenditure involved in execution of the project. Production capacity of the unit will be 40 tons/day.

Schedule of Implementation

Detailed feasibility studies and designing of the project have been completed. Necessary legal, administrative and financial formalities have also been completed. The project is expected to be completed within 4-6 months from the date of environmental approval. Subsequently the construction, operational and maintenance aspects of the project will be undertaken by the proponent.

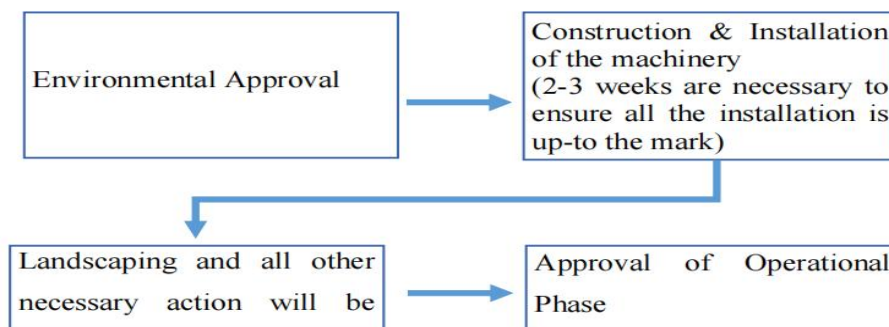


Figure 3: Schedule of implementation

Project Description

The project for which this Environmental Impact Assessment (EIA) Study has been conducted is the establishment of Paper Cone manufacturing unit under the title of M/s Suriya Aslam Paper Mills (Pvt.) Limited to be located at Plot No. 11-A, Multan Industrial Estate, Phase-I, Multan. Total area for the instant project is One Acre (8-kanal 43560 sq.ft). Production capacity could be varied according to the demand. However, installed capacity is 45 ton per day and total cost of the project is approx. 75 Million. The layout map of the project is annexed as **Annex-C**.

Raw Materials

Waste paper and Wheat straw will be used as a raw material. Proponent will buy the raw material from local market.

Project Process

The paper manufacturing process is a complex and resource-intensive process that involves converting raw materials such as waste paper and wheat straw, or other plant-based fibers into high-quality paper products. Paper is a ubiquitous product that is used in a variety of applications, from printing and packaging to hygiene and personal care products.

The paper manufacturing process involves several stages, including the preparation of raw materials, pulping, refining, forming, pressing, drying, and finishing. The following is a general overview of the process:

Preparation of the Fiber

The preparation of the fiber is the first step in the paper manufacturing process. It involves breaking down the raw material into small fibers that can be used to make paper. The preparation of raw materials is a crucial step in the paper manufacturing process, as it affects the quality and properties of the final paper product. The main raw materials used in paper making are waste paper and wheat straw, recycled fiber, and other materials such as pulp substitutes, fillers, and chemicals. Wheat straw is cooked with steam in a digester for obtaining fibers.

The preparation of Recycled fiber is another important raw material used in paper making, and it involves collecting used paper and converting it into pulp. The recycled fiber is then blended with the fibers obtained from wheat straw in order to create a pulp mixture that meets the desired quality and performance requirements.

Other materials, such as pulp substitutes, fillers, and chemicals, may also be added to the pulp mixture to improve the paper's properties, such as strength, brightness, and print ability. These materials can include clay, talc, starch, dyes, and various chemical additives.

Once the raw materials are prepared, they are typically transported to the paper mill, where they undergo further processing, such as refining, forming, pressing, drying, and finishing, to create the final paper product.

Overall, the preparation of raw materials is a critical step in the paper manufacturing process, and it requires careful attention to detail and quality control to ensure that the final pulp mixture meets the desired quality and performance requirements.

Pulping

Pulping is a crucial step in the paper manufacturing process, during which recycled paper, or other raw materials are turned into pulp, which is then used to make paper. The pulping process can be divided into two main types: mechanical pulping and chemical pulping.

Mechanical pulping is the process involved in industrial activities of the project. This process involves grinding of the raw materials using mechanical force to separate the fibers. This method is fast and efficient but produces a lower-quality pulp that is not suitable for all paper types.

Chemical pulping, on the other hand, uses chemicals to break down the lignin that binds the fibers together, resulting in a higher-quality pulp. However the instant project will only mechanical pulping.

Once the pulp is produced, it goes through a series of refining, cleaning, and screening processes to remove impurities. The pulp is then ready to be used to make paper or other products.

After the pulping process, the fibers are washed and screened to remove any remaining impurities. The resulting pulp can then be used to make paper or further refined to improve its properties.

Refining

Refining is an important step in the paper manufacturing process that occurs after the pulping stage and involves passing the pulp through a series of conical or cylindrical refiners, which use rotating discs or bars to mechanically refine the fibers. The refining process can be adjusted to control the degree of fiber separation and the resulting fiber characteristics, such as fiber length, strength, and flexibility. The goal of refining is to create a pulp that is suitable for the specific type of paper being produced, whether it is newsprint, printing and writing paper, packaging materials, or specialty papers. The refining process can be adjusted to create pulps with different characteristics, such as higher or lower tensile strength, porosity, or smoothness.

Forming

Forming is a critical step in the paper manufacturing process that involves transforming the pulp into a continuous sheet of paper on a paper machine. The paper machine is a complex piece of equipment that typically consists of several sections, including the forming section,

press section, drying section, and calendering section. The forming section is where the pulp is transformed into a continuous sheet of paper.

In the forming section, the pulp slurry is pumped onto a moving mesh screen or wire. As the pulp travels along the screen, water is drained off, and the fibers begin to bond together to form a wet web of paper. The consistency and speed of the pulp flow are carefully controlled to ensure that the paper sheet has the desired properties, such as strength, smoothness, and thickness. The wet web of paper is then passed through the press section, where it is squeezed between two or more rolls to remove more water and improve the paper's density and strength. Next, the paper is dried in the drying section using steam-heated cylinders, and then it may pass through the calendering section to improve its surface finish and smoothness.

The forming process is critical to the quality of the final paper product, as it can affect the paper's surface properties, such as smoothness, porosity, and formation. Proper formation of the paper sheet is essential to ensure that it has the desired physical and mechanical properties for its intended use.

Pressing

Pressing is another important step in the paper manufacturing process that occurs after the pulp is formed into a continuous sheet of paper on the paper machine. The pressing stage involves passing the wet paper web through one or more sets of rollers or presses, which squeeze out water and flatten the paper. This process helps to improve the paper's density, strength, and smoothness by removing excess water and consolidating the paper fibers. The pressing stage typically follows the forming stage and precedes the drying stage in the paper machine. The number of press sections and the pressure applied during pressing can vary depending on the desired properties of the final paper product.

The pressing process helps to remove the majority of the remaining water from the wet paper web, which can account for up to 50% of the paper's weight. As the paper web is squeezed between the rollers, the fibers are flattened and compacted, resulting in a denser and stronger paper product. After pressing, the paper web typically enters the drying section of the paper machine, where it is dried using heated cylinders or other drying methods. The pressing stage helps to prepare the paper web for efficient drying and can significantly impact the final quality of the paper product.

Drying

Drying is a crucial step in the paper manufacturing process that occurs after the pulp has been formed into a continuous sheet of paper and pressed to remove excess water. The drying stage involves passing the paper web through a series of heated cylinders or other drying methods to remove the remaining water and bring the paper to its final moisture content. The drying process is carefully controlled to ensure that the paper is dried

uniformly and without any damage to its structure or surface properties. The drying section of the paper machine typically consists of several sets of heated cylinders arranged in a specific sequence to gradually reduce the moisture content of the paper web. As the paper web travels through the drying section, it is subjected to increasing temperatures and decreasing humidity levels, which cause the remaining water to evaporate.

Cutting and Packaging

Cutting and packaging are important steps in the paper manufacturing process, as they ensure that the finished product is of the desired size and shape and is packaged in a way that protects it during shifting and handling. After the paper is made, it is typically rolled onto large spools called jumbo rolls, which can be several meters wide and weigh several tons. These jumbo rolls are then transported to a converting facility, where they are cut down into smaller rolls or sheets and packaged for sale. The cutting process typically involves feeding the jumbo roll through a series of large cutting blades, which slice it into smaller rolls or sheets of the desired size. These cutting blades can be adjusted to produce rolls or sheets of different widths and lengths, depending on the requirements of the customer.

Once the paper has been cut to size, it is typically packaged in protective wrapping to prevent damage during shifting and handling. This wrapping can be made of materials such as plastic or paper and may be printed with information about the paper product, such as its weight, grade, and manufacturer. Overall, cutting and packaging are essential steps in the paper manufacturing process, as they ensure that the finished product meets the specific needs of customers and is protected during transportation and storage.

This is the finishing stage of the paper manufacturing process. Finishing is the final stage of the paper manufacturing process, which involves a variety of processes to improve the paper's appearance, performance, and functionality for specific applications. When this stage is carried out properly, you will be able to avoid additional operating costs.

Wastewater

Paper production is an extensive water consumption project and play vital role in industrial activities of such kind. During construction phase, 2000 gallon/day water will be used in various activities while its consumption will be around 15 meter cube during operational activities. Out of 15 meter cube, 10 meter cube will be consumed in pulp and paper making 5 meter cube will be consumed in steam generation process. Every effort shall be made to preserve water and most part of it will be reused after sedimentation in pulp making process. About 2-3 meter cube wastewater will be generated which will be biologically treated and it will be disposed off into industrial drain. Whereas sewage will be disposed off through septic tanks. The design of septic tank is annexed as **Annex-D**.

Air Emissions

Air emissions will be comprised of stack emissions of boiler and standby diesel fired power generator. Coal fired boiler will be installed for meeting demand of the project. The emissions generated from boiler during industrial activities will be treated through a system comprising of the following:

- i. Cyclone
 - ii. Gravity settler
- Wet scrubber

Solid Waste

In construction phase all waste materials such as landscape and land clearing debris, gravel and aggregate products, concrete, masonry scrap and rubble (brick, concrete masonry, stone), and plastics and paper from cement bags will be recycled during the construction activities as road filling and maintenance purposes. Solid waste by domestic sources will be generated during construction phase which will be placed in separate bins. In operational phase, waste will be produced from offices that will be handed over to local waste collector while sludge generated during sedimentation and biological treatment will be recovered and disposed of after removal of water contents in sludge drying beds through waste handling companies/ individual having EPA valid NOC.

Health and Safety

A well-maintained health and safety plan will be established. It will be ensured that the contractor will maintain all the safety measures in operational phase. Mainly ear muffs and helmets will be provided at the time of operation. In operation no activity is involved because 98% system is automated. Beside this safety mats, shoes, gloves all will be part of the work's dress.

Table 4: Details of PPEs

Protection	Occupational Hazards	PPE
Head Protection	Falling objects, inadequate height clearance, and overhead power cords	Helmets with or without electrical protection
Hand protection	Hazardous material, cuts or lacerations, vibrations, extreme temperatures	Synthetic or Rubber gloves, leather, insulating material etc
Eye and face protection	Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation	Glasses, shield protective, etc.
Hearing protection	Noise, ultra sound	Hearing protectors like ear plugs, ear muffs
Respiratory protection	Dust, fogs, fumes, gases, smoke, vapors, oxygen deficiency	Face-mask or air supply

Body protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	Aprons, insulating clothing etc. of appropriate materials
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Safety Signs/Safety Boards

At any workplace Safety signs and symbols are very important to avoid many accidents. They must be in easy and understandable language to all the workers. Workers should have the knowledge of sign wordings and they must be trained and aware about them. Safety signs, symbols and boards must be provided by every site to protect the workers and employees from the risks of hazards that has not been controlled by other means. Safety signs and boards give safety message and they must be of different colors that workers could understand their meanings easily. At the subject project, safety signs and boards will be placed to avoid the workers and staff from any risk.

Fire Protection System

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

Restoration and Rehabilitation Plans

All possible precautions will be taken to prevent an untoward incident in terms of life and property losses. On completion of the project, solid waste will be removed from the site in order to maintain aesthetics of the area. All measures will be undertaken for ensuring occupational safety, security and clean environment during the working hours. Vegetation and landscaping will be done by the proponent after the completion of project.

Details of Restoration and Rehabilitation at the End of the Project Life

There will be no matter of rehabilitation as the site is already owned by the project proponent. At the end of the life of the project, it will be duly dismantled with special precautions to avoid/ minimize pollution and at the same time taking all safety precautions to protect human life and property around the building. The materials capable of recycling/reuse will either be sold in the market or to be reused for other suitable purposes.

Government Approvals

The proponent is very purposive about the approval from all local and government bodies but NOC from EPA is prerequisite for approval from all these bodies.

CHAPTER – 4

STAKEHOLDERS AND PUBLIC CONSULTATION

The consultation process with various stakeholders of ChemSA Engineering Zone, Water Treatment Technology & Environmental Consulting Firm has been carried out to involve community and other stakeholders at earlier stages. Information dissemination during public consultation is fundamental to successful conclusion of the Project. This chapter describes the objectives and details of the consultative process adopted; its outcome and the conclusions drawn thereafter.

Public consultation has been conducted during the planning and design phases of the Project with Government departments, line agencies, NGOs and affected persons of the Project area; concerns and suggestions thereafter have been taken into account and included where appropriate. The consultative process to date has been effective in addressing the concerns over the Project Operational impacts.

Objectives of Consultation

Public consultation plays a vital role in studying the effects of any development project on stakeholders and in its successful implementation and execution. It affords an opportunity to exchange knowledge with those who as members of the society are concerned with the Project, immediately or remotely. Referring particularly to a Project related to environmental assessment, involvement of public is all the more essential, as it leads to better and more acceptable decision-making.

The objectives of the stakeholder and Public consultation conducted in Project Area were;

- To apprise the Project community and stakeholders about Project interventions and potential impacts,
- To record the community concerns and recommendations regarding the project;
- To address/incorporate those recommendations in the Project design to the extent possible and;
- To share the mitigation measures with the local communities.

Consultative Aspect

The project involves stakeholders from various segments of the society, who have direct or indirect interest in the developmental activity. The Environment and Social team has endeavored to hold consultative sessions with a number of prominent stakeholders (Project Proponent, Government departments, line agencies, NGOs and affected persons of the Project Area) to evince their views on the project and their opinions, suggestions, understanding on various issues and concerns. The consultations aimed specifically at:

- Dissemination of Project information through discussions, education and liaison.
- Eliciting the comments and feedback on the project.
- Documentation of information narrated by the stakeholders.
- Documentation of mitigation measures proposed by the stakeholders.
- Incorporation of public concerns and their addresses in the EIA/EMMP.

Identification of main stakeholders

There are two types of stakeholders related to the project i.e. primary and secondary stakeholders. Primary stakeholders are those which are directly affected by the Project activities and secondary stakeholders are those which are affected indirectly. The project does not have direct impacts on any individual; therefore, no primary stakeholders are identified. Secondary stakeholders are institutional stakeholders, which includes Project Proponent, local Government representatives, and Government officials of the relevant departments, NGO, general public, local residents, shop keepers, vendors, hospital owners/staff, teachers, pedestrians, and businessmen/traders of the city. The categories of the stakeholders who provided useful feedback, included:

- Project Proponent
- Government officials
- Environmental practitioners and experts
- Teachers/students
- Shopkeepers

All those stakeholders have different types of stakes according to their involvements in various aspects of the Project. The consultant tried to contact all the stakeholders and shared their views and concerns and also interacted with the community-based organizations that can support the community.

Meetings with stakeholders

A series of consultation was carried out with stakeholders and general public in within industrial estate and nearby areas. The purpose of this survey was to achieve the objectives of the consultation, highlight the main issues in the implementation of the project and finally propose mitigation measures. Open and close ended questionnaire was used to collect the views concerning the assessment survey. Scoping sessions and informal group discussions were also carried out with local residents and local government representatives regarding the project. The outcome of whole consultation process was very encouraging. The following issues were discussed during Informal Meetings with local representatives:

- a. Brief Description of the Project
- b. Current economic condition in the area
- c. Suggestions for improvement in the current industrial system and all activities related to industry
- d. Perceptions about the project

e. Perceived impacts of the project

The local poor people predominantly requested for unskilled and semi-skilled jobs during implementation of the Project. On the basis of the consultations so far, it appears that the Project will have no insurmountable environmental and social impact. The community generally supported the project. Consultative meeting forms are annexed as **Annex-F**.

Analysis of Stakeholder Consultation

Sample Size

Sample size was selected by the Team of consultants for conducting the socioeconomic survey. Women were also consulted for the said survey; some of their names are mentioned in the above list of respondents while most of them were not willing to give personal information.

Statistical Analysis

Statistical analysis of the data collected during the visit of study site villages through questionnaires.

Result and Discussion

According to survey, 100% respondents were male. 88 % respondents were educated while 12% were uneducated. So, according to the survey overall education status of the area is good. As per survey, 78% people were satisfied with the project and they gave positive remarks regarding the existing unit and project as they got job over there, their living standard raise over working there. While 13% respondents were having no opinion regarding the project and 9% respondents were not satisfied with the production unit due to their concern regarding the aesthetic degradation and no preference to local people for jobs. Majority were in favor that no effect will produced by this project.

Summary of Issues Raised by Stakeholders

A summary of the key issues raised by stakeholders and how these are being addressed by Project Proponent is provided in Table below.

Table 5: Summary of issues and commitments by Proponent

Issues	Concerns Raised by Stakeholders	Project Proponent Commitment
Employment Opportunities	Expectations of employment are very high. Job opportunities are less for herders as they generally have less skills and	Employment is the main priority of the industry. Mostly locally skill and unskilled labor will be prioritized and also there will be job in

	training.	executive level. Max. Persons according to the requirement will be employed by the industry.
Training Opportunities	People are keen to consult with subject industry if the Project offers training and upgrading opportunities to enhance their trade or professional skills.	Development of the Training Strategy, including commitment of allocation of budget investment for training infrastructure, delivery and design. Installation of training facilities for worker of the company and students will be accommodated. The internship program will offer to the students to develop professional skills.
Health & safety	Truck traffic is a main concern because the road used by the Project passes through a number of small communities and different industries and there will be a high volume of trucks transporting concentrate.	Extensive consultation on the road corridor and safety aspects, including on herder and animal crossings. Development of Transport Management. Plan including traffic safety training. Traffic advisory signs will be installed along project site and all nearby specific areas.
Local economy and business development	Local service providers are keen to participate in providing services, raw material and expect to receive in order to adjust their businesses to meet specific needs. Local businesses want to receive support in terms of finance and facilities to diversify their businesses. Local/regional companies and entrepreneurs have limited understanding about meeting the high volumes required by the Project and the quality standard, but are keen to know these requirements so	Proponent intends to arrange all the materials regarding construction and operation from local market This will help the local and small business and to people who are keen interested to become suppliers.

	they can become suppliers.	
Environmental Issues	Dust and noise impacts, particularly from the construction activities and in operation of mechanically unfit machines, are of concern to herders and other residents. Environmental degradation during road construction and use. Loss and change of vegetation due to soil degradation. Increased waste along project boundary and around economic zone.	Implementation of controls under the Environmental Management Plans, including on and off-site dust and noise monitoring. A seed rehabilitation program has been established and initial work has been completed in economic zone and along the boundary. A Participatory Environmental Monitoring Program will be launched to spread awareness.
Water quantity and quality	Water quality and quantity, and impacts from the wastewater disposal are all key concerns for nearby herders.	Implementation of consultation in relation to water use and development of the Participatory Environmental Monitoring Program. Water treatment facility will be installed by the proponent that will help to safe disposal of the water.

CHAPTER – 5

DESCRIPTION OF ENVIRONMENTAL & SOCIAL BASELINE CONDITIONS

Baseline Conditions

Baseline conditions refer to the existing physical, environmental and socioeconomic status of the Project area. The baseline information and indigenous knowledge is required for scoping potential environmental issues associated with the implementation of the Project. On the basis of baseline information, the Project interventions are assessed and mitigation measures are proposed. The baseline information also helps to indicate the specific issues to be monitored during Operational phase of the Project.

The project area is located within Multan Industrial Estate and status of the area is industrial. The land in the area is plain. Water supply to the project area has been arranged through self-turbine. The project, in no way, is causing adverse impacts on the environment including surface water body. The ground water is quite fit for human consumption. The project area experiences four seasons i.e. winter, summer, spring and autumn. The existing environment around the proposed Project area has been studied with respect to Physical, Ecological and Socioeconomic resources. The description of physical environment, which include topography, surface/ groundwater, the climate, geology, seismic etc. of Multan district, in general, and specific of the project area, are presented in the following sub-section:

PHYSICAL RESOURCES

Topography & Geography

Multan is located in a bend created by five rivers of central Pakistan. It is built on a mound just east of the Chenab River. Multan District is surrounded by Khanewal to the North, Vehari to the East and Lodhran to the South. The Chenab River passes on its Western side, across which lies Muzaffargarh. The site is situated within Multan Industrial Estate, Multan. Site area is generally flat and slopes towards south and south-west at an average gradient of 1:3000. The project area is surrounded by industrial units.

Figure 4: Map of Multan District



Soil

The soil of Multan is mostly alluvial. The alluvial deposits transported by the Chenab and Indus River and its tributaries have contributed soil characteristics very specific to a River Flood plain. Generally, the soil is silt clay in character and inclined to be dry. However, it is rich in potential nutrients and suitable for agriculture.

Climate, Temperature & Precipitation

Climate

Multan is a city located in the southern part of Punjab, province in Pakistan. Multan features an arid climate with very hot summers and cold winters. The city witnesses some of the most extreme temperatures in the country. Dust storms are a common occurrence within the city. The closest major city is Bahawalpur. The area around the city is a flat plain and is ideal for agriculture, with many citrus and mango farms. There are many canals that cut across the Multan District, providing water from nearby farms. This makes the land very fertile. However usually land close to the Chenab River are flooded in the monsoon season.

Factors

The monsoon and the Western Disturbance are the two main factors that affect the weather in Multan; otherwise, Continental air prevails for rest of the seasons. Following are the main factors that influence the weather over Multan.

Western Disturbances generally occur during the winter months and cause moderate rainfall. Hailstorms are also a common occurrence in the city.

Smog Does occur in December and January when Fog Concentration is High in The City Of Saints. The fog and smoke combine strongly in these months to form Smog. During intense bouts of smog the local government often prohibits inhabitants of the city from going out excessively, usually for a period of 5–7 days each year, to avoid hazardous health complications.

Fog does occur during the winter season, and remains for three days to multiple weeks. It also results in closure of Multan Airport at times of dense fog.

Dust storm occur during summer months with peak in the months of May and June. These dust storm are quite violent. Dust storms during summer indicate arrival of monsoon while dust storms in winter mark the beginning of the winter season.

Heat waves occur during May and June, and lead to a high incidence of heat strokes among the residents of the city during these months. Being close to Thar and Rajasthan deserts. Multan has seen some worst heat waves in the history of Pakistan

- In 1956, about 49 °C (120 °F) was recorded.
- In 2006, 47 °C (117 °F) was recorded that killed 33 people.
- In 2010, record-breaking heat wave was observed all over Pakistan, and in Multan fifty four year record was broken when temperature touched 50 °C (122 °F) on 27 May.

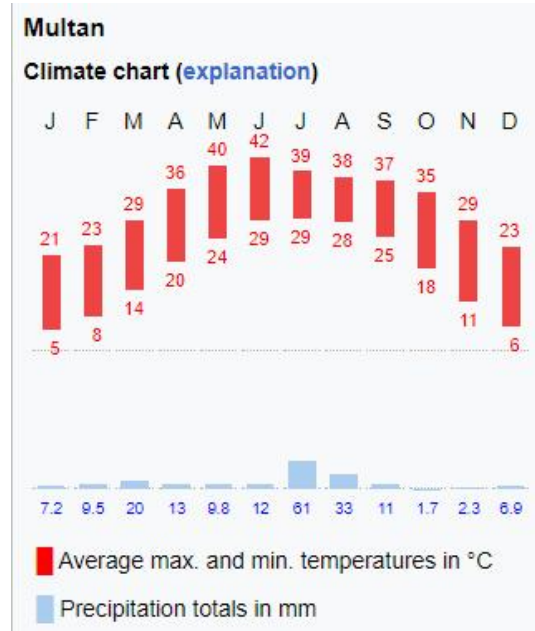
South West Monsoon also occur in the summer from the month of June till September. Monsoon rains bring much awaited relief from the scorching heat of the summer. These monsoon rains are quite heavy.

The average monsoon rainfall for Multan is 119.7 millimetres (4.71 in), following is the monsoon rainfall of Multan since 2005;

- In 2005, a total of 123 millimetres (4.8 in) rainfall was recorded.
- In 2005, a total of 124 millimetres (4.9 in) rainfall was recorded.
- In 2006, a total of 35 millimetres (1.4 in) rainfall was recorded.
- In 2008, a total of 70 millimetres (2.8 in) rainfall was recorded.
- In 2009, a total of 56 millimetres (2.2 in) rainfall was recorded.
- In 2010, a total of 227 millimetres (8.9 in) rainfall was recorded.
- In 2011, a total of 112.2 millimetres (4.42 in) rainfall was recorded.
- In 2012, a total of 304 millimeter of rainfall was recorded.

The given below Figure shows the precipitation diagram for District Multan on how many days per month, certain precipitation amount is reached. The project area has maximum rainfall in July & August and dry season from October to December. In tropical and monsoon climate, the amounts may be underestimated.

Figure 5: Average Temperature & Precipitation Data of Multan



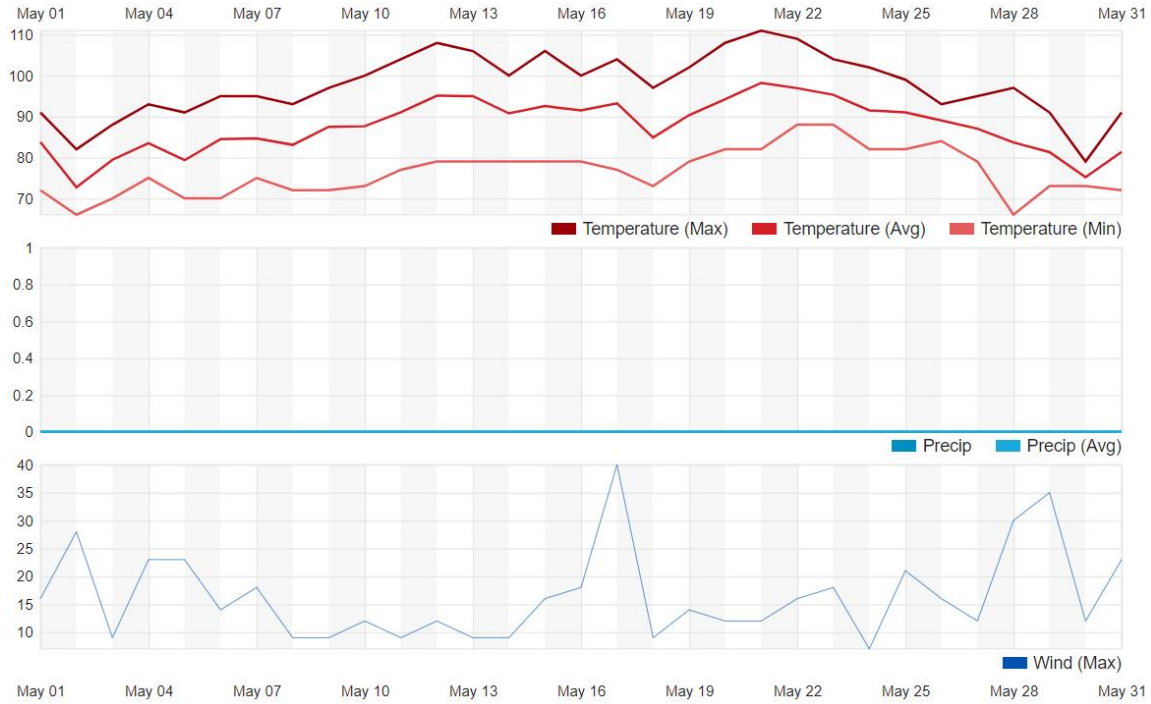
Source <https://worldweather.wmo.int/en/city.html?cityId=899>

Figure - 6
Meterological Data for the Period 1961-1990

Climate data for Multan													[hide]
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	28.3 (82.9)	32.0 (89.6)	39.0 (102.2)	45.0 (113.0)	48.9 (120.0)	52.0 (125.6)	52.2 (126.0)	45.0 (113.0)	42.5 (108.5)	40.6 (105.1)	36.0 (96.8)	29.0 (84.2)	52.2 (126.0)
Average high °C (°F)	21.0 (69.8)	23.2 (73.8)	28.5 (83.3)	35.5 (95.9)	40.4 (104.7)	42.3 (108.1)	39.2 (102.6)	38.0 (100.4)	37.2 (99.0)	34.6 (94.3)	28.5 (83.3)	22.7 (72.9)	32.6 (90.7)
Daily mean °C (°F)	12.7 (54.9)	15.4 (59.7)	21.0 (69.8)	27.5 (81.5)	32.4 (90.3)	35.5 (95.9)	33.9 (93.0)	33.0 (91.4)	31.0 (87.8)	26.4 (79.5)	19.7 (67.5)	14.1 (57.4)	25.2 (77.4)
Average low °C (°F)	4.5 (40.1)	7.6 (45.7)	13.5 (56.3)	19.5 (67.1)	24.4 (75.9)	28.6 (83.5)	28.7 (83.7)	28.0 (82.4)	24.9 (76.8)	18.2 (64.8)	10.9 (51.6)	5.5 (41.9)	17.9 (64.1)
Record low °C (°F)	-2.2 (28.0)	-1 (30)	3.3 (37.9)	9.4 (48.9)	13.5 (56.3)	20.0 (68.0)	21.1 (70.0)	21.1 (70.0)	16.7 (62.1)	8.9 (48.0)	0.6 (33.1)	-1.1 (30.0)	-2.2 (28.0)
Average precipitation mm (inches)	7.2 (0.28)	9.5 (0.37)	19.5 (0.77)	12.9 (0.51)	9.8 (0.39)	12.3 (0.48)	61.3 (2.41)	32.6 (1.28)	10.8 (0.43)	1.7 (0.07)	2.3 (0.09)	6.9 (0.27)	186.8 (7.35)
Mean monthly sunshine hours	222.3	211.6	250.8	273.3	293.5	266.8	265.0	277.6	277.6	274.9	255.0	229.2	3,097.6

Source: NOAA (1961–1990)^[100]

Figure - 7
Meterological Data for the Month of May, 2023



Temperature (°F)	Max	Average	Min	▲	
Max Temperature	111	97.77	79		
Avg Temperature	98.24	87.59	72.7		
Min Temperature	88	76.35	66		
Dew Point (°F)	Max	Average	Min	▲	
Dew Point	79	64.6	50		
Precipitation (in)	Max	Average	Min	Sum	▲
Precipitation	0.00	0.00	0.00	0.00	
Snowdepth	0.00	0.00	0.00	0.00	
Wind (mph)	Max	Average	Min	▲	
Wind	40	5.76	0		
Gust Wind	52	0.15	0		
Sea Level Pressure (in)	Max	Average	Min	▲	
Sea Level Pressure	29.48	28.76	0		

Continental air prevails during the period when there is no precipitation in the city.

Wind Speed & Direction

Wind speed and its direction can be estimated from the figure given below. The data is simulated on base of 30 years' hourly weather condition data collected by Pakistan Meteorological Department (PMD). Mostly, greater than 5 Km/h winds blow in area of project site and its direction toward South– North side. Greater than 19 Km/h wind blow mostly towards South – West direction.

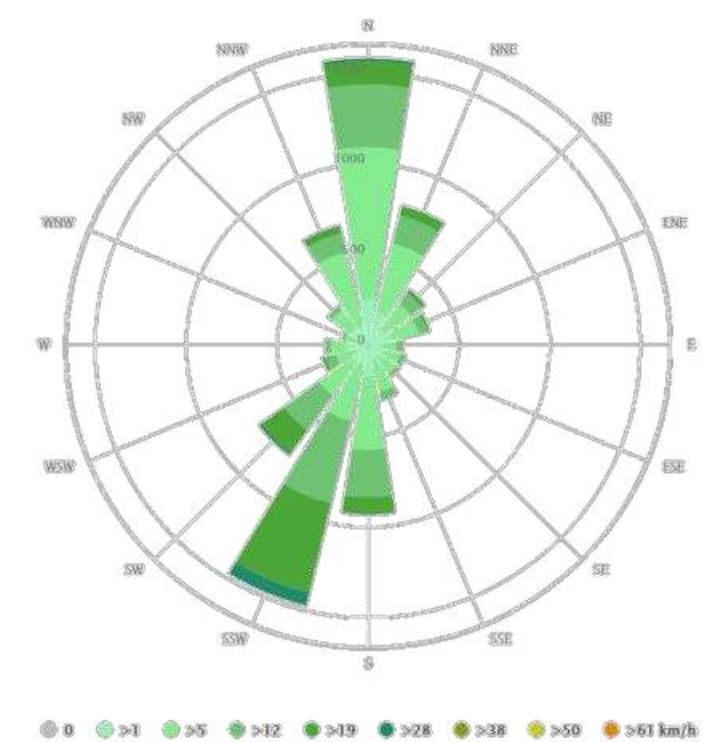


Figure 8: Wind Rose of Project Site

Hydrology

A. Surface Water

There is well / canal system operated in the district for irrigation of lands. Multan Irrigation was created on 25.03.1968. The Zone is controlled by the Chief Engineer with help of the 04 Nos Superintending Engineers. This zone is consisting on 03 Canal Circles and 01 Development Circle namely, Haveli Canal Circle, at Multan, Mailsi Canal Circle, at Multan, Nili Bar Circle, at Sahiwal and Development Circle, Multan Zone, at Sahiwal. The circle is controlled by Superintending Engineer with help of Executive Engineer, Sub Divisional Officer, Deputy Collector, Zilladar, Sub Engineer and other technical and office staff. The Index Plan of Multan Zone is as under:

The main sources of the supply of water are Mangla Command and Tarbela Command. The 04 Nos. Barrages/Head works fall in this zone. The name and capacity of the Barrages/ Head-works are as under:

(i) Trimmu Barrage is on River Chenab with capacity 6.45 Lac Cs

Name of the Project	Trimuu Barrage
Year of Construction	1938-39
No of Bay of Main Weir	37 No each having 60 wide
Designed Capacity	6.45 Lac Cs
Off Taking	
Haveli Main Line	5170 Cs
Trimmu Sidhnai Link	12500 Cs
Rangpur Canal	2170 Cs/1800 Cs
Flood Level	
Low	1.50 Lac Cs
Medium	2 Lac Cs
High	3 Lac Cs
Very High	4.50 Lac Cs
Exceptionally High	6.00 Lac Cs
Maximum Flood Record	
1959	9.43 Lac Cs
1973	7.33 Lac Cs
1952	8.88 Lac Cs

(ii) Sidhnai Barrage is on River Ravi with capacity 1.50 Lac.Cs

Name of the Project	Sidhnai Barrage
Year of Construction	1960
No. of Bay of Main Weir	11 No each having 40 wide
Designed Capacity	1.50 Lac Cs
Off Taking	
Sidhnai Canal	4005 Cs
Sidhnai Mailsi Link	11300 Cs
Flood Level	
Low	0.30 Lac Cs
Medium	0.45 Lac Cs
High	0.60 Lac Cs
Very High	0.90 Lac Cs
Exceptionally High	1.20 Lac Cs
Maximum Flood Record	
1973	2.09 Lac Cs
1976	2.43 Lac Cs
1988	3.32 Lac Cs

(iii) Sulaimanki Headworks is in River Sutlej with capacity 3.25 Lac.Cs

Name of the Project	Sulaimanki Head works
Year of Construction	1922-27

No of Bay of Main Weir	24 No each having 60 wide
Designed Capacity	3.25 Lac Cs
Pond Level	569.0
Off Taking	
Upper Pakpattan Canal	5600 Cs
Eastern Sadiqia Canal	5230 Cs
Fodwah Canal	3447 Cs
Flood Level	
Low	0.50 Lac Cs
Medium	0.80 Lac Cs
High	1.20 Lac Cs
Very High	1.75 Lac Cs
Exceptionally High	2.25 Lac Cs
Maximum Flood Record	
1950	3.32 Lac Cs
1955	5.97 Lac Cs
1988	5.00 Lac Cs

(iv) **Islam Head works is on River Sutlej with capacity 3.00 Lac.Cs**

Name of the Project	Islam Head works
Year of Construction	1922-27
No of Bay of Main Weir	24 No each having 60 wide
Designed Capacity	3.00 Lac Cs
Pond Level	569.0 Lac Cs
Off Taking	
Under Bahwal Canal	5400 Cs/1000 Cs
Qaim Canal	483 Cs
Flood Level	
Low	0.50 Lac Cs
Medium	0.80 Lac Cs
High	1.20 Lac Cs
Very High	1.75 Lac Cs
Exceptionally High	2.25 Lac Cs
Maximum Flood Record	
1955	4.92 Lac Cs
1988	3.06 Lac Cs
1995	1.83 Lac Cs

B. Ground Water

Quality of ground water at project site and its vicinity are reasonably good. The ground water will be extracted through pumps and deep wells and used for industrial and domestic purposes. Potable water sample was collected from the project site). The collected samples were analyzed for important parameters with respect to human consumption. The results of water quality are annexed in Baseline Study Data.

Ambient Air

Ambient air quality data was obtained from the available resources for the priority pollutants including Carbon mono-Oxide (CO), Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂) and Particulate Matter (PM₁₀). In addition to these pollutants other necessary parameters like temperature, wind direction, wind velocity etc. were also monitored.

Methodology for Air Quality Monitoring

Carbon mono-Oxide (CO) level was monitored continuously for 24 hours using a portable automatic analyzer calibrated prior to field use and hourly average data was reported. Sampling and analysis of Sulphur dioxide (SO₂) was conducted in accordance to US-EPA method 40 CFR 50, App. A and 24 hours average was reported. Nitrogen dioxide (NO₂) was monitored in accordance to ISO 6768 Method. Similarly Ambient Particulate Matter (PM₁₀) USAEPA method 40 CFR 50, App. J. the equipment used for these monitoring was in accordance to the specified methods. All the equipment was duly calibrated before use in order to get accurate data. The results of ambient air quality are annexed in Baseline Study Data.

Ecological Environment

Fisheries

The area where site for project, don't have any lake, river or pound. Therefore, this aspect of environment is out of question for this project.

Flora

The project site has very few trees i.e. keekar (*Acacia arabiana*), Sheesham (*Dilbarjia sisso*), Shehtot (*Morus alba*), Bair (*Ziziphus mauritiana*), Sufaidah (*Eucalyptus*) and Weeds include parthinium, Akk and meskits species are present at the site.

Fauna

There are number of locally available birds, reptiles and mammals are present in the project area but there is no protected species.

Table 6: Important Fauna of the Area

Sr.No	Common Name	Scientific Name
1	Intermediate Egret	<i>Egretta intermedia</i>
2	Indian-Pond Heron	<i>Ardeolagrayii</i>
3	Red-Wattled Lapwing	<i>Hoplopterusindicus</i>
4	Common Sandpiper	<i>Actitishypoleucos</i>
5	White Wagtail	<i>Motacilla alba</i>
6	Yellow Wagtail	<i>Motacillaflava</i>
7	Red-vented Bulbul	<i>Pycnonotuscafer</i>
8	House Sparrow	<i>Passer domesticus</i>
9	Common Myna	<i>Acridotherestrictis</i>
10	Bank Myna	<i>Acridotheresginginianus</i>
11	Pied Myna	<i>Sturnus contra</i>
12	House Crow	<i>Corvussplendens</i>
13	Nectariniaasiatica	<i>Purple sunbird</i>
14	Black Drongo	<i>Dicrurusmacrocerusvieillot</i>
15	Black kite	<i>Milvus migransmigrans</i>
16	Blue rocky pigeon	<i>Columba livia</i>
17	Little brown dove	<i>Sreptopeliasenegalensis</i>
18	White-breasted Kingfisher	<i>Halcyon smyrnensis</i>
19	Little Green Bee eater	<i>Meropsorientalis</i>
20	Golden-backed woodpecker	<i>Dinopiumbenghalense</i>
21	Hoopoe	<i>Upopaepops</i>
22	Pheasant-tailed jacana	<i>Hydrophasianuschirurgus</i>

History & Archeology

Multan is one of the oldest continuously inhabited cities in Asia, with a history stretching deep into antiquity. The ancient city was the site of the renowned Multan Sun Temple, and was besieged by Alexander the Great during the Mallian Campaign. It was conquered by the Ummayyad military commander Muhammad bin Qasim in 712. The city later became independent as the capital of the Emirate of Multan in 855 A.D., before subsequently coming under the rule of empires such as the Ghaznavids, the Ghurids and the Mamluks. In 1445, it became capital of the Langah Sultanate. In 1526, it was conquered by the Mughal Empire. Multan Subah would become one of the largest provinces of the Mughal Empire when it was created by administrative reforms of Emperor Akbar. Afterwards, Multan became part of the Durrani and Sikh empires successively. In 1848, it was conquered by the British Empire and became part of British Punjab. After independence, it became part of Pakistan and it is known as city of saints.

Detail of major archaeological sites is given hereunder:

- The **Shrine of Bahauddin Zakariya** is a 13th-century shrine located in the city of Multan. The tomb is dedicated to the Muslim mystic Bahauddin Zakariya, founder of the Suhrawardiyya order of Sufism. It considered to be one of the most

important shrines in southern Punjab province, and is the prototype for Multan's distinct architectural style.

- The **Shahi Eid Gah** Mosque is an early 18th-century mosque located in city of Multan
- **Clock Tower, Multan**, locally known as **Ghanta Ghar, Multan**
- The **Tomb of Shah Rukn-e-Alam** located in Multan is the mausoleum of the 14th century Punjabi Sufi saint Sheikh Rukn-ud-Din Abul Fateh. The shrine is considered to be the earliest example of Tughluq architecture and is one of the most impressive shrines in Asia.
- **Pir Shah Shamsuddin Sabzwari Multani** (died 1276 C.E) was a Muslim Pir from Sabzewar in present-day Iran. Shamsuddin Sabzwari arrived in Multan in early 1200C.E. and established a dargah and preached Islam to the local population. He is considered to be a saint due to his poetry and the local traditions and died in 1276 and his mausoleum is located in Multan.
- **Shah Yousuf Gardez** was an Islamic Sufi saint who came to Multan, in 1088 AD. He is said to have restored the city of Multan, converted many people to the Islamic religion, and performed numerous miracles. He came from Gardez, Paktia, Province of Afghanistan

Socioeconomic Environment:

“The socioeconomic environment is one the component of the regional ecosystem.” The development projects can impact either negatively or positively to the regional socio-economic environment.

Demography

Population

Multan city had a population of 1,078,245 in the 1998 census. As of 2017 census, Multan's population jumped to 1.827 million. Multan had a sex ratio of 950 females per 1000 males and a literacy rate of 74.69%: 77.50% for males and 71.74% for females. 440,112 (24.09%) were under 10 years of age.

Language

At the time of the 2017 census, 42.10% of the population spoke Saraiki, 29.25% Punjabi, 26.77% Urdu and 1.18% Pashto as their first language.

Religion

Islam is the predominant religion, with 98.99% of the population and 0.86% Christian. 1,728 are Hindus and 104 Sikhs.

Education

Bahauddin Zakariya University (formerly known as Multan University) is the main source of higher education for this region. Other universities include Muhammad Nawaz

Shareef University of Agriculture Multan, Air University Multan Campus, the NFC Institute of Engineering and Technology, Nishat School and College. Nishtar Medical University, Multan Public School, Multan Medical and Dental College, Institute of Southern Punjab, and Women University Multan. In July 2021, Pakistan opened its first ever government-run school for transgender students in the city of Multan.

Transportation

Motorways

Multan is connected to operational motorways M4 on northside connecting to Faisalabad and M5 on south side connecting Sukkar. M4 is further connected to M3 connecting Lahore and M2 connecting Islamabad and Peshawar to Multan. While M5 will be connecting to Karachi via Karachi-Lahore Motorway in future.

Multan is situated along the under-construction 6-lane Karachi–Lahore Motorway (M3) connecting Southern and northern Pakistan that is being built as part of the \$54 billion China Pakistan Economic Corridor. Currently, Lahore to Multan travel time is 4 hours on motorway M3 and M4. The 6-lane, 392 kilometre long M-5 section of the motorway is built between Sukkur and Multan at a cost \$2.89 billion. The M-5 is open since 2019. It is connecting Multan to Sukkar and will connect to Karachi when Sukkar-Karachi Motorway will be opened.

Multan is also connected to the city of Faisalabad via the M-4 motorway, which in turn is connected to the M-1 and M-2 motorways that provide access to Islamabad and Peshawar. Further links with the Karakoram Highway will provide access to Xinjiang, China, and Central Asia.

Construction of the M3 motorway also at a cost of approximately \$1.5 billion, and was launched in November 2015. The motorway is branch off of the M-4 motorway and connects Lahore to the M-4 at Abdul Hakeem. The M4 is now operational.

Rail



Figure 9 Multan Cantonment railway station as the main railway station of Multan.

Multan is connected by rail with all parts of the country and lies on the main track between Karachi, Peshawar, Lahore and Quetta. The Main Line-1 Railway that links Karachi and Peshawar passes through Multan district is being overhauled as part of

the China Pakistan Economic Corridor. As part of the project, railways will be upgraded to permit train travel at speeds of up to 160 kilometre per hour, versus the average 60 to 105 km per hour speed currently possible on existing track, The project was divided into three phases, with the Peshawar to Multan portion to be completed as part of the project's first phase by 2018 and the entire project is expected to be complete by 2021. However, the project could not be completed within stipulated time period and it is be re-scheduled.

From Multan, links to Khanewal, Lodhran and Muzafargarh are offered by rail. Multan Cantonment railway station is the main railway station of Multan.

Bus Rapid Transit (Metro Bus)

The Multan Metrobus is a bus rapid transit line which commenced service in January 2017, at a cost of 28.8 billion rupees. The BRT route serves 21 stations over the course of 18.5 kilometre, of which 12.5 kilometre are elevated. 14 stations are elevated, while the remainder are at ground level. The BRT route begins at Bahauddin Zakariya University in northern Multan, and heads southward to pass by the eastern edge of Multan's old city at the Daulat Gate before turning east to finally terminate at the Kumharanwala Chowk in eastern Multan.

Air



Figure 10 Multan International Airport

Multan International Airport is located 10 km west of Multan's city centre, in the Multan Cantonment. The airport offers flights throughout Pakistan, as well as to the Persian Gulf States.

In March 2015, a new terminal building was formally inaugurated by Pakistani Prime Minister Nawaz Sharif. Following the opening of the new terminal, passenger traffic soared from 384,571 in 2014–2015, to 904,865 in 2015–2016.

Culture & Festival

The people of Punjab celebrate many festivals and events throughout the year, blending Mughal, Western, and other traditions. Eid-ul-Fitr and Eid-ul-Adha are celebrated. Many people decorate their houses and light candles to illuminate the streets and houses during public holidays; roads and businesses may be lit for days.

CHAPTER – 6

POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

The following chapter describes the overall possible impacts of project on the physical, biological and socioeconomic environment because of operation phases and mitigation measures to minimize the significance of the possible impacts up to an acceptable level. The anticipated impacts related to location, design, construction and operation of the project have been assessed and mitigation measures have been suggested in this report. Impacts are assessed by analyzing their magnitude and sensitivity. The sensitivity and magnitude of the impact are described with reference to legal requirements, accepted scientific standards or accepted impact assessment practice, and/or social acceptability; where possible. But where no known published 'standard' criteria exist for determining the magnitude of effects, established professional criteria and best practice techniques are used.

Methodology for Impact Evaluation:

The methodology adopted for impact evaluation includes the Modified Leopold Matrix.

Leopold Matrix

The analysis is performed with the Leopold Matrix (LM). This matrix has:

- i. On the horizontal axis, the actions which cause environmental impact, and
- ii. On the vertical axis, the existing environmental conditions which may be affected by those actions.

This provides a format for comprehensive review of the interactions between proposed actions and environmental factors. The most important blocks marked are evaluated individually, and a number between 1 and 10 is placed in the upper left-hand corner to indicate the relative magnitude of the impact (1 represents the least magnitude, and 10 the greatest). Likewise, a number between 1 and 10 is placed in the lower right-hand corner to indicate the relative importance of the impact (again, 1 represents the least magnitude and 10 the greatest).

Table 7: Scale Table of Importance & Magnitude

Sr. No.	Type of Impact	Scale of Magnitude 0-10	Scale of Importance 0-10
1.	No Impact		
2.	Low Impact	1-4	1-4
3.	Edium Impact	5-6	5-6
4.	High Impact	7-10	7-10

For the evaluation of this project, each action checked was evaluated in terms of magnitude of effect on environment characteristics and conditions [on the vertical axis]. From upper right to lower left across each block where significant interaction is

expected slash \was placed diagonally. The most important blocks marked are evaluated individually, and a number between 0 to10 is placed in the upper left-hand corner to indicate the relative magnitude of the impact 1is the best magnitude, and 10 the greatest magnitude. In the same way, a number between 0 and 10 in the lower right-hand corner to indicate the relative importance of the impact again, 0 is the magnitude, and 10 the greatest.

The next step is to evaluate the numbers which have been in the slashed boxes. The high or low numbers on any one box indicates the degree of impact of the appropriate action on the given characteristic of the environment. The assignment of magnitude and importance numbers is based, to the extent possible, on factual data rather than on the evaluator preference. For the rating design regarding the probable impacts requires the evaluator to quantify his\her judgment. The rating scheme\scheme allows the reviewers to thoroughly follow the evaluator line of reasoning, to aid in identifying points of agreement and disagreement. In fact, matrix is the abstract for the text of the environmental impact assessment.

Magnitude Importance			Transportation of raw material	Operation of generators	Water consumption	Wastewater generation	Storage of raw materials	Social activities	Public welfare	Economic activities	Employment	Infrastructure improvement	Total Score of Impact	Average Score of Impact
PHYSICAL	Soil	Soil Quality	2 1	0 0	1 1	5 2	4 4	1 1	0 1	1 1	1 3	4 6	22 22	2 2
		Erosion	2 1	0 0	0 0	2 2	1 1	2 1	0 0	1 1	1 1	3 4	18 17	1.6 1.5
		Geomorphology	0 0	0 0	4 2	5 3	2 1	0 0	0 0	1 1	2 1	4 6	23 19	2.09 1.7
	Water	Surface Water	0 0	0 0	6 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	6 0	0.5 0
		Subsurface Water	1 2	0 0	7 8	5 7	1 1	0 0	0 0	1 1	0 0	2 2	18 22	1.6 2

	Air	Air Quality	2	0	0	2	1	2	0	1	1	3	18	1.6
		Odors	1	3	0	5	4	1	0	0	1	1	17	1.5
		Noise	5	7	0	5	2	5	0	5	4	4	46	4.1
BIOLOGICAL	Fauna & Flora	Crops	2	3	0	4	2	2	4	5	3	3	33	3
		Birds	2	5	2	4	1	5	0	5	3	4	34	3.4
		Mammals	2	5	1	4	1	4	0	5	4	4	37	3.3
			5	2	2	4	2	3	0	4	3	3	34	3.3
SOCIO-ECONOMIC	Social	Industrial	5	5	4	6	4	6	5	8	9	7	66	6
		Recreational Use	6	5	6	7	5	5	5	8	9	7	72	6.5
		Historical / Cultural	2	2	3	3	1	3	4	4	2	4	31	2.8
			3	3	3	3	1	4	5	5	1	3	35	3.1
			2	2	2	4	1	5	4	5	3	4	39	3.5
			2	2	1	4	1	4	4	5	4	4	38	3.4

Table 8 Leploid Matrix

Impact analysis and prediction

In order to evaluate the socioeconomic and environmental impacts, field surveys are extremely essential. In addition to the surveys at the preliminary stage, consultation with the community and their active participation plays a vital role in successful implementation of the project. For the impact analysis and predictions following methods were adopted.

Consultations/ Case Studies:

To study the impacts of the project on physical and biological environment, site visits were conducted by the environmental practitioners and experts and possible physical and biological impacts which may arise due to the subject project were identified through consultations and case studies and their mitigation measures were suggested accordingly.

Meetings:

For the identification of the social impacts of the project, meetings and group discussions were held with the local people, stakeholders, nearby residents and passerby because social acceptability of the project and the area is a key to success. Consultation with the stakeholders is a tool for managing two-way communication between the project proponent and the affected public. Its goal is to improve decision making and built understanding by actively involving individuals, groups and organizations, which have stake in the project. This involvement increases project's long term viability and enhances its benefits to locally affected people and other stakeholders.

To identify the different types of stakeholders and ascertain their perceptions about the project, an initial study was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed hereunder:

The EIA team carried out public consultations at various locations around the Project Site. The stakeholder's consultation during this phase of the work targeted the project area, administrative and private offices, Govt. offices, shops, etc. near the Project Area:

- Selection of the stakeholders for consultation, reconnaissance of the project site and initial discussions with the neighboring factory workers, villagers, shopkeepers, drivers etc.
- Environmental consultants and social specialists and documenting the opinions of the stakeholders expressed during the meetings etc.

Characteristics of Impacts:

Impact 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

Rating of Consequence of Effect on Environment	Rating of Frequency of Occurrence				
	A. Very low: Not heard of but could occur	B. Low: Has occurred in other industry	C. Medium Has occurred in oil and gas industry	D. High: Occurs several times a year in oil and gas industry	E. Very high: Occurs several times a year in PDO
Slight effect: Local environmental damage. Within the fence and within systems. Negligible financial consequences	LOW RISK				
Minor effect: Contamination. Damage sufficiently large to attack the environment. Single exceedence of statutory or prescribed criterion. Single complaint. No permanent effect on the environment.		MEDIUM RISK			
Localized effect: Limited loss of discharges of known toxicity. Repeated exceedence of statutory or prescribed limit. Affecting neighborhood.					
Major effect: Severe environmental damage. The company is required to take extensive measures to restore the contaminated environment to its original state. Extended exceedence of statutory limits	HIGH RISK				
Massive effect: Persistent severe environmental damage or severe nuisance or nature conservancy extending over a large area. In terms of commercial or recreational use, a major economic loss for the company. Constant, high exceedence of statutory or prescribed limits				EXTREME RISK	

Table 9: Impact Assessment criteria

Analysis of Impacts and Recommended Mitigation

Impacts during Operational Phase:

The positive and negative impacts of subject project, during its operation are discussed below:

Impacts on Physical Environment

Solid Waste/ Sludge Management:

In the operation of project proper solid waste management system will be adopted for the prompt, timely and efficient disposal of solid waste & sludge for the reduction of its impacts. Impacts due to solid waste & sludge may be temporary and minor in nature.

Nature of impact: Direct

Duration: Short term

Timing: Construction & operation

Reversibility: Not applicable

Likelihood: Low (unlikely) if mitigation measures ensure efficient solid waste management.

Consequences: Mild, as it will be removed from site within few hours

Impact significance: Low, based upon low likelihood and mild to moderate consequence.

Mitigation measures:

- i. Devise plan & develop guidelines for the safe handling, storage & disposal;
- ii. Sludge will be confined at the site after cleaning of wastewater treatment facility;
- iii. PPEs are strongly recommended for workers for the handling of sludge;
- iv. Separate bins at various places must be present for solid waste collection and segregation;
- v. Waste will be handed over to EPA approved waste contractor;
- vi. Solid waste will be recycling at maximum level;
- vii. Industrial ecology practices will be implemented wherever possible;
- viii. 7 R's of sustainability is recommended;

Wastewater

Waste water will be produced only from domestic activities. In operation, no activity is place to used water and wastewater produced from it.

Nature of impact: Direct

Duration: Short term

Timing: Construction & operation

Reversibility: Not applicable

Likelihood: Low

Consequences: Mild

Impact significance: Low.

Mitigation measure

- a. Wastewater that is finally disposed off, will be in limits of PEQS
- b. Septic tank should be available.

- c. Water conservation approaches will be follow to reduce its wastewater.
- d. Wastewater treatment facility will be provided to treat the wastewater.

Gaseous Emissions

Emissions will be produced by Furnaces, generators, and vehicles and other equipment, will produce similar to those, produced by generators in terms of the resulting pollutants (SO₂, NO_x, PM, etc.). Dedicated air pollution control system will be installed in order to minimize its adverse impacts to the extent possible. However, emission would not exceed the prescribed PEQS permissible limits.

Nature of impact: Direct

Duration: long term

Timing: operation

Reversibility: irreversible

Likelihood: moderate if mitigation measures will effectively be implemented.

Consequences: moderate, if pollutant levels in the ambient air will be control within acceptable limits by adopting proper mitigation.

Impact significance: moderate, based upon low likelihood and mild to moderate consequence.

Mitigation Measures

None of the potential effects discussed above will be exceeded to acceptable limits. The mitigation measures given below used to reduce their impact, and ensure that they remain within acceptable limits. All equipment and vehicles during the operation of project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions. Vehicle speed will be reduced on track passing through or close to shops. Speed limits will be imposed and encourage more efficient journey management worked to reduce the dust emissions produce by vehicular traffic. Water sprinkling will be done where necessary. Management make sure process will be environment friendly Pollution abatement technologies regarding air pollution will be adopted.

Energy Requirement

Energy consumption in industrial area is usually very high. Machinery work runs all day in different industries. Energy conservation technique should be in mind.

Mitigation measures

- i. Do not waste the energy/electricity when there is no need of it.
- ii. Use energy efficient machinery and equipment
- iii. Use energy saving products
- iv. Do not leave the machinery in running form when there is no working being done
- v. Machinery must never be left unattended
- vi. It is recommended to save and conserve the energy and adopt energy efficient technologies during the operation phase.

Noise Level:

Noise is a concern during the operation phase. It can be generated from the traffic on the road and from the machinery used for operations.

Nature of impact: Direct

Duration: long term

Timing: operation

Reversibility: Not applicable

Likelihood: low

Consequences: slightly significant

Impact significance: moderate, based upon low likelihood and mild to moderate consequence.

Mitigation measures:

- a. Machinery and vehicles will be tuned and maintained
- b. Limits will impose on unnecessary use of horns
- c. Safety signs will be displayed. public & drivers will be aware of them
- d. Sound proof wall will be constructed for generator.

Health and Safety

Workers should be provided with safe and healthy working environment taking into account risks inherent to the particular sector and specific classes of hazards in area.

Impact significance: Low to Moderate

Nature of impact: Direct

Duration: Short-term

Timing: Construction & operation

Reversibility: NA

Likelihood: moderate

Consequences: Moderate

Mitigation:

- i. Layout plan for site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents
- ii. Protection devices (ear muffs) should be provided to the workers doing job in the
- iii. vicinity of high noise generating machines
- iv. Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc.
- v. Ensure strict use of wearing these protective clothing during work activities
- vi. Instruct foremen to strictly enforce the keeping out of non-working persons, particularly children, off work sites
- vii. Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic at construction sites, haulage and access roads.

Impact on Biological Environment

Natural Vegetation

Project activities will not impose any potential impact on the area's natural vegetation and plantation.

Assessment of Impact:

A significant impact can be caused due to the unnecessary or excessive removal and burning of plants for fuel wood.

Nature of impact: Direct

Duration: long term

Timing: Operation phase

Reversibility: irreversible

Likelihood: moderate

Consequences: Mild, as no rare plant species were present in the areas.

Impact significance: significant

Mitigation Measures:

The following mitigation measures will reduce the impact on vegetation:

- a) Prohibition to park vehicles on green belts/ grass;
- b) Unnecessary damage to vegetation is strictly avoided;
- c) Proponent planted trees and other species after construction phase;
- d) Proponent will plant 10 trees if he removes a single plant during the construction/ development of the project.
- e) Installation of proper air pollution control devices for controlling and bringing emission level within permissible limits of PEQs
- f) Recycling of solid waste, wastewater and disposal of sludge through environmentally approved waste handling facilities.

Fauna

The fauna including wildlife specially endangered species do not exist at the project site.

Nature of impact: Direct

Duration: short term

Timing: construction phase

Reversibility: not applicable

Likelihood: low

Consequences: Nil, as no rare animal species are present in the areas.

Impact significance: not significant

Mitigation:

Maximum plantation is recommended

Fauna will be preserved by different conservation strategies (in-situ and ex-situ), if any.

Potential Environmental Enhancement Measures

The project will be installed with all precautionary measures to enhance and safe the environment. Following necessary measures will be adopted during Operational phase of the project:

- a) Sprinkling of water will be done on dusty roads and tracks.

- b) Constructional and domestic solid waste will be disposed-off in an environment friendly manner.
- c) Local people will be informed in advance when work is about to start in an area.
- d) Machinery will never be left unattended.
- e) 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.
- f) Safety signs and boards will be placed during construction.
- g) Air pollution controlling devices will be installed within the project during operation.
- h) Machinery will be maintained.
- i) Waste water will be recycled and it will be disposed of through through efficient treatment facility that will be provided within the premises of the project site.
- j) Proper SOPs will be followed with proper schedule along with the HSE conditions.
- k) Area will be restored with native plants. A proper tree plantation plan will be formulated to save the environment.
- l) Solid waste will be handed over to contractors and agreement will be made.
- m) Noise will be controlled by adopting proper measures.
- n) PPEs will be provided to workers during working.
- o) Firefighting equipment's and system will be installed.
- p) Safety signs will be placed at all locations where required.
- q) Hygienic conditions will be ensured and proper quality will be maintained by quality control testing.
- r) First aid facilities will be made available.

Purpose of Mitigation Measures

What is the problem i.e. In terms of "major environmental impacts" which may arise by the project activity?

The major impacts which may arise by the subject project are air, water and noise pollution. Other impacts are of minor importance. These impacts may arise during Construction & Operational phase of the project because the construction phase of the project includes the construction of boundary walls, roads and offices, so they will not cause any major harmful impacts on the environment and during the operational phase of the project, they may cause the issues of air, water and noise pollution if proper precautionary measures to avoid this pollution will not be taken but it will be ensured that precautionary measures will be adopted prior to start of the activity, during the activity and post activity to cause minimum impacts to the environment.

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

Negative impacts may arise during the constructional and operational phase of the project if proper precautionary measures and procedures will not be followed. If proper precautionary measures and procedures will be implemented, there will not be any major problem. If any impact would arise due to the subject project activity, it will be addressed on site. Training will be conducted on site prior to start work while other

precautionary measures will also be adopted to make the project safe and environment friendly.

Where and how the problem should be addressed?

The problem should be address at the site and immediate response should be provided to address the problem which may arise. Institutional capacity responsible for the implementation of EMP will be responsible for addressing such problems if arise. They will assess any impact that could be arisen during both phases and they would also be responsible to address the problem and to mitigate it.

Ways of Achieving Mitigation Measures

Changing in planning and design:

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

Improved monitoring and management practices:

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

Replacement, relocation and rehabilitation:

Site of the project is located adjacent to the Multan Industrial Estate, Phase-I, Multan and it is ideally located amid other industrial units and without any human settlement within and around, hence, there is no replacement or relocation of a single person or economic activity involved in execution of the instant project. Management will develop Restoration/ reclamation or tree plantation plan to restore the project area after the construction phase of the project. Maximum Plantation will be done with native species within and outside the premises of the industrial estate, along the boundary wall and road side if directed. Also, in-front of main area, horticulture plan will be formulated and area for this will be kept reserved.

Schedule of Implementation and Environmental Budget

The implementation of an EMP will be based on ISO guidelines for continuous improvement environment management.

EMP implementation stages

To implement an EMP, four steps will be taken:

Stage I. Environmental Planning. Planning is one of the most important stages in the process of building and implementing EMP. For this the following must be determined:

- The organization's environmental policy;
- Environmental matters;
- Legal procedures and other requirements;
- General objectives and specific targets;
- Environmental management program, including;
 - designation of responsibility for achieving objectives and targets at each relevant function and level of the organization;
 - the means and the time to be achieved.

Stage II. Implementation and operation.

For an effective implementation of the environmental management plan, the organization will develop resources and support mechanisms necessary to perform environmental policy, objectives and targets in this domain.

For the implementation of an EMP the following must be defined:

- Structure and accountability;
- Training and awareness;
- Documentation of the EMP;
 - Document control;
 - Operational control);
 - Prevention (emergency preparedness and response capacity).

Stage III. Checking and corrective action.

This step is a key element of the environmental management, which comes after planning and implementation of the environmental policy. The organization will control and correct, where appropriate, key elements of the environmental management. The organization will monitor and evaluate its environmental performance by;

- Monitoring and measurement;
- Non-conformity, corrective action and preventive action;
- Recordings (reports);
- Environmental management system audit (internal and external).

Stage IV. Management analysis.

The organization will analyze and continuously improve its environmental management, aimed at improving overall performance. It can be achieved with the analysis quality management system done by the leadership.

In order to maintain continuous improvement, fitness and effectiveness of the EMP, and its performance, the organization management will review and assess the EMP at defined intervals. The management review will ensure that the necessary information is collected to allow management to continue this assessment.

This review shall be documented. Management review will address the possible need to change the strategy, objectives or other elements of the Environmental Management, in light of the audit systems of environment management results, changing circumstances and the commitment to continuous improvement. Reviewing the strategy, objectives and procedures will be carried out at the managerial level which defined them.

The review shall include:

- the audit results;
- the extent to which they achieved objectives and targets;
- continuous convenience of the EMP related to the changing information and conditions.

The implementation requires the involvement of all staff of the organization, whatever level of seniority and functions involved, and especially the employment of a dynamic and cyclic process of continuous improvement and self-assessment of environmental impacts.

Environmental Management Cost

The management cost that has to be spending on the mitigation measures has been estimated and is included in the following table.

TABLE 10: Environmental Management Cost

#	Component	Particulars		Estimated Cost	Allocation Capital Investment	Allocation Recurring Expenditure
1.	Water Pollution Control	Installation of in-house treatment facilities for air and waste water pollution		50,00,000	55,00,000	1,00,000
2.	Occupational Health, Safety & Environment	Glares, Breathing Masks, Gloves, Boots, Helmets, Ear Plugs etc. & annual medical checkup of workers and water filtration plant		10,00,000	12,00,000	2,00,000
3.	Noise Control	Installation of anti- vibration pads.		1,00,000	1,50,000	--
4.	Waste Management	Disposal of hazardous waste.		--	--	1,00,000
5.	Green Belt	Green belt development & maintenance		1,00,000	1,50,000	1,00,000
6.	Energy conservation	Installation of solar lights within project premises		3,00,000	5,00,000	--
7.	Environment Monitoring	Environment Monitoring Parameters		--	--	4,00,000
		Emissions from boiler and standby generator	All parameters as required by EPA			
		Noise of working area	--			
		Effluents	All parameters as required by EPA			
Total (Rs.) =				65,00,000	75,00,000	9,00,000

CHAPTER – 7

ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

The primary objectives of the EMMP are to:

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

Institutional Capacity

The overall responsibility for compliance with the environmental management plan rests with the project proponent. He will appoint a HSE/Project Manager of relevant qualification.

HSE/Project Manager will act as Environmental Manager and will manage all HSE conditions at the PEQS.

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 cross-checked.

Following functionaries will be involved in the implementation of EMP:

- i. Project Proponent
- ii. HSE Officer
- iii. In-Charge Administration
- iv. Supervisor of project

Training Schedule

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

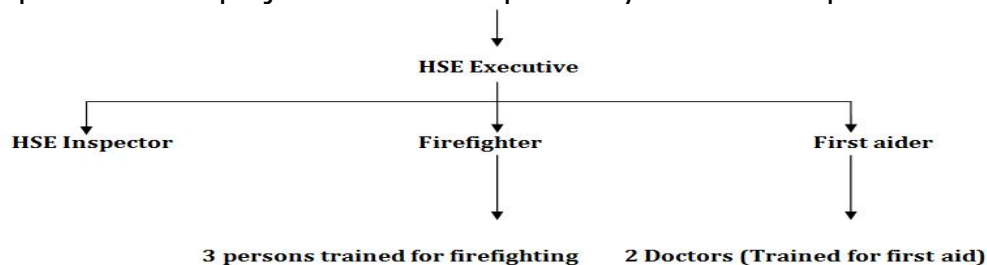


Figure 10

Management will hire or appoint HSE officer before the initiation of constructional work at the project site. HSE officer will be responsible for conducting the training of the labor, which will be organized either by the management of industry or by the contractor. Following schedules of training will be implemented:

Table 10: Training Program

Sr. No.	Description of program	Labor/ Personnel involved	Time/ duration
1)	General HSE Training	Trainers and whole labor	Quarterly for 1 hour
2)	Instrument use/ workplace specific items	Trainers and whole labor	Quarterly for 1 hour
3)	PPEs use and safe work practices at work site.	Trainers and whole labor	Quarterly for 1 hour
4)	Reporting and investigating accidents/ incidents	Trainers and whole labor	Quarterly for 1 hour
5)	Emergency procedures	Trainers and whole labor	Quarterly for 1 hour
6)	Medical and first aid	Trainers and whole labor	Quarterly for 1 hour
7)	Health and safety promotion	Trainers and whole labor	Quarterly for 1 hour

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 project site and affective implementation of the EMMP.

The training modules will include air, noise and water pollution monitoring, social awareness, Environmental Laws, National & Provincial Environmental Quality Standards (PEQS), Usage of personal protection equipment, and health and safety related issues at the project site. The HSE/Project Manager will train all workers & staff in basic sanitation and health care issues 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 be responsible for conducting Training on monthly or quarterly basis regarding health & safety, hygiene, firefighting and first aid.

Training of Building Contractor

Training of building contractor & workers and its TORs will be part of the construction. TORs will include the training and submission of reports in the following area:

- i. Handling of Machinery in a safe way
- ii. Use of PPEs
- iii. Maintenance of vehicles and submission of Environmental Monitoring Reports
- iv. Maintenance of Water Consumption records
- v. Testing of water and waste water and submission of Environmental Monitoring Reports
- vi. Placement of safety signs/boards during construction
- vii. Sprinkling of water on the roads and dusty tracks
- viii. Monitoring of generator emissions

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

Summary of Impacts and their mitigation measures:

Table 11

Serial	Environmental Issues/ Impacts	Mitigation Measures
PLANNING, SITE SELECTION AND DESIGN STAGE		
1	Observance of administrative and legal formalities	It is recommended to obtain the approvals from all other relevant departments.
2	Acquisition of land	Land is the property of the project proponent.
3	Loss of environmentally sensitive areas	There is no 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 community
4	Changes in traffic pattern	There is no need to change the traffic pattern due the development of the subject project because only few vehicles will visit the project on daily basis.
5	Potential conflicts with stakeholders	There is no conflict at the current stage of the project. People of the surrounding area have no 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	- 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 construction materials is recommended. - Sprinkling of water on construction site and surrounding areas is recommended.
3	Generation of noise	- Avoid using 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
CONSTRUCTION STAGE		
1	Minor erosion of land	- Add more vegetation; restore the land by more plantations. - Sprinkling of water on dusty tracks is recommended. - Clearing of land should be step wise; vegetation should be removed only from the area where main building will be developed.
2	Contamination of land and water	Essential services like water supply, sewerage disposal and solid waste management must be in working condition.
3	Air Pollution (PM)	- Sprinkling of water on dusty tracks is recommended - Do not throw heavy equipment and construction materials in haphazard manner - Prohibit idling of vehicles - Workers on the site should be issued with dust masks during dry and windy conditions
4	Noise pollution	- Construction should be carried out only during daytime - Workers to wear ear muffs if working in noisy section
5	Traffic density	- Proper signage put in place to notify neighbours of the activity and presence of heavy vehicles and to direct traffic. - Presence of boards directing patrons to the site - Strict adherence to traffic rules. - Provide adequate parking and driveways

		• Control and management of traffic through enforcement of speed limits • Provide bill boards at the site/entrance to notify motorists about the development
6	Ecological considerations (flora & fauna)	• The flora and fauna should be restored after construction by landscaping and maintaining the introduced plants
7.	Solid Waste	• Excavation waste should be re-used or backfilled. • Waste generated should be collected by a privately contracted waste collection company • The site should have waste receptacles with bulk storage facilities at convenient points to prevent littering • Unusable construction waste, such as damaged pipes, formwork and other construction material is handed over to the local contractor • For wastewater treatment facility 5 Marla is reserve in housing scheme.
8	First Aid	• A well-stocked first aid kit shall be maintained by qualified personnel
9.	Occupational Health and Safety	• Train workers on personal safety and how to handle equipment and machines • Report any accidents / incidences and treat and compensate affected sanitary workers • To reduce health and safety risks, effective emergency response plans will be observed during construction. • Proper personal protective equipment i.e. safety shoes, helmet, goggles, respiratory equipment and gloves shall be used at all times on site • Provide first aid kits and contact points in case of injury and accidents • Form a safety and health committee to coordinate safety and health issues at workplace • Provide regular safety awareness talks and trainings
10.	Material transportation	• All fine earth materials must be enclosed during transportation to the site to prevent spillage and dusting. Trucks used for that purpose should be close properly and with tarpaulins to cover the materials. • The transportation of lubricants and fuel to the construction site should only be done in the appropriate vehicles and containers, i.e. fuel tankers and sealed drums. • As far as possible, transport of construction materials should be scheduled for off-peak traffic hours. • This will reduce the risk of traffic congestion and of road accidents on the access roads to the site.

Table 12

OPERATION STAGE		
1	Contamination of land and water sources	- Continuous vigilance on maintenance of services - Tarpaulin sheets or concreted area must be placed to avoid leaching of oil into ground - Plantation to avoid land erosion
2.	Noise Pollution	- Maintain plant equipment. - Workers to wear ear muffs if working in noisy section. - Management to ensure that noise from the residents is kept within reasonable levels - There should not be unnecessary honking of the involved machinery - Trainings for safe driving practices & HSE trainings of the employees and workers is recommended.
3	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 the industry. - Firefighting drills carried out regularly. - Firefighting emergency response plan. - Ensure all firefighting equipment is regularly maintained, serviced and inspected.
		Fire hazard signs and directions to emergency exit, route to follow and assembly point in case of any fire incidence
4	Air Emission	- All equipment, generators, and vehicles used during the project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions. - Imposing speed limits and encouraging more efficient journey management will reduce the dust emissions produced by vehicular traffic. - All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke. - Dry Scrubbers will be installed to reduce the emissions from furnace.
5	Safety/security concerns	- Safety of the workers and others will be ensured. - Privacy of the neighbors will not be disturbed.
6	Malfunction of utilities	It is proposed to appoint maintenance engineer with technicians like plumber and electrician for smooth operation of utility services.
7	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 ear muffs, gloves and glasses must be strictly used by the operators at the work site. - Safety of management, workers and visitors must be ensured. - Observance of construction and safety codes must be ensured.

		- Provision of emergency exits must be ensured. - Equipment's should be marked and tagged properly
8	Ecological considerations (flora & fauna)	The flora and fauna should be restored after construction by landscaping and maintaining the introduced plants
9	Solid Waste	- Separate waste bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton. - Recyclable material will be separated at source. - Non-hazardous non-recyclable wastes will be disposed off on designated site. - No waste will be dumped at any location outside the plant boundary. - All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking. - An emergency response plan will be developed for the hazardous waste (and substances). - All containers of hazardous waste will be appropriately labeled. - 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. - The site should have waste receptacles with bulk storage facilities at convenient points to prevent littering during operation.
10	Traffic Management	- Night time driving of project vehicles will be limited where possible. - Vehicles will remain confined to defined access. - Speed limit of 10 km/h will be maintained on the section of the access road that is adjacent to the village.
10	House Keeping	Sites shall be properly managed with a good standard of housekeeping to reduce the risks of accidental injury.
11	Energy use & use	- Install electricity meters and monitor them regularly to measure efficiency. - Turn Off Lights, Machines and other equipment when not in use.
12	Water consumption	- Avoid unnecessary toilet flushing - Promptly detect leaking taps and repair them - Turn off taps when not in use - Install water conserving taps that turn off immediately when water is not in use - Install a discharge water meter in the premises to check on total water use and for billing purposes
13	Electricity use	- Erect a meter in the premises to check on total kilowatts used and for billing purposes - Switch off light that are not in use

		• Use of energy conserving bulbs/tubes • Use of natural light for lighting purposes • Use natural ventilation from windows and doors and avoid using Air Con that use electricity • Provide a standby generator in the premises in cases power goes out • Switch off lights in the offices at night
14	Wastewater disposal	• Wastewater treatment facility will be installed for treatment of wastewater. • Waste water should empty to the septic tank via well laid sewage pipes • Conduct inspections for sewer pipe blockages or damages and fix them

Environmental Management Plan
Table 13: Environmental Management Plan

Sr. No.	Environmental Parameter/ Element	Mitigation measure to be taken during		
		Construction	Regular operations	Responsibility
Physical Environment				
1	Waste water	The sewage to be generated will be discharged into the septic tank for its primary treatment and then it drained out into sewer. Domestic/construction waste water after Treatment in septic tank will be drained into nearby local sewage drain.	Waste water from industrial process will be treat in wastewater treatment facility. Sewage and other waste effluents will be handled to avoid contaminating surface and groundwater. No contaminated effluents will be released into the environment without having been treated. Monitoring will be conducted by EPA certified lab if required.	Environmental / Project Manager
2-	Health & safety	Local people will be informed in advance when work is about to start in an area. Safe driving practices will be adopted, particularly while passing through settlements Basic health facilities will be provided to employees	Basic health facilities will be provided to employees Proper firefighting system will be installed. Security guards will be present round the clock.	Environmental / Project Manager

		Open fires will not be allowed anywhere outside the site.	Regular medical check-ups must be ensured to improve the working condition and efficiency of workers.	
			Relevant safety devices like ear muffs, gloves and glasses must be strictly used by the operators at the work site. Safety of management, workers and visitors must be ensured. Provision of emergency exits must be ensured. Equipment's should be marked and tagged properly	
3-	Water supply	It will be ensured that no activity tempers with the water supply system.	It shall be ensured that no activity tempers with the water supply system. Project proponent committed to provide safe drinking water to all workers and staff	Environmental/ Project Manager
4-	Solid wastes	Excavation waste will be re-used or backfilled. Waste generated will be collected by a privately contracted waste collection company	Separate waste bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton. Recyclable material will be separated at source. Non-hazardous non-recyclable wastes will be disposed off on designated site. No waste will be dumped at any location outside the plant boundary. All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking.	Environmental/ Project Manager
			An emergency response plan will be developed for the hazardous waste (and substances). All containers of hazardous waste will be appropriately labeled. 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. The site should have waste receptacles with bulk storage facilities at convenient points to prevent littering during operation.	
5-	Noise	In order to avoid noise in the project area, vehicles to carry raw materials, shall be operated during night time as far as possible. The project construction activities will not involve any activity which may create high noise levels. Ear plugs will be provided & implemented.	In order to avoid noise in the project area, vehicles to carry domestic and commercial materials, shall be operated during night as far as possible. No activity producing extra ordinary levels of noise will be allowed as a policy matter. PPE will be provided to worker. Generators will be installed in a specially constructed room where its noise will be curtailed within the limiting values of the Punjab Environmental Quality Standards. Monitoring will be conducted by EPA Certified lab as per PEQS if required	Environmental/ Project Manager

6-	Gaseous emissions and particulate matter/dust emissions	Construction materials i.e. sand, clay and like will be transported to the project site during night time. All equipment, generators, and vehicles used during the project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions. All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.	Generators should be maintained properly Generators will be installed in a specially constructed room. Avoid off road travel Maintain vehicle speeds Monitoring should be conducted as per instruction of Environment Protection department. Dry Scrubbers will be installed to reduce the emissions from smelting furnace. Speed for traffic movement in the scheme should be limited to avoid noise. Canopies should be built over generators to avoid noise pollution.	Environmental/ Project Manager
7	Soil disturbance/erosion	Control earthworks and compact loose soils Landscaping of project is done after construction. Controlled and managed excavation activities will be done Soil erosion control and conservation structures/means where necessary was provided. To the greatest extent possible, phase site clearance so as to minimize the area of exposed soil at any given time	Maximum plantation is recommended within at outside the land subdivision and for this area is reserved. Tarpaulin sheets will be placed under generator (s), and other leaching substances. Land will be restored by planting indigenous plants. Landscaping on project completion	Environmental/ Project Manager
8-	Traffic related problems	The vehicles number will be regulated in a way that no stampedes occur on the site. Large size vehicles in very limited number	The project site has additional area reserved exclusively for parking cars and motor cycles.	Environmental/ Project Manager
		will be visited the project site during night time.		
9-	Trash burning	No trash burning will be done during construction phase.	No trash burning will be allowed on the roads and streets.	Environmental/ Project Manager
10-	Dust	The open place will be cleaned after sprinkling of water to avoid any dust to spread around.	Plantation will be ensured in open space to avoid dust.	Environmental/ Project Manager
BIOLOGICAL ENVIRONMENT				
1	Fauna and Flora	Site is devoid - off any protected species of both fauna & flora	Awareness programs will be planned regarding the protection of fauna & flora. Species of Indigenous plants will be planted at site.	Environmental/ HSE Manager
SOCIOECONOMIC IMPACTS				
12	Resettlement issues	There is no issue of resettlement due to the construction of the subject project.	There will not be any issue of resettlement due to the operation of the subject project.	Environmental/ HSE Manager
13	Change in cultural language	Maximum employment of Local people is recommended to preserve the local cultural language. It will be helpful in communication with the local people to resolve any emerging issue near the project area.	Maximum employment of Local people is recommended to preserve the local cultural language. It will help in communication with the local people to resolve any emerging issue near the project area	Proponent
14	Education	Schools and colleges already exist in the area.	Schools and colleges exist in the area. The project proponent is committed to initiate an educational awareness program.	Proponent

15	Health	Heath facility already exists near the project site. The project proponent will be provided first aid facilities at site and also social security and medical checkups of the workers.	Heath facility already exists near the project site. The project proponent is committed to provide first aid facilities at site and also social security and medical checkups of the workers.	Proponent
16	Culture, Norms of the area	Maximum local employment will be ensured to preserve the culture of the area	Maximum local employment should be ensured to preserve the culture of the area	Proponent
17	Gender inequality	Women involvement will be ensured in decision making process should be ensured.	Women involvement in decision making process should be ensured	Proponent
Others				
18-	Environment quality enhancement measures: Flowers and plants and decoration lights.	---	Flower pots containing flowers and plants will be planted in front of the buildings to add to the improvement of the environment around. Street lights will be provided in the roads and streets.	Environmental/ Project Manager
19-	Staff for catering the Environmental Management Plan	---	Special staff will be recruited to implement this Environmental Management Plan on regular basis.	Environmental/ Project Manager
20-	Enhancement of aesthetic beauty of the building and the area.	---	All other necessary measures shall also be taken to maintain standards of cleanliness so that the building may add to the scenic/aesthetic beauty of the area around.	Environmental/ Project Manager

Proposed Environmental Monitoring

To oversee the environmental performance of the project through its life cycle enforcing the PEQS an Environmental Monitoring Program should be formulated which ensures effective surveillance of the environmental parameters at various stages of the project development and compliance with PEQS and legal obligations. Monitoring for following Environmental Parameters is recommended:

Table 14: Environmental Monitoring

Sr. No.	Parameters	Monitoring Schedule	Monitoring Duration
1.	Ambient Air Monitoring (NO _x , CO, SO _x , PM ₁₀)	Quarterly	24 Hours
2.	Noise Level	Quarterly	24 Hours
3.	Water quality	Quarterly	24 Hours

CHAPTER – 8

CONCLUSION & RECOMMENDATIONS

Based on the study conducted for Environmental Impact Assessment (EIA) for the project under consideration, the following conclusions are made:

Conclusion

The EIA study reveals that the project is economically viable and socially acceptable and the proponent will implement the project in the environment friendly manner. He will adopt all the necessary measures to control any impact if resulting from the project. He will provide the safe drinking water, safe working environment, proper training and first aid facility to all workers and staff. The project will generate additional jobs during construction and operation phases.

Recommendations

In view of the comprehensive screening process and findings of the present study there is no need of conducting further investigations.

- Tree plantation inside and near the project area is recommended.
- The Management of will continue to assist the local communities as a corporate/social responsibility (CSR).
- Any seepage and leakage will be controlled through proper mitigation measures.
- Sound proof room should be constructed for generator to control its sound.
- Use of narcotics and smoking must be prohibited during working, filling or handling of fuel.
- PPEs must be provided to workers such as gloves, masks, etc.
- Proper solid waste management system must be adopted.
- Safety signs, safety board's etc. must be placed on site during various developmental stages.
- Machinery will never be left in running condition.
- First Aid measures, health & safety Equipment (PPEs) will be provided to workers.
- Fire Fighting station & system will be installed.
- The management of subject project will assist the local communities as a corporate social responsibility.
- Jobs and employment will be provided to the local area.

The present EIA report is enough to meet the administrative and legal framework. After the complete study of the project, it is concluded that project will not have significant adverse impacts on the nearby community and on environment. Overall the project will have positive impacts on the local population and country as a whole. Therefore, it is requested for the environmental approval for the subject project.

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section 12 of Punjab Environmental Protection Act 1997
Pakistan Environmental protection act 1997
Punjab Environmental Protection Act 1997
Guideline for the Environmental Assessment
Regulations of Environmental Assessment, Regulations 2000
National Conservation Strategy- Pakistan
Guideline for the public consultation
National Resettlement Policy and Ordinance
National Environmental Quality Standards (Self-monitoring and reporting by the industry)
Labor laws
Canal and Drainage Act, 1873
National Environmental Policy 2005
The Land Acquisition act, 1894
The Punjab local Governmental ordinance, 2001
Meteorological data from meteorological department and website
Pakistan Biosafety rules 2005
Pakistan Environmental agency (review of IEE/EIA) regulation 2000
Punjab Portal (<http://www.punjab.gov.pk/attack>)
Multan Chamber of Commerce Industries (<http://www.mcci.org.pk/Multan.html>)
Sectorial Guideline for environmental reports, industrial states
Pakistan Environmental Protection ordinance (PEPO), 1983
OSHAS 1800 for health and safety

GLOSSARY

Words	Dictionary
Air Quality Sensitive Receptors	People, property, species or designated sites for nature conservation that may be at risk from exposure to air pollutants potentially arising as a result of a proposed development.
Air Quality Standard	Air quality limiting values and objectives.
Annual Average Rainfall	Average amount of precipitation falling at a specified site recorded by the Meteorological Office. It gives a measure of the overall wetness of the local climate.
Annunciation	A formal public statement
Anticipated Impacts	Expected Impacts
Aspects	A distinct feature or element in a problem
atm	Standard unit of atmospheric pressure; the pressure exerted by the weight of air in the atmosphere of Earth
Baseline	Existing environmental conditions present on, or near a site, against which future changes can be measured or predicted.
Biodiversity	The variety of life in the world or in a particular habitat or ecosystem.
Climate	The climate can be described simply as the 'average weather', typically looked at over a period of 30 years. It can include temperature, rainfall, snow cover, or any other weather characteristic.
Climate Change	A change in the state of the climate, which can be identified by changes in average climate characteristics that persist for an extended period - typically decades or longer.
Compliance	Acting according to certain accepted standards
Cutting	A linear excavation of soil or rock to make way for a new railway or road. Cuttings help reduce the noise and/or visual impact of passing trains or road vehicles.
Decibel	A unit used to express relative differences in sound power or intensity. There is a million to one ratio in sound pressure (measured in Pascal (Pa)) between the quietest audible sound and the loudest tolerable sound. The decibel (dB) scale, based on a logarithmic ratio, is used in sound measurement because of this wide range. Audibility of sound covers a range of approximately 0-140dB.
Discharge	spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping
Discrepancies	A difference between conflicting facts, claims or opinions
Dust	All airborne particulate matter
Earthworks	The removal or placement of soils and rocks such as in

	cuttings, embankments and environmental mitigation, including the in-situ improvement of soils/rocks to achieve desired properties.
Ecosystem	A biological community of interacting organisms (e.g. plants and animals) and their environment.
Effluent	Any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour.
Environment	air, water and land; all layers of the atmosphere; all organic and inorganic matter and living organisms; 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.
Environment Agency	Government agency established to protect and improve the environment and contribute to sustainable development. Responsibilities include: water quality and resources, flooding and coastal risk management and contaminated land.
Environment Budget	Monetary assets reserve for Environmental activity
Evaluated	Estimate or determine the nature, value, quality, ability, extent, or significance
Excavated Material	Soil, rock and other material that has been removed from the ground during construction.
Fauna	All the animal life in a particular region or period
Flora	Variety of Plants found in an area
Greenhouse Gas	A gas such as carbon dioxide, methane, chlorofluorocarbons, nitrous oxide, ozone, and water vapor that contributes to the greenhouse effect by absorbing infrared radiation.
Groundwater	All water that is below the surface of the ground and within the permanently saturated zone.
Groundwater Body	A distinct volume of groundwater within an aquifer
Heavy Metals	A loosely defined term which refers to a group of metal and metalloids, many of which are toxic to some degree.
Impact	Used throughout this environmental impact assessment report to refer to the consequence of an impact to the receiving environment.
Environmental Impact Assessment	an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and framing

	of recommendations and such other components as may be prescribed in respect of a project.
Legislation	law enacted by a legislative body
million	10,00,000
Mitigation	The measures put forward to prevent, reduce and where possible, offset any adverse effects on the environment.
Mitigation Measures	Measures aimed to curtail or entirely control an adverse impact or to compensate some loss or cause additional improvements
Punjab Environmental Quality Standards	the permissible standards for emission of air pollutants and noise and for discharge of effluent and waste specifically in Punjab.
Nuisance	Annoyance
Orientation Session	Direction Session
Potential Issue	Problems likely to arise
Proposed Project	Planned activity
Rehabilitation	The conversion of wasteland into land suitable for use of habitation or cultivation
Residual Impacts	Impacts left behind after implementation of the mitigation measures
Risk Assessment	An assessment of the probability of a hazard occurring that could result in an impact
Sand	Soil particles from 0.06mm-2.0mm in equivalent diameter. Fine sand particles are from 0.06mm-0.2mm; medium sand from 0.2mm-0.6mm; and coarse sand from 0.6mm-2.0mm.
Scoping	An initial stage in the environmental impact assessment process to determine the nature and potential scale of environmental effects arising as a result of a proposed development, and an assessment of what further studies are required to establish their potential environmental Impacts and effects.
Screening	The first stage in an environmental impact assessment. It is used to determine if further assessment is necessary and to categorize the project.
Significant	Important
Soil Erosion	The detachment and movement of soil by the action of water and/or wind.
Soil Profile	A vertical cross-section through a soil.
Stakeholders	A person or organization with an interest or concern in something
Statutory Requirements	Legal Requirements
Substitutions	An event in which one thing is substituted for another

Surface Water	Waters including rivers, lakes, reservoirs, canals, streams, ditches, coastal waters and estuaries.
Sustainability	such developments that meet the needs of the present generation without compromising the ability of future generations to meet their needs.
Topography	The natural or artificial features, level and surface form of the ground surface
Topsoil	Upper layer of a soil profile, usually darker in color (because of its higher content of organic matter) and more fertile than subsoil, and which is a product of natural biological and environmental processes.
Waste	any material, substance, or by-product eliminated or discarded as no longer useful or required after the completion of a process

TERMS OF REFERNCES

These terms and references are being submitted for the subject EIA study under clause 5(f) of policy and procedure for the filing, review and approval of environmental assessment. These TORs have been prepared by **CHEMSA** in consultation with proponent of the project. Proposal and TORs for the EIA accepted by the M/s Suriya Aslam Paper Mills (Private) Limited.

1. INTRODUCTION OF PROJECT

Subject project is M/s Suriya Aslam Paper Mills (Private) Limited" situated at Plot No. 11-A Multan Industrial Estate, Phase-I, Multan which will be designed for industrial establishment.

2. COST OF PROJECT

The total cost of subject project is about Rs. Rs. 75-Million.

3. AREA OF THE PROJECT

Total area of the proposed project is 8-Kanal

4. NAME OF PROPONENT

Name : Mr. Naveed Iqbal s/o Muhammad Iqbal
CNIC No. : 36301-8032763-1
Address : | Plot No. 11-A, Multan Industrial Estate, Phase-I, Multan

5. ENVIRONMENTAL CONSULTANT & CLINT

The project proponent appointed M/s CHEMSA as Consultant for the subject project to conduct the Environmental Impact Assessment. M/S CHEMSA will be called as "CONSULTANT" and "M/s Suriya Aslam Paper Mills (Private) Limited" will be called as "CLIENT".

6. OBJECTIVE OF THE IEE STUDY The objective of the study includes the compliance of Section 12 of Punjab Environmental Protection Act-1997, Punjab Environmental Quality Standards and fulfillment of HSE conditions.

7. PURPOSE OF EIA STUDY

The key objectives of the EIA are to:

- i. Document the ecological and socioeconomic baseline conditions of the study area and the affected communities.
- ii. Inform and obtain input from stakeholders (e.g. government authorities, public and indigenous communities) and capture their relevant issues and concerns.
- iii. Assess in detail the environmental, social and health impacts that would result from the Project.
- iv. Identify environmental and social mitigation measures to address the impacts identified.

- v. Develop the EMPs as discussed above, based on the mitigation measures developed in the EIA.
- vi. Meet the requirements or recommendations of the applicable Provincial Environmental Laws and Guidelines.

8. CLIENT RESPONSIBILITY

We expect the following inputs from the clients:

- i. As soon as the Proposal is accepted, the Consultants will request for the nomination of senior officer to be nominated as Coordinator who will be responsible for all coordination activities as required by the Consultants and to whom the Consultants will refer for information and assistance. All correspondence between the Consultants and the CLIENT will be routed through the Coordinator.
- ii. CHEMSA require free access to all relevant information available with the Client.
- iii. Assess and identify major potential issues and impacts particularly those which may have influence on design, construction and operation at any stage.
- iv. The report developed for the CLIENT shall be the property of the CLIENT and the Consultant shall adhere to confidentiality morality as well as legally.
- v. Client will provide relevant documents as,
 - a) Signed application on company letter head (pattern will be provided).
 - b) Affidavit on Rs 100- Stamp Paper (pattern will be provided)
 - c) Undertaking on Rs. 100/- Stamp Paper (pattern will be provided)
 - d) Demand Draft of Rs. 30,000/- in favour of Director General, Environmental Protection Agency Punjab, Lahore
 - e) Copy of NIC of proponent
 - f) Signature on Schedule IV (pattern will be provided)
 - g) Detail Company Profile
 - h) Details of firefighting Equipment
 - i) Layout Map of the project
 - j) Other NOCS/ Certificates form other concerned departments (if any)
- vi. If any legal litigation arises from stockholders during the proceeding of IEE. The consultants will not be responsible for the delay in the approval process.

Signature:
CONSULTANT
M/S CHEMSA

Signature:
CLIENT
M/s Suriya Aslam Paper Mills (Private) Limited