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**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
W.H.O	World Health Organization
PET	Punjab Environmental Tribunal
SWM	Solid Waste Management
CSR	Corporate Social Responsibility
MSWs	Municipal Solid Wastes
TMA	Town Municipal Authority
KVA	Kilo Volt Ampere
PPEs	Personal protective equipment's
PM	Particulate matter

**LIST OF ANNEXURES**

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# EXECUTIVE SUMMARY

**Project Title and Location**

The Said project for which this Environmental Impact Assessment (EIA) Study has been conducted is the establishment of pharmaceutical unit under the name of Zoic International (Pharmaceutical Unit), located at Plot No. 573, Sunder Industrial Estate, Raiwind Road, District Lahore.

**Project Proponent**

It is intending of Muhammad Waseen Khan S/O Muhammad Yasin Khan, proponent of Said project, wants to get Environmental approval of said unit by submitting the Environmental Impact Assessment Report for the compliance of section 12, PEPA, 1997 (Amended 2012).

**Table 0-1: Details of Project Proponent**

Name	Muhammad Waseen Khan S/O Muhammad Yasin Khan
CNIC	35202-9351820-5
Mailing Address	House No. 8, Street No. 37, Muhala Qila Lachan Singh, Ravi Road, Lahore.

**The EIA Study Consultant**

EcoRise Consults, as independent consultants, has been appointed by the proponent to conduct Environmental Impact Assessment (EIA).

**EcoRise Consults**

Office address 99-Burj Al Saeed Plaza 1<sup>st</sup> Floor Room#110, Ichra Lahore.

Email: ecoriseconsukts25@gmail.com

Contact: 03287570417.

**Positioning of the Project**

Pharmaceuticals units fall under category of Chemical Projects mentioned in Schedule-II (B) (2) of Review of IEE/EIA Regulations 2022, hence such projects require submission of EIA Report to obtain Environmental Approval, under Section 12 of Punjab Environmental Protection Act 1997.

**Brief Description of the Project**

The Said project is the construction of pharmaceutical unit under the name of M/S Zoic International (Pharmaceutical Unit). The total area of plot is 18000 sft, covered area of ground floor and first floor will be 9477 sft of each, area of mumty will be 248 sft, covered area of guard room will be 356 sft, total approved area will be 29035 sft, additional covered area of 3<sup>rd</sup> floor will be 9418 sft, total covered area will be 38453 sft and open area of plot will be 8411 sft. The estimated cost will be 250 million.

**Brief Outline of the Proposal**

<b>Name of the Said project</b>	<b>M/S Zoic International (Pharmaceutical Unit)</b>
<b>Purpose of the Project</b>	<ul style="list-style-type: none"> <li>➤ To establish the Pharmaceutical unit to meet medicinerequirement of country.</li> <li>➤ To establish the business of proponent.</li> <li>➤ To enhance economic growth of the country.</li> </ul>
<b>Process Details</b>	
Manufacturing Process	Pharmaceutical Unit
Finished Products	ENROBARN 20% Oral Liquid, FLORZOC 23% Oral liquid, FLORZOC-10% Oral liquid, ZANRO 10% Oral liquid, ZANROCOL Oral Liquid, Z-FLORCOL Oral liquid, COLIMAX-60 WSP, COLIZOC WSP, NEOZOC-720 WSP, OXFLOLOR-Z WSP, TITHEMYCIN WSP, Z-FLORCIN WSP, Z-LINCO 40 WSP, Z-LINCO-44 WSP, Z-LINCOLIS WSP, OXZY-950 WSP.
Intermediate Products	Nil
By Products	Nil
Production Capacity	250kg/250 liter per batch
<b>Land Requirement</b>	
Total Area of Industry	Total area of the unit is 18000 sft
<b>Status and location</b>	
Location of the proposed site	Plot No. 573, Sunder Industrial Estate, Raiwind Road, District Lahore.
Description of project	The subject project is the Zoic International that manufactures Pharmaceutical Products.
<b>Water Requirement</b>	
Water consumption for the project	1500 Liter/ day during construction phase
Ways of extraction	Motor pump
Source of Water consumption	Underground.
Amount of waste water	20% of total used water. 80% water will be recycled within company.
Source of waste water	Constructional and Domestic Waste
Mode of treatment	During land development septic tanks will be installed for the safe disposal of domestic and constructional wastewater.
<b>Solid Waste</b>	
Source of solid waste generation	Construction and Domestic sources
Mode of disposal	Construction waste will be reuse in construction. Domestic waste will be handed over to local contractors.
Solid waste during operation of unit	Waste only from offices.
<b>Manpower</b>	
Labor Force	About 15-20 persons during construction

Labor Force	About 25-30 persons during operation
<b>Power requirements</b>	
Source of power	Power requirements at the project site will be fulfilled by WAPDA.

**Major Impacts & their Mitigations**

In order to identify all the activities associated with the project during construction and operation phase with potential to cause significant environmental impacts and harm a thorough review has been conducted. Project will not have significant negative impacts on the nearby community and on environment. Overall the project will have positive impacts on the local population and country as a whole. Moreover, area for plantation is also reserved for environmental enhancement measures

Table 2: Summary of Major Impacts & their Proposed Mitigation during Construction Phase

Potential Impact	Key Mitigation Measures
<p><b>Dust Emissions</b>— Dust and PM may be generated during road construction and excavation activities. Gaseous emissions from site generators and transportation vehicles may affect ambient air quality in the vicinity of the project site.</p>	<p>Sprinkling of water on dusty roads, tracts and surfaces is recommended; During excavation works drop heights will be minimized to control the fall of materials reducing dust escape; Vehicle speed restrictions should be applied in the project area; Raw materials should be transported in covered trucks;</p>
<p><b>Solid waste Management</b>— If solid waste will not be managed properly, it may cause negative impacts</p>	<p>Constructional waste should be utilized for road filling and maintenance purposes; Domestic waste should be disposed off properly, handed over to contractors, placed in bins; Proper solid waste management plan should be devised and implemented.</p>
<p><b>Waste water-</b> water used in construction process and excessive water generate as wastewater and it also produced from campsite domestic activities</p>	<p>Waste water after treatment in septic tank should be drain out in nearby drain</p>

**Construction Noise-** Noise may be generated during landscaping activities and from generators and transportation vehicles at the project site; which may be a nuisance for the workers.

Activities generating high levels of noise should be minimized at the project site.

If the noise level will exceed the permissible limits with reference to national and OSHA standards, following recommendations are suggested to take action against the high noise levels:

- Proper tuning of construction machinery and vehicles is recommended.
- Ear muffs and ear plugs are recommended in case of high noise levels.
- Rubber wounds should be placed underneath the generator to avoid the vibration.

<p><b>Vegetation Loss/ Soil erosion</b>— Minor negative impact may arise as only some weeds and grasses are present at the project site which will be cleared for the purpose of construction.</p>	<p>No tree cutting/ vegetation loss issue will be involved in the subject project as project site is free of any dense vegetation and trees. Preparation of a Reinstatement Plan to restore the land after the constructional activities is recommended.</p>
<p><b>Soil Contamination</b>—Oil and Chemical spills can contaminate the soil.</p>	<p>Provision of spill prevention and control kits; Use of impermeable surfaces in workshops, and storage areas; Contaminated soil will be collected and incinerated.</p>
<p><b>Traffic issues-</b> Traffic issues may arise due to the constructional activities at the project site if traffic will not be managed properly.</p>	<p>Traffic impact assessment study should be conducted at the project site; Speed limit of 10 km/h should be maintained on the access road; Ample parking area must be allocated at the project site. Guards should be hired to manage the traffic at the project site.</p>
<p><b>Socioeconomic impacts</b>—Inter-cultural differences between the project staff from other areas and the local community may arise due to the subject project. Positive socioeconomic impacts due to increased infrastructure, employment opportunities and economic growth.</p>	<p>Training of the non-local project staff on local culture and norms; Employment opportunities should be provided to the local people.</p>

Table 3: Summary of Major Impacts &amp; their Proposed Mitigation during Operation Phase

Potential Impact	Key Mitigation Measures
<p><b>Dust Emissions-</b> Particulate matter emissions during project activities can deteriorate the air quality in the working area and be a nuisance for the workers' health. Gaseous emissions from site generators and transportation vehicles can result in deterioration of ambient air quality of the outdoor environment.</p>	<p>PPEs i.e. masks have been provided to workers during the working hours.            Proper ventilation should be ensured in the working area.            Vehicles to use for the transportation of materials should be properly tuned.            Monitoring should be conducted as per EPA PEQS Rules.</p>
<p><b>Machinery Noise-</b> Working of machinery can be a nuisance for the workers in the working area.</p>	<p>PPEs i.e. ear muffs have been provided to workers in case of high noise.</p>
<p><b>Health &amp; Safety Issues-</b> Health and Safety issues e.g. Cuts and Injuries may be caused during the machinery handling.</p>	<p>Proper training of the staff has been conducted to avoid the accidents at regular basis and training record will be maintained by the management.            First aid measures should be provided at the workplace.            HSE policy will be formulated and implemented during admitted by management.            Use of PEP's has been ensured during project activities</p>
<p><b>Discharge of wastewater-</b> The discharge of untreated wastewater can be a negative impact.</p>	<p>No wastewater will be disposed of into drain without having treatment in septic tank.            After treatment wastewater will be disposed of into nearest drainage system.            Compliance of PEQS for Municipal and Liquid Industrial Effluents will be ensured.            Monitoring will be conducted as per PEQS and reports will be submitted to EPA as per Rule (if required)</p>

<b>Solid waste management-</b> Improper solid waste management may cause health problems and aesthetic Issues	Waste bins have been placed at suitable areas at unit, contract has been made with local contractor. Domestic and process related waste should be handed over to contractors.
<b>Groundwater</b> —The increased withdrawal of groundwater for the project will affect the groundwater resources of the project area	No impact on the community groundwater needs is envisaged as a result of the project (ensured by management)

### **Proposed Environmental Monitoring**

To oversee the environmental performance of the project through its lifecycle 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 compliances with PEQS and legal obligations. Monitoring for following Environmental Parameters is recommended:

- **Ambient Air**

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

- **Noise**

Regular monitoring for noise level should be maintained periodically during operation 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 operational phases of the project and report should be submitted to EPA Punjab. Record should be maintained regarding the underground water pump and consumption.

### **Schedules of Proposed Monitoring:**

<b>Sr. No.</b>	<b>Parameters</b>	<b>Monitoring Schedules</b>
1	Ambient Air Monitoring (NO <sub>x</sub> , CO <sub>x</sub> , SO <sub>x</sub> , VOCs, PM <sub>10</sub> )	Regularly
2	Noise Level	Regularly
3	Water quality	Regularly

**Note:** Environmental Monitoring data log book should be maintained by the projectproponent.

## **Screening:**

The Said project for which this Environmental Impact Assessment (EIA) Study has been conducted is the establishment of pharmaceutical unit under the name of M/S Zoic International (Pharmaceutical Unit), located at Plot No. 573, Sunder Industrial Estate, Raiwind Road, District Lahore.

*According to the Punjab Environmental Protection Act 1997 (Amended 2012) and its interpretation as per Review of IEE & EIA Regulations, 2000 for filling, review and approval of environmental assessments, the construction of Medevo (PVT.) Ltd. falls under Schedule-II (EIA) category B (2).*

*Further, the client is required to fulfill the legal requirements of the Section-12 of the Punjab Environment Protection Act 1997(Amended 2012).*

# INTRODUCTION

### **1.1 Purpose Of Report**

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. For the last four decades, this aspect has gained momentum both at official and public level. Because of this, official regulations and laws have been promulgated for the protection and conservation of the physical, biological and social environment. The law makes it mandatory to carry out Initial Environmental Examinations (IEE) or detailed Environmental Impact Assessment (EIA) of the development Projects depending upon the nature and magnitude of the impacts.

### **1.2 Identification of the Project**

Subject project is the construction of Pharmaceutical unit. According to the IEE and EIA Regulations, 2022, the project fall under Schedule II (List of projects requiring an EIA), Category B and Clause 2.

#### **The Proponent**

It is intending of Muhammad Waseen Khan S/O Muhammad Yasin Khan, proponent of Said project, wants to get Environmental approval of said unit by submitting the Environmental Impact Assessment Report for the compliance of section 12, PEPA, 1997 (Amended 2012).

Table 1-1: Details of Project Proponent

Name	Muhammad Waseen Khan S/O Muhammad Yasin Khan
CNIC	35202-9351820-5
Mailing Address	House No. 8, Street No. 37, Muhala Qila Lachan Singh, Ravi Road, Lahore.

CNIC of proponent is attached as **ANNEXURE-A**.

### **1.3 The Consultant**

EcoRise Consults, as independent consultants, has been appointed by the proponent to conduct Environmental Impact Assessment (EIA).

#### **EcoRise Consults**

Office address 99-Burj Al Saeed Plaza 1<sup>st</sup> Floor Room#110, Ichra Lahore.

Email: ecoriseconsukts25@gmail.com

Contact: 03287570417.

The current work has been carried out by the following professionals:

Name	Qualification	Position in the EIA/IEE Team
Shahid Iqbal	MSc (Environmental Science) PU Lahore	Project Incharge And Supervisor
Ali Naeem	MSc (Environmental Engineering) UET-Lahore	Team Leader and Coordinator (Author of the Report)
Muhammad Gulzaib Afzal	B.sc Environmental Engineering (UET Lahore)	Environmental Engineer
Sadaqat Ali	LLB (Islamia University Bahawalpur)	Research Associate (Author of the Report)

## 1.4 Brief Description of Project

### 1.4.1 Nature & Size of Project

Subject project is the establishment of medicine formulation unit under the name of M/S Zoic International (Pharmaceutical Unit), located at Plot No. 573, Sunder Industrial Estate, Raiwind Road, District Lahore and many other industrial units are already in process of establishment and operation in the surroundings. The Said project is the construction of pharmaceutical unit under the name of M/S Zoic International (Pharmaceutical Unit). The total area of plot is 18000 sft, covered area of ground floor and first floor will be 9477 sft of each, area of mumty will be 248 sft, covered area of guard room will be 356 sft, total approved area will be 29035 sft, additional covered area of 3<sup>rd</sup> floor will be 9418 sft, total covered area will be 38453 sft and open area of plot will be 8411 sft. The estimated cost will be will be 250 million.

### **1.5 Objectives Of The Study**

The overall objective of the EIA study is to identify and evaluate the environmental impacts from the proposed unit and to develop an appropriate Environmental Management Plan (EMP) for the mitigation of the potential adverse impacts and ensure compliance with applicable EPA Punjab regulations to obtain the NOC for the project. The study addresses the construction and operation phases of the project.

The objectives of this study are outlined as under;

- Collection of detailed baseline data comprising of physical, biological and socio-economic environmental aspects through extensive field surveys, geographical and topographical maps and other relevant literature;
- Environmental analysis of alternatives for the processes, technologies and approaches associated with the project development;
- Identification of potential impacts on existing physical, biological and socio-economic environments due to the construction and operational activities at the site;
- Devising mitigation measures for the significant adverse impacts during both the construction and operation phases of the Said project; and
- Develop a detailed Environmental Management and Monitoring Plan (EMMP) along with allocation of responsibilities to the concerned persons and authorities.

## **1.6 Structure Of The Report**

EIA Study comprises of Executive Summary following nine 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. 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

# DESCRIPTION OF PROJECT

This chapter presents all aspects of the Said project. It details the nature of the Said 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. The total area of plot is 18000 sft, covered area of ground floor and first floor will be 9477 sft of each, area of mummy will be 248 sft, covered area of guard room will be 356 sft, total approved area will be 29035 sft, additional covered area of 3<sup>rd</sup> floor will be 9418 sft, total covered area will be 38453 sft and open area of plot will be 8411 sft. The estimated cost will be will be 250 million.

### **Type & Category of the Project**

Subject project is the construction of pharmaceutical unit. According to the IEE and EIA Regulations, 2022, the project falls under Schedule II (List of projects requiring an EIA), Category B and Clause 2.

### **Objective Of Project**

Following are the main objectives of the Said project:

- Established business for the proponent
- Provide the product to nearby area's market and hospitals
- Reduce the import.

## **2.2 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 (Amended 2012). 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. Land is the property of proponent, land ownership documents are attached as **ANNXURE-C**.

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:

- The site is at industrial estate.
- 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

## Alternatives:

### Introduction

This project doesn't have alternative for site and technology and the justifications are described below.

### 2 The No Project Alternative

A zero-alternative entail maintaining existing use to which the proposed project site has previously been put to. This alternative would eventually evade any short-term potential negative impacts from project execution. To this end, any potential positive impacts envisaged during midterm and long-term project implementation will be missed.

Adopting zero alternative would mean abandoning all the potential that the site offers to investor(s), contribution to government revenue and even local community livelihoods improvement.

### 3 Location Alternatives:

To fulfill the commercial aspects of the project under reference of this EIA Report, it is to be sited at a place where commercial 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.

#### 3.1 Rejected Sites

Before the consideration of selected project site, project proponent had considered another site. Site-1, later it was rejected due to high cost of land and less benefits of project site. Another site, Site-2 was considered for the construction of the subject project by the management but it was also rejected due to some reasons.

#### 3.2 Reason for Rejection

This site was rejected due to the following reasons:

- Dense vegetation/ tree cutting issue
- Cost of land
- Lack of road infrastructure
- There was no facilities or benefits like industrial estate
- There was no proper drainage of wastewater was available
- Area of available land was low

### 3.2 Location and Site Layout of the Project

The said project is located at Plot No. 573, Sunder Industrial Estate, Raiwind Road, District Lahore.

The project is surrounded by the following:

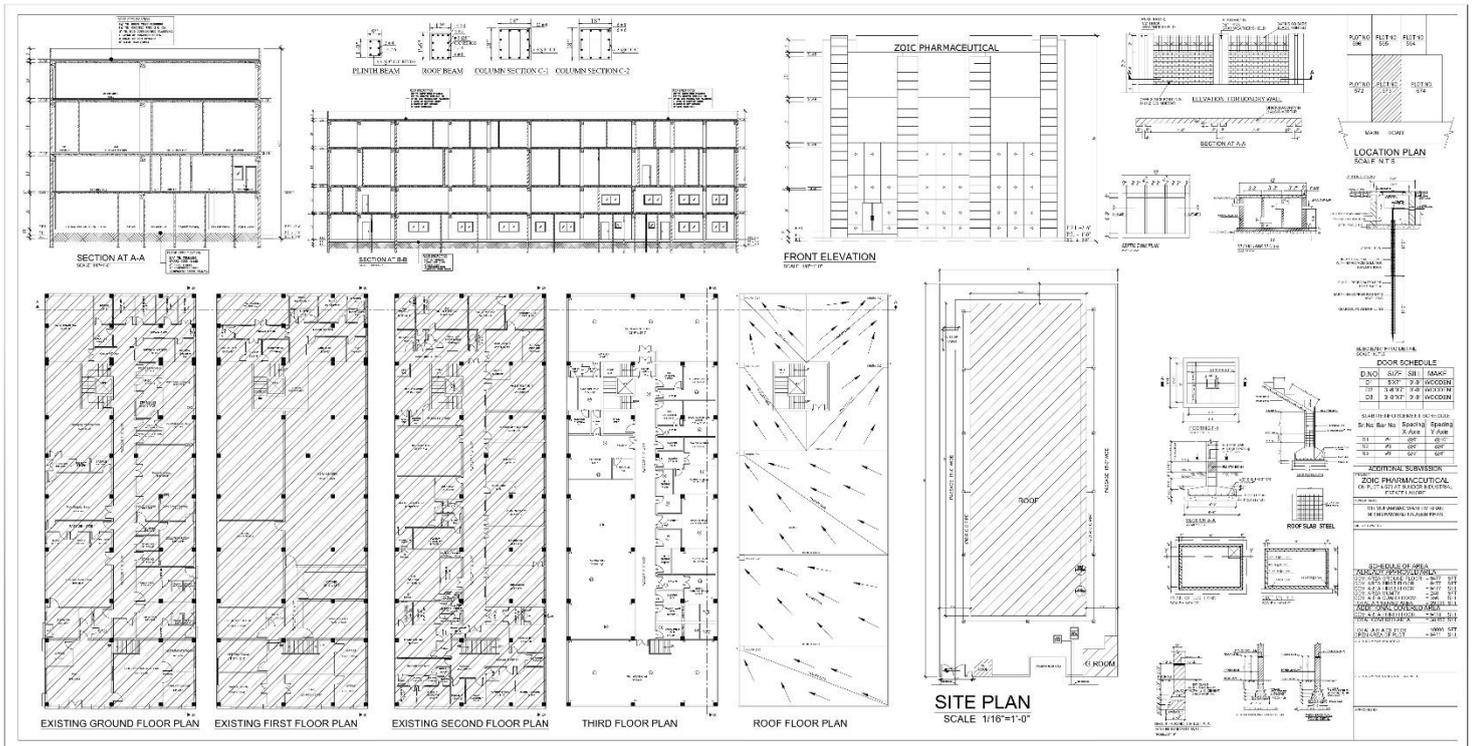
<i>East</i>	Industrial Unit
<i>West</i>	Road
<i>North</i>	Industrial Unit
<i>South</i>	Access Road/ Industrial Unit

SCHEDULE OF AREA		
ALREADY APPROVED AREA		
COV. AREA GROUND FLOOR	= 9477	SFT
COV. AREA FIRST FLOOR	= 9477	SFT
COV. AREA FIRST FLOOR	= 9477	SFT
COV. AREA MUMTY	= 248	SFT
COV. AREA GUARD ROOM	= 356	SFT
TOTAL APPROVED AREA	= 29,035	SFT
ADDITIONAL COVERED AREA		
COV. AREA THIRD FLOOR	= 9418	SFT
TOTAL COVERED AREA	= 38,453	SFT
TOTAL AREA OF PLOT	= 18000	SFT
OPEN AREA OF PLOT	= 8411	SFT

Further, the land coordinates and google earth and layout maps of the project are annexed and also have been given below.



*Google map of the project:*



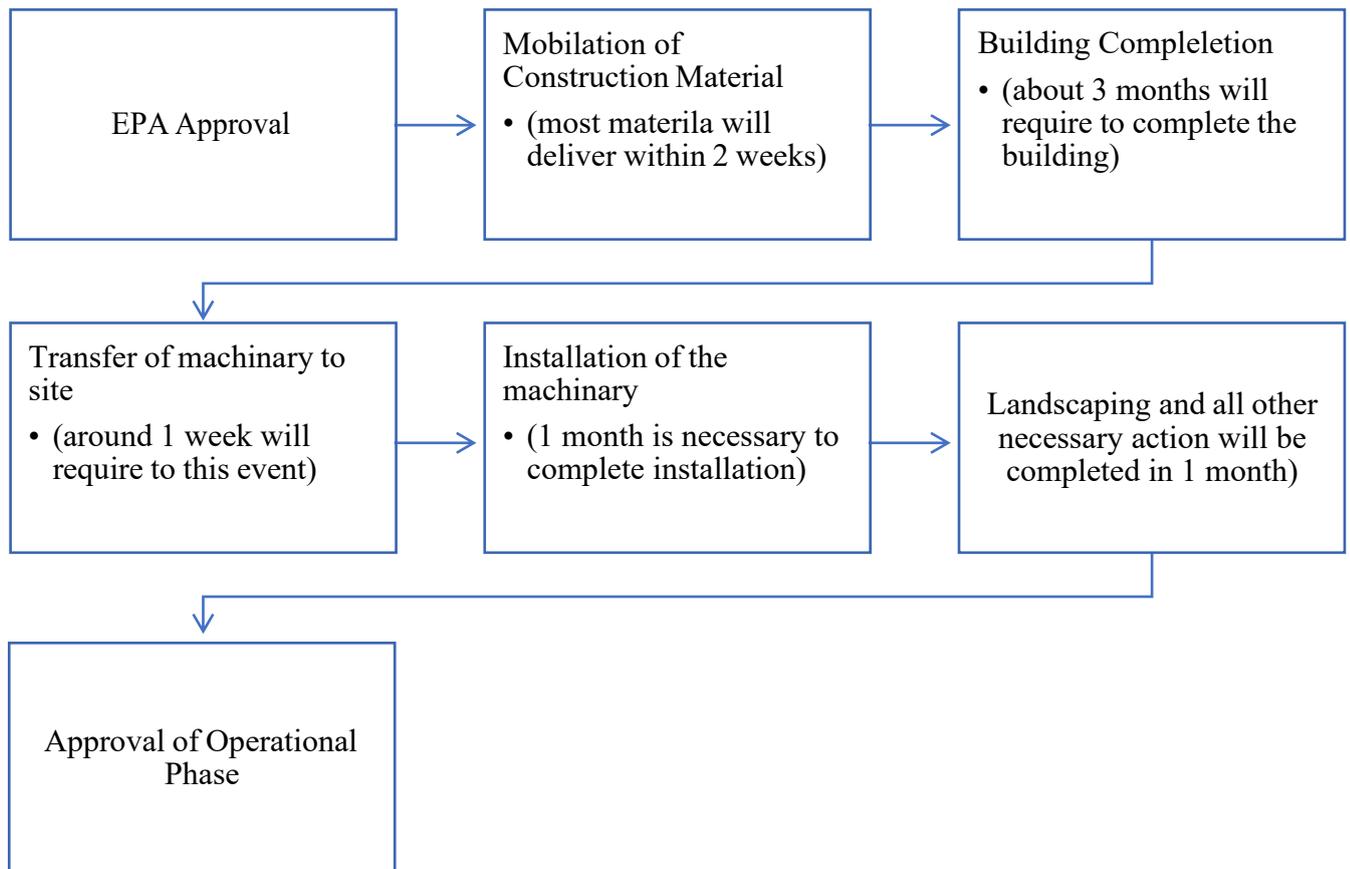


Figure 1: Schedule of implementation

**2.7 Project Description**

Subject project is the establishment of medicinal formulation unit. The production capacity of the unit is 250kg/250 liters per batch.

**2.8.1 Raw Material**

Enrofloxacin
Florfenicol
Colistin Sulphate
Neomycin Sulphate
Lincomycin HCL
Oxytetracycline HCL

**Machinery Detail:**

Mixing room	13	Platform with stairs	ZLG-013	01	Local	SS made
Mixing room	14	Micronizer	ZLG-014	01	Javeed Engg.	Complete SS
Liquid section	15	HVAC	ZLG-015	01		15 ton
Bottle blowing room	16	Bottle blowing machine	ZLG-016	01	Local	
Quarantine	17	Scraper	ZLG-017	01	Local	SS made
Quarantine	18	Leveler rod	ZLG-018	01	Local	SS made
Mixing/filling room	19	Pouch for BMR	ZLG-019	02	Javeed Engg.	Ss made
Quarantine	20	Trays	ZLG-020	67	Local	SS made
Filling room	21	Portable trolleys	ZLG-021	02	Zoic fabricated	SS made
Filling room	22	SS stools	ZLG-022	05	Local	SS made

**Packing Hall** ..... **Supervisor** .....

Description	Sr. No	Equipment/machinery	Asset No	Qty	Made	Specs
Packing hall	01	Conveyer belt	ZP-001	02	Javeed Engg.	10 X 8 X 4
Packing hall	02	HVAC	ZP-002	01		15 ton
Packing hall	03	Pouch for BMR	ZP-003	01	Javeed Engg.	Ss made
Packing hall	04	Stools	ZP-004	10		
Packing hall	05	Pellet	ZP-005	16	Local	
Packing Hall	06	Material transfer trolley	ZP-006	02	Local	SS made
Packing Hall	07	Conveyer belt	ZP-007	02		

**Stores** ..... **Supervisor** .....

Description	Sr. No	Equipment/machinery	Asset No	Qty	Made	Specs
Stores	01	Racks	ZS-001		Local	MS made
Packing material store	02	Cabinet for labels	ZS-002	01	Local	
Stores	03	Pellet	ZS-003	06	Local	
Stores	04	Digital Hygrometer	ZS-004	03	England	
Dispensing	05	Split A.C	ZS-005	03	Kenwood	3 ton each
Dispensing	06	Dispensing Room 1	ZS-006	01	Local	
Dispensing	07	Dispensing Room 2	ZS-007	01	Local	
Sampling	08	Sampling Booth	ZS-008	01	Local	SS made
Dispensing	09	Table	ZS-009	01	Local	SS made



## Machine/Equipment List

Powder Section 1 ..... Supervisor .....

Description	Sr. No	Equipment/machinery	Asset No	Qty	Made	Specs
Entrance	1	SS Step Over	ZPG-001	01	Local	S.S made
Entrance	2	Gown Cabinet	ZPG-002	01	Local	Glass
Mixing Room	2	Digital Hygrometer	ZPA-001	01	England	
Filling room	3	SS Pellet	ZPG-003	01	Local	SS made
Filling room	4	Auto Powder Filling/ Sealing PLC controlled Line	ZPG-004	01	Khan Engg.	Auto
Filling room	6	SS Stools	ZPG-005	04	Local	SS made
Packing room	7	SS Table	ZPA-002	02	Local	SS made
Mixing/filling room	8	HVAC	ZPG-006	01		
Filling room	9	Digital Hygrometer	ZPA-003	01	England	
Mixing room	10	Cone Mixer 250 kg	ZPG-007	01	Javeed Engg.	Ss made
Quarantine room	11	Portable Trolley	ZPA-004	02	Zoic fabricated	SS made
Mixing/filling room	12	Pouch for BMR	ZPA-005	02	Javeed Engg.	Ss made

Liquid Section ..... Supervisor .....

Description	Sr. No	Equipment/machinery	Asset No	Qty	Made	Specs
Liquid filling	01	Auto Powder Filling/ Sealing PLC controlled Line	ZLG-001	01	Awan Engg.	Auto
Liquid filling	02	Liquid filling machines 1	ZLG-002	02	Javeed Engg.	SS 20 bottle / m
Liquid filling	03	Liquid filling machine 2	ZLG-003	01	Javeed Engg.	
Liquid filling	04	SS table	ZLG-004	02	Local	SS made
Quarantine	05	SS Pellet	ZLG-005	5	Local	100 lit
Liquid filling	06	Induction sealer	ZLG-006	02	China	
Liquid filling	07	Stablizer for induction sealer	ZLG-007	01	Local	
Liquid filling	08	Stand for induction sealer	ZLG-008	01	Local	SS made
Liquid filling	09	Digital Hygrometer	ZLG-009	01	China	
Mixing room	10	1000 lit SS tank with Silversan mixer	ZLG-010	01	Local	1000 lit
Mixing room	11	1000 lit SS tank with Stirrer mixer	ZLG-011	01	Local	1000 lit
Mixing room	12	SS transfer lines	ZLG-012		Local	

**List of final Products:**

ENROBARN 20% Oral Liquid
FLORZOC 23% Oral liquid
FLORZOC-10% Oral liquid
ZANRO 10% Oral liquid
ZANROCOL Oral Liquid
Z-FLORCOL Oral liquid
COLIMAX-60 WSP
COLIZOC WSP
NEOZOC-720 WSP
OXFLOR-Z WSP
TITHEMYCIN WSP
Z-FLORCIN WSP
Z-LINCO 40 WSP
Z-LINCO-44 WSP
Z-LINCOLIS WSP
OXZY-950 WSP

**Lab Instruments:**

Sr.	Lab Instruments	Qty
1	Distillation Unit (4 L/hr)	1
2	Melting Point Apparatus	1
3	Conductivity meter	1
4	pH Meter	3
5	Air Particles Counter	1
6	Karl Fischer Titrator	1
7	Sealing Test Apparatus	1
8	Hot plate stirrer	1
9	Polarimeter	1
10	Refractometer	1
11	Chemicals storage cabinet	1
12	Osmo meter	1
13	Potentiometer	1
14	HPLC	1
15	FTIR	1
16	TOC Analyzer	1
17	UV Spectrophotometer	1
18	Oven	2
20	Autoclave	2
22	Air Sampler	1
23	Microscope	1
24	Fully automatic Colony counter	1
25	Viscometer	1
26	Weighing Balance (Analytical)	3
27	Moisture Analyzer	1
28	Incubator with data logger	1
29	Cool incubator with data logger	1

## 2.8.2 Water Consumption & Wastewater Disposal

In constructional phase, 1000 liter/day ground water will be used. During the operational phase of the project approx. 3500 liter/day water will be required for project process and 500 liter/day for domestic purposes.

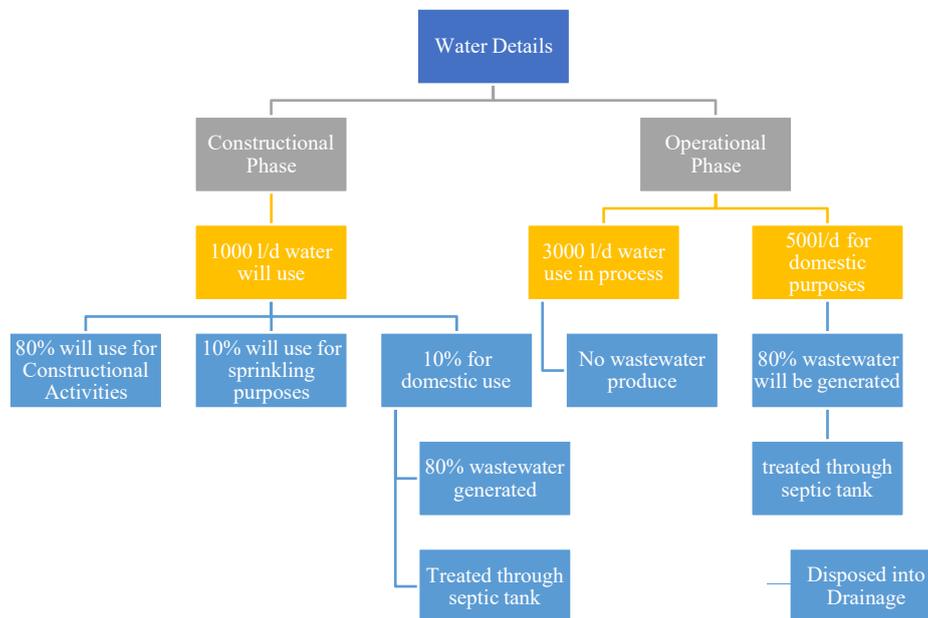


Figure 2: Water Detail

## 2.8.3 Solid Waste:

In constructional 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, according to an estimate, approx. 200 kg/day domestic and project related solid waste will be produced during the operation phase of the project.

The Solid waste will be managed in proper way by following operations:

1. Placement of separate waste bins for domestic and project related waste in all working halls and designated points.
2. Collection of waste from all the working halls at one designated point by the sanitary workers on daily basis.
3. Collection of waste from designated area and handling to the solid waste contractors for its final disposal.

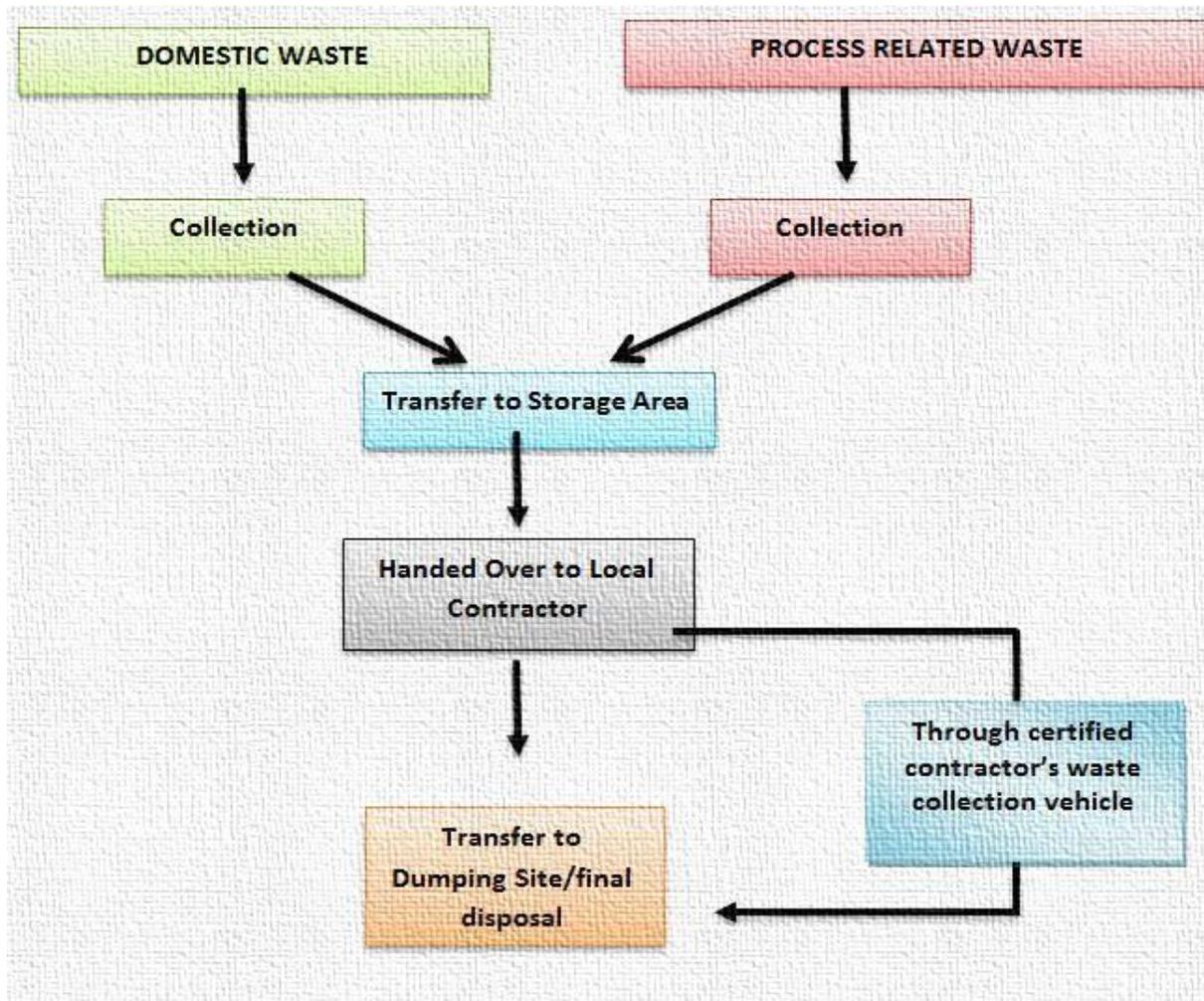


Figure 3: Solid Waste Detail

**2.8.4 Health And Safety**

A well maintained health and safety plan will be established. It will assure the contractor will maintain all the safety measures in construction. 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 2: Details of PPEs

Protection	Occupational Hazards	PPEs
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, smokes, vapors, oxygen deficiency	Facemasks or air supply
Body protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	Aprons, insulating clothing etc of appropriate materials

#### **2.8.4.1 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.

#### **2.8.5 Plantation**

Area for plantation will be reserved. Proper plantation will be done to control the suffocation and for the esthetic purpose.

#### **2.8.6 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 Said project. Fire buckets and fire extinguishers will be installed at all sensitive places within the working area of Said project.

### **2.8 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.

#### **2.9.1 Details of Restoration and Rehabilitation at the end of the Project Life:**

There will be no matter of rehabilitation as the proposed 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.

Debris or any other wastes resulting from demolishing of the building will be disposed off in environmentally sustainable fashion. The materials capable of recycling/reuse will be either sold in the market or to be reused for other suitable purposes. While dismantling the building all Government rules and regulations are applicable to such activities will be strictly adhered to.

### **2.9 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.

# **ANALYSIS OF ALTERNATIVES**

This Chapter deals with the analytical overview of different alternatives that have been considered. The analysis has been carried out critically so as to justify the need of the Project and to select the most feasible alternative. Besides the economic viability; environmental sustainability and social soundness of the Said project has also been considered while analyzing different alternatives.

### **3.1 The No Project Alternative**

A zero-alternative entail maintaining existing use to which the Said project site has previously been put to. This alternative would eventually evade any short-term potential negative impacts from project execution. To this end, any potential positive impacts envisaged during midterm and long-term project implementation will be missed.

Adopting zero alternatives would mean abandoning all the potential that the site offers to investor(s), contribution to government revenue and even local community livelihoods improvement.

### **3.2 Location Alternatives:**

To fulfill the commercial 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.

#### **3.2.1 Rejected Sites**

Before the consideration of selected project site, project proponent had considered another site (site-1) but later it was rejected due to high cost of land and less benefits of project site. Another site (site-2) was considered for the construction of the subject project by the management but it was also rejected due to some reasons.

#### **3.2.2 Reason For Rejection**

This site was rejected due to the following reasons:

- Dense vegetation/ tree cutting issue
- Cost of land
- Lack of road infrastructure
- There was no facilities or benefits like industrial estate
- There was no proper drainage of wastewater was available
- Area of available land was low

### **3.3 Modified Construction Technology Alternatives**

The proposed development will be constructed using modern, locally and internationally accepted technology and materials to achieve public health, safety, security and environmental aesthetic requirements. Equipment that saves energy and water will be given first priority without compromising on cost or availability factors. The concrete pillars and walls will be made using locally sourced stones, cement, sand (washed and clean), metal bars and fittings that meet the quality standards requirements.

### **3.4 Technology Alternatives**

There is local machinery available that is environmental friendly. Final design of industry and Machinery is based on latest available technology to produce high quality. These machines have pollution remove technologies built in. Therefore, it the best option to use that technology.

# **STAKEHOLDERS AND PUBLIC CONSULTATION**

The consultation process with various stakeholders of EcoRise Consults 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 done 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 construction and operational impacts.

#### **4.1 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 Said project;
- To address/incorporate those recommendations in the Project design to the extent possible and;
- To share the mitigation measures with the local communities.

#### **4.2 Consultative Aspect**

The Said 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 Said 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 Said project.
- Documentation of information narrated by the stakeholders.
- Documentation of mitigation measures proposed by the stakeholders.
- Incorporation of public concerns and their addressable in the EIA/EMMP.

### **4.3 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 Said 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.

### **4.4 Meetings With Stakeholders**

A series of consultation was carried out with stakeholders and general public in Sundar 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 Said 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 Said project. The outcome of whole consultation process was very encouraging. The following issues were

discussed during Informal Meetings with local representatives:

- i. Brief Description of the Project
- ii. Current economic condition in the area
- iii. Suggestions for improvement in the current industrial system and all activities related to industry
- iv. Perceptions about the Said project
- v. Perceived impacts of the Said 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 Said project. They have opinion that the Project will not only provide livelihood during construction stage, but also will help to eradicate the burning issue of regarding import of materials.

#### **4.5 Analysis Of Stakeholder Consultation**

##### **4.5.1 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.

<b>S#</b>	<b>Stakeholder Name</b>	<b>Designation</b>	<b>Area</b>
1	Mr. Shahzad Azam	President SIE	Sundar Industrial Estate
2	Mr. Mubeen Yaseen	Shopkeeper, General Store	Village Mull
3	Mr. Qamar Farooq	Shopkeeper, Cosmetics Store	Village Mull
4	Mr. Nazir Gujjar	Land Owner	Sultanke
5	Mr. Muhammad Tariq	Brick Kiln Owner	Sultanke
6	Mr. Rana Khalil Ahmed Manj	Property Dealer, Farmer, Politician	Sultanke
7	Mr. Saim Farooq	Helper	Nullah Village
8	Mr. Liaqat Maseeh	Livestock Farmer	Nullah Village
9	Mr. Salmoon Arshad Naz	Kiryana Shopkeeper	Nullah Village
10	Mr. Rana Shaukat Ali	Farmer	Wara Siddhu Wala

11	Dr. Khalid Mahmood	Homeopathic Doctor	Wara Siddhu Wala
12	Mr. Riasat Ali	Mason	Wara Siddhu Wala

**4.5.2 Statistical Analysis**

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

**4.5.3 Result And Discussion**

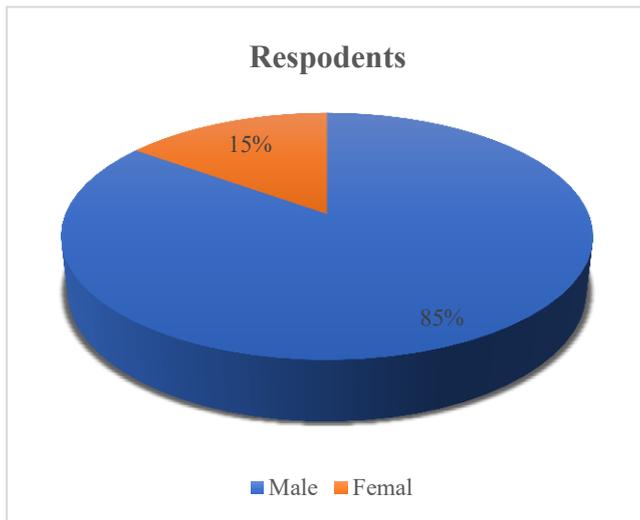


Figure 4: Gender Ratio of Respondents

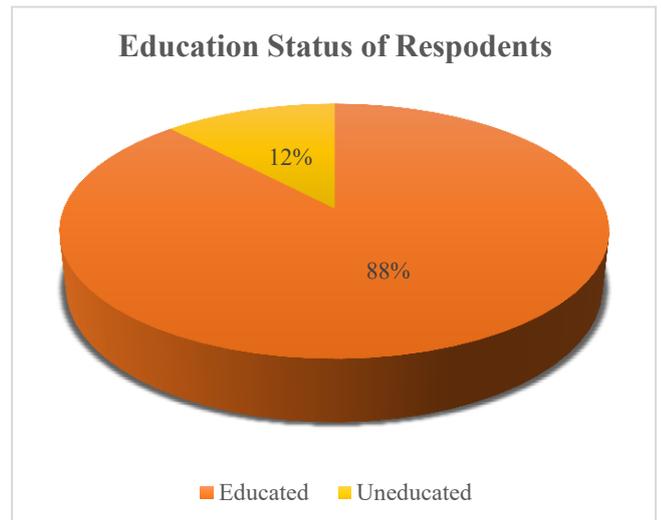


Figure 5: Education status of respondents

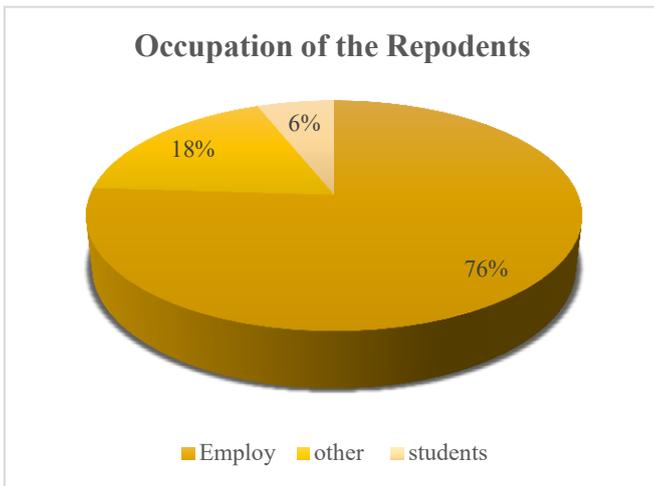


Figure 6: Occupation of respondents



Figure 7: Satisfaction of respondents

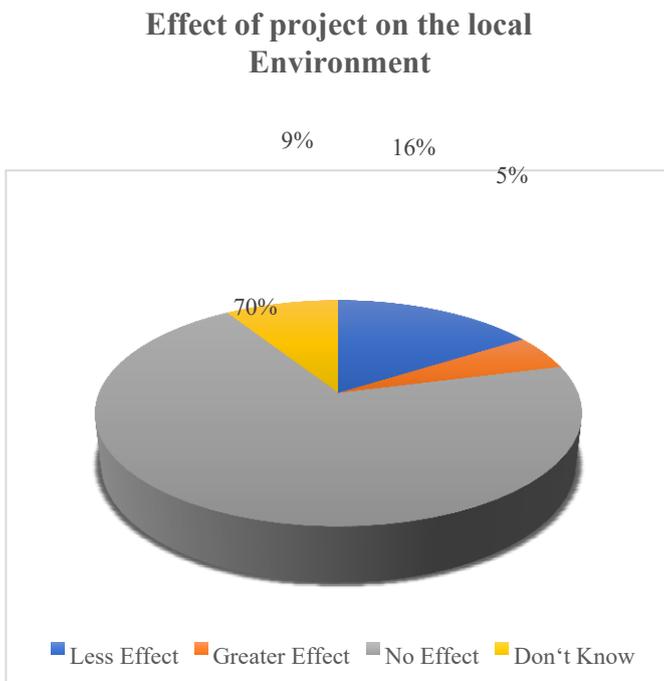


Figure 8: Effect of project on local environment

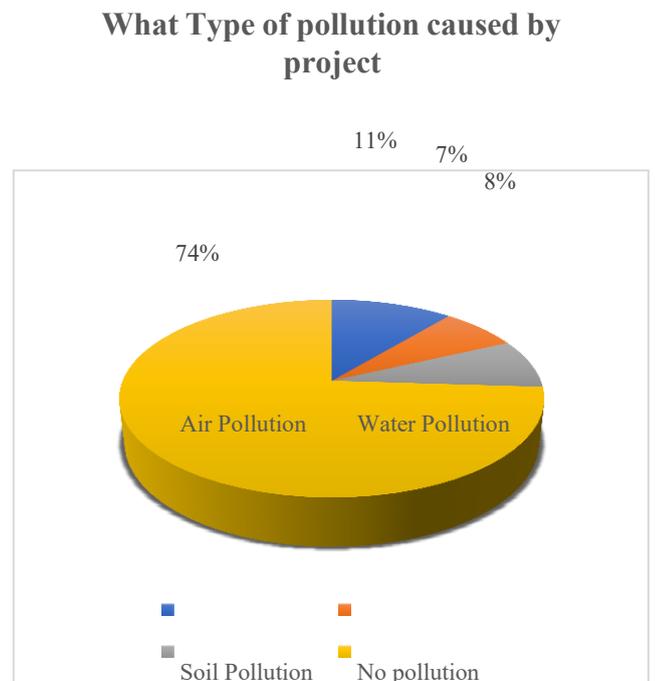


Figure 9: What type of pollution caused by project

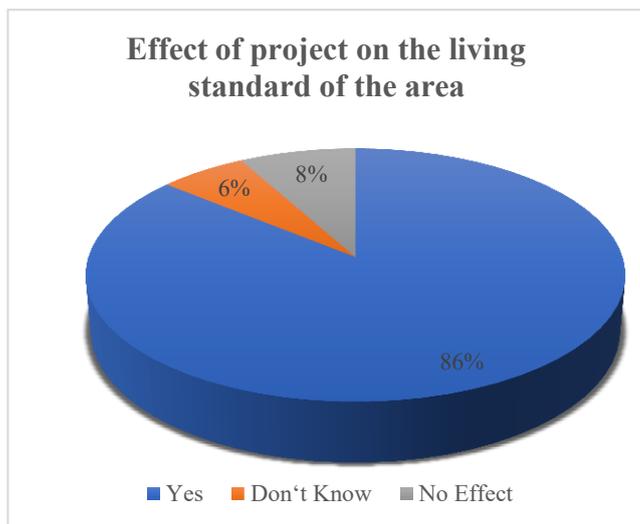


Figure 10: Effect of project on the living standard of area

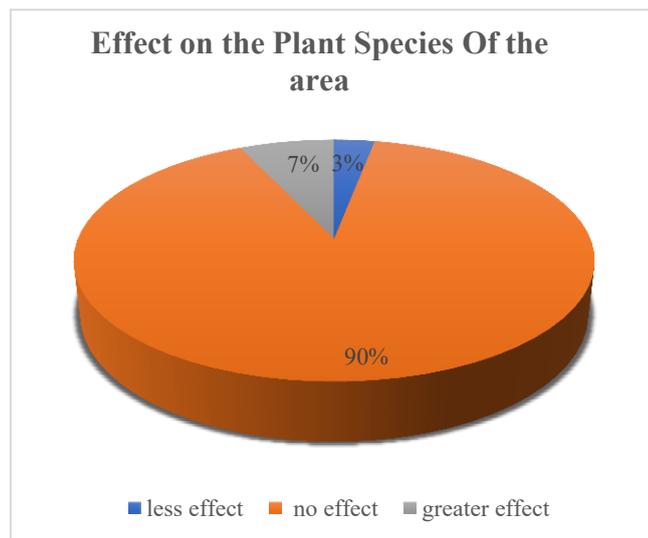


Figure 11: Effect on plant species of area

According to graphical representation, 85 respondents were male while 15 % respondents were female. The number of female respondents is less as compared to male respondents because according to the social binding female hesitates to respond or communicate comfortably. 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 Said project and they gave positive remarks regarding the existing unit and Said project as they got job over there, their living standard raise over working there. While 13% respondents were have 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.

**4.5.4 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 3: Summary of issues and commitments by Proponent

Issue	Aspect/Concern raised by Stakeholders	Project Proponent Commitments
Employment Opportunities	Expectations of employment are very high. Job opportunities are less for herders as they generally have less skills and training.	Employment is the main priority of the industry. Mostly locally skill and unskilled labor will be prioritized and also there will be job in executive level. Around 100 person will be employed by the industry.

<p>Training Opportunities</p>	<p>People are keen to consult with subject industry if the Project offers training and upgrading opportunities to enhance their trade or professional skills.</p>	<p>Development of the Training Strategy, including commitment of allocation of budget investment for training infrastructure, delivery and design. Installation of training facilities in for worker of the company and students will also be accommodating. The internship program will offer to the students to develop professional skills.</p>
<p>Health &amp; safety</p>	<p>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.</p>	<p>Development of Transport Management Plan including traffic safety training. Traffic advisory signs will be installed along project site and all nearby specific areas.</p>
<p>Local economy and business development</p>	<p>Local service providers are keen to participate in providing services to provide raw material and expect to receive in order to adjust their businesses to meet specific needs. 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 they can become suppliers.</p>	<p>Proponent has main focus that they will all the material regarding construction and plant operation to buy from the local market. This will help the local and small business and to people who are keen interested to become suppliers.</p>
<p>Environmental Issues</p>	<p>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.</p>	<p>Implementation of controls under the Environmental Management Plans, including on and off-site dust and noise monitoring. A Participatory Environmental Monitoring Program will be launched to spread awareness.</p>
<p>Water quantity and quality</p>	<p>Water quality and quantity, and impacts from the wastewater disposal are all key concerns for nearby herders.</p>	<p>Implementation of consultation in relation to water use and development of the Participatory Environmental Monitoring Program. Water treatment will be done by the proponent that will help to safe disposal of the water.</p>

# **DESCRIPTION OF THE ENVIRONMENT**

## **4.1 General**

For any development project, the prevailing environmental conditions need to be assessed prior to the preliminary stages of planning, designing and execution of the project. Identification of physical, ecological and social aspects of environment and collection of relevant data is essentially important for the evaluation of impacts as well as for the suggestion of adequate mitigation measures which forms the basis of the Initial Environmental Impact Examination exercise.

The existing environmental conditions of the said project have been considered with respect to physical, biological and socio-economic aspects. Information has been collected from variety of sources, including published literature, field observations and surveys conducted specifically for this project have been analyzed for this study.

## **4.2 Methodology**

For baseline data collection, following sequences of various techniques has been adopted. These techniques were chosen because of their pragmatic application in very short span of time.

1. Reconnaissance survey;
2. Field investigations/ Surveys;
3. Meteorological analysis;
4. Environmental analysis (air, noise and water quality surveys);
5. Collection and review of secondary environmental and social data; and
6. Basic parameters collection from published sources.

### **4.2.1 Reconnaissance Survey**

Reconnaissance survey of the project site was conducted on June, 2025 for the collection of preliminary information about the flora, fauna and existing human intervention along with ecological characteristics. Reconnaissance survey helped us to delineate the ecological habitats and to explore the diversified ecological rich environment.

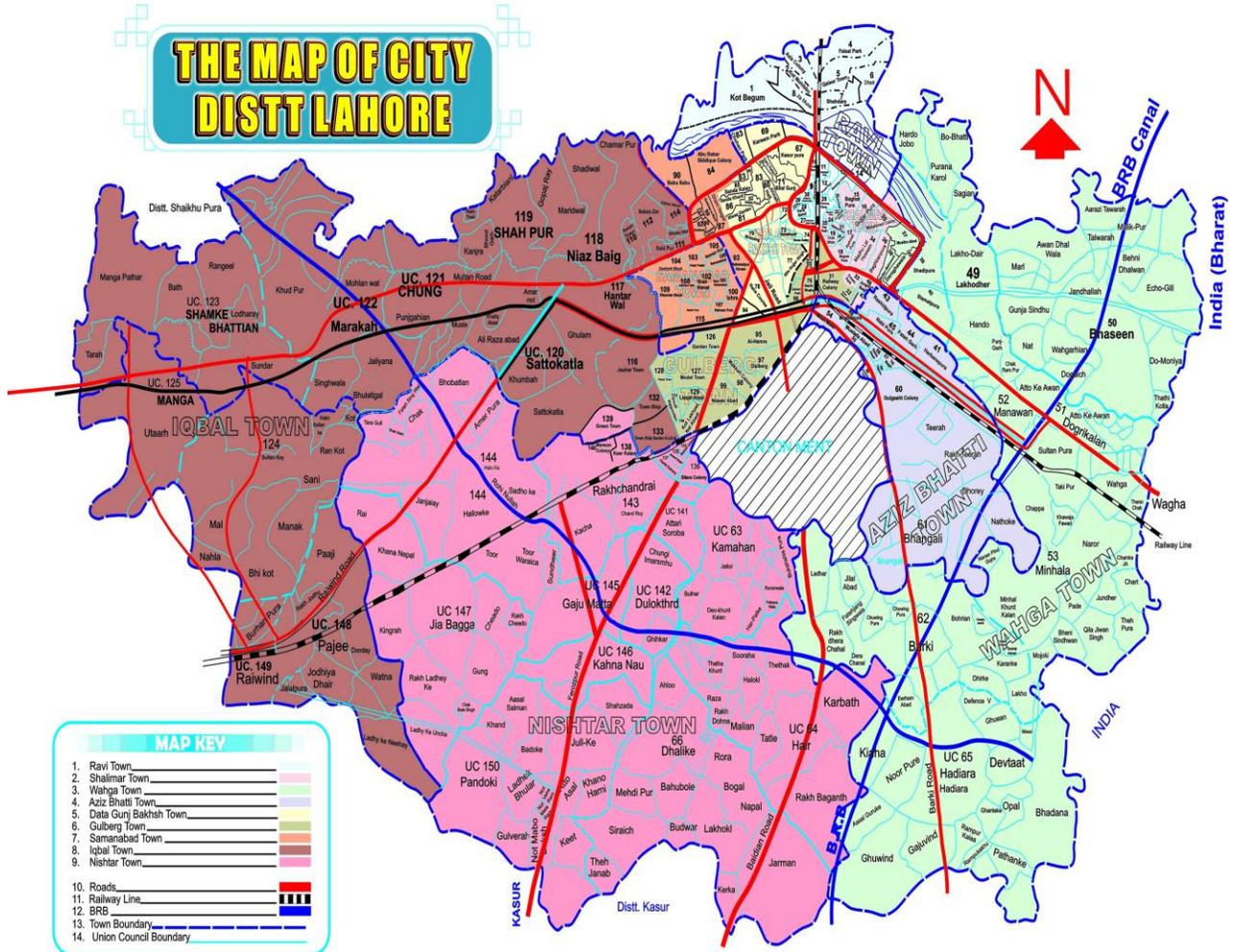
This information has become the baseline information for the detailed survey that specifically targets those areas which are going to be affected by the implementation of the said project. As a result of this survey, basic plants and animals' families were identified that actually

prevailing in the associated habitats.

### 4.3 Physical Environment

#### Topography

An account of different components of the physical environment of the area is given hereunder:



- **Physical resources topography, soils, climate, surface water, ground water, geology;**

This chapter contains a brief description of the prevailing environmental state of the area. The main components of the environment include physical resources, ecological resources, cultural resources and socio-economic conditions of the area. A comprehensive detail of each is given below:

### **Topography**

Lahore city is lying between 31°15'—31°45' N and 74°01'—74°39' E, Lahore is bounded on the north and west by the Sheikhupura District, on the east by Wagah, and on the south by Kasur District. The Ravi River flows on the northern side of Lahore. Lahore city covers a total land area of 1014 km<sup>2</sup> and is still growing. Lahore is generally flat and slopes towards south and south-west

at an average gradient of 1:3000. It can be divided into two parts i.e. the low lying area along River Ravi and the comparatively upland area in the east away from Ravi. The low lands are generally inundated by the river water during monsoon floods. River Ravi flows in the west of Lahore District forming a boundary with Sheikhupura District. The original physiographic features like channels remnants and levees have been destroyed or changed by the construction of urban infrastructure. Flood plains have been confined by construction of embankments (bunds) and spurs. Sub-recent flood plain is 4 to 8 meters higher than the recent flood plain and can be identified at number of places i.e. Shalimar Garden, Mughalpura and Multan Road. Lahore city is situated at an average elevation of 210 meters above mean sea level.

### **Soil**

The soil is different in color and generally inclined to be dry. The alluvial complex consists principally of fine to medium sand, silt and clay. Beds of gravel or coarse sand are uncommon. However pebbles of siltstone or mudstone may be found embedded in silty or clayey sand in many places. Except for a few local lenses, few feet thick beds of hard compacted clay are rare in the area. However it is rich in potential plant nutrients. The soil is of alluvial type and deposited by Ravi River. Alluvium is soil or sediments deposited by a river or other running water. A river length. Where the river flow is fast, more particles are picked up than dropped. Where the river flow is slow, more particles are dropped than picked up. Areas where more particles are dropped are called alluvial or flood plains and the dropped particles are called alluvium.

## Climate

Lahore features a five season semi-arid climate and the seasons are winter, summer, spring, autumn and monsoon. The hottest month of the year is June when temperatures routinely exceed 40 °C. The wettest month is July, with heavy rain falls and evening thunderstorms with the possibility of cloudbursts. The coolest month is January with dense fog.

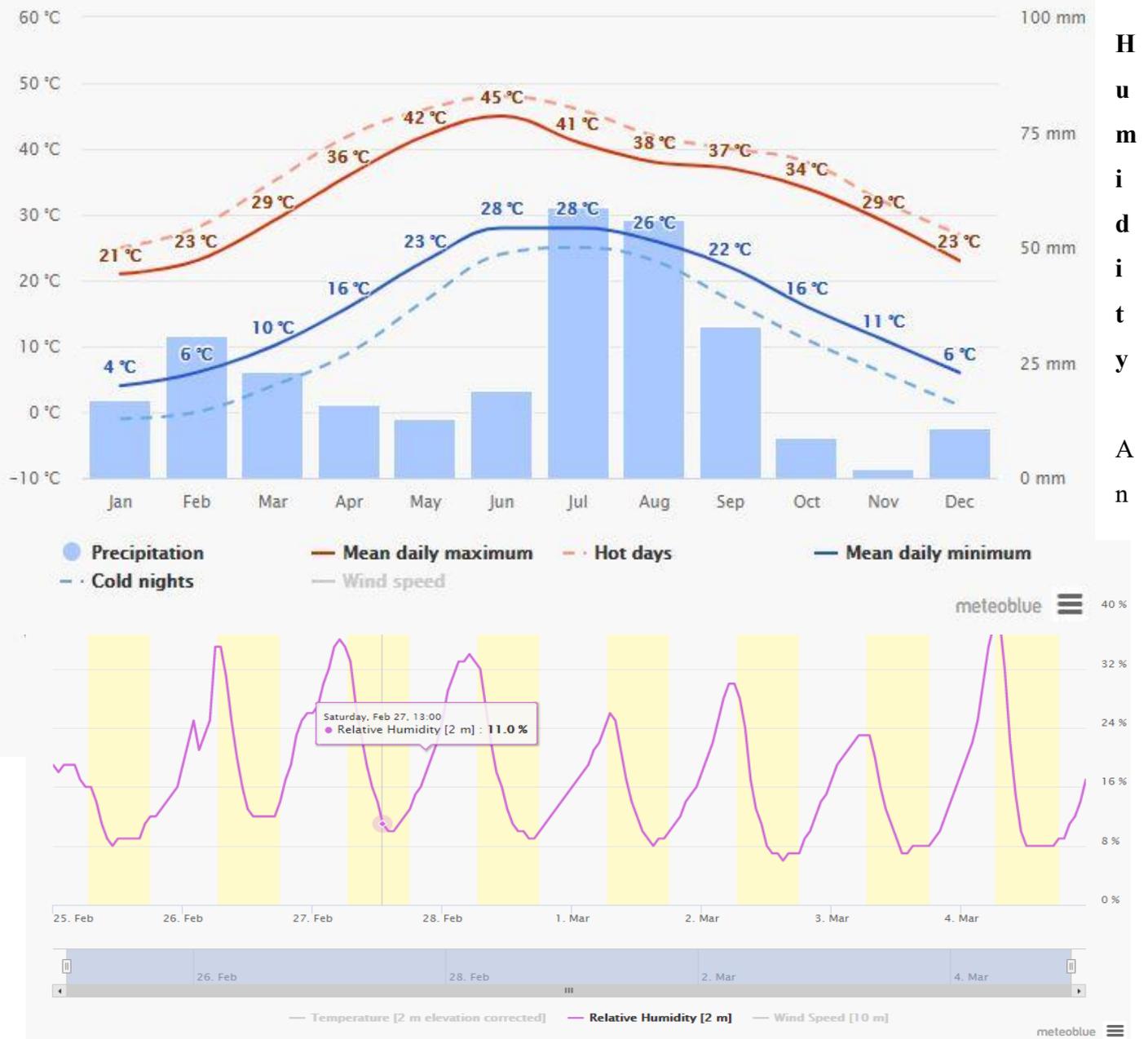
A short description is given hereunder to present the climatic conditions of the area.

Month	Mean Temperature		Precipitation (mm)	Relative Humidity AT 0500 HRS (%)	Relative Humidity AT 2000 HRS (%)
	Maximum	Minimum			
January	19.8	5.9	28.92	80.4	51.9
February	22.0	8.9	37.14	79.0	52.4
March	27.1	14.0	34.3	68.6	42.2
April	33.9	19.6	44.32	50.2	25.3
May	38.6	23.7	24.38	45.7	27.2
June	40.4	27.3	91.62	59.1	40.9
July	36.1	26.8	150.52	76.7	60
August	35.0	26.4	161.42	78.8	65.9
September	35.0	24.4	67.28	74.4	56.4
October	32.9	18.2	11.74	70.6	44.2
November	27.4	11.6	4.44	77.1	48.8
December	21.6	6.8	9.94	82.9	53.73
Annual	30.8	17.8	666	70.34	47.4

## Temperature

The climate of the project area is hot in summer and cold in winter. May and June are the hottest months with maximum temperature reaching 40.4°C. January is the coldest month with minimum temperature falling to 5.9°C. The summer season starts towards the end of April and continues till September. The winter begins in November and lasts till February. The spring season exists during March and April and is pleasant.

### Average temperatures and precipitation

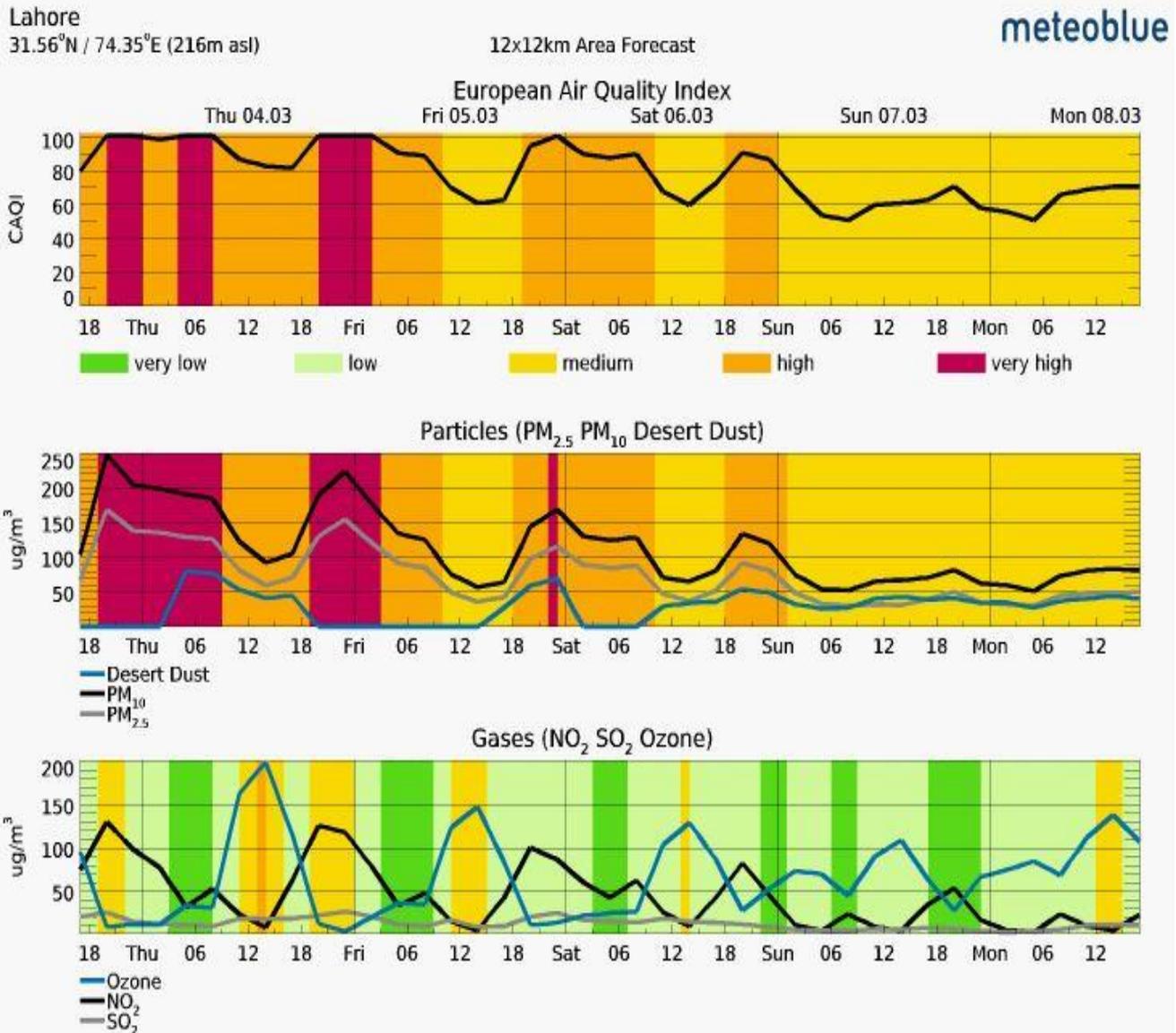


ive humidity for this area has been worked out as 70.34%. The maximum recorded humidity for the district is 82.9% in December while the minimum humidity is 45.7% in May.

### Precipitation

The average annual rainfall is 666 mm. Most of the rain occurs during monsoon in summer which often results in flooding of the nearby water drain and canal. The groundwater level is improved toward the end of the season in September and October.

### Precipitation amounts

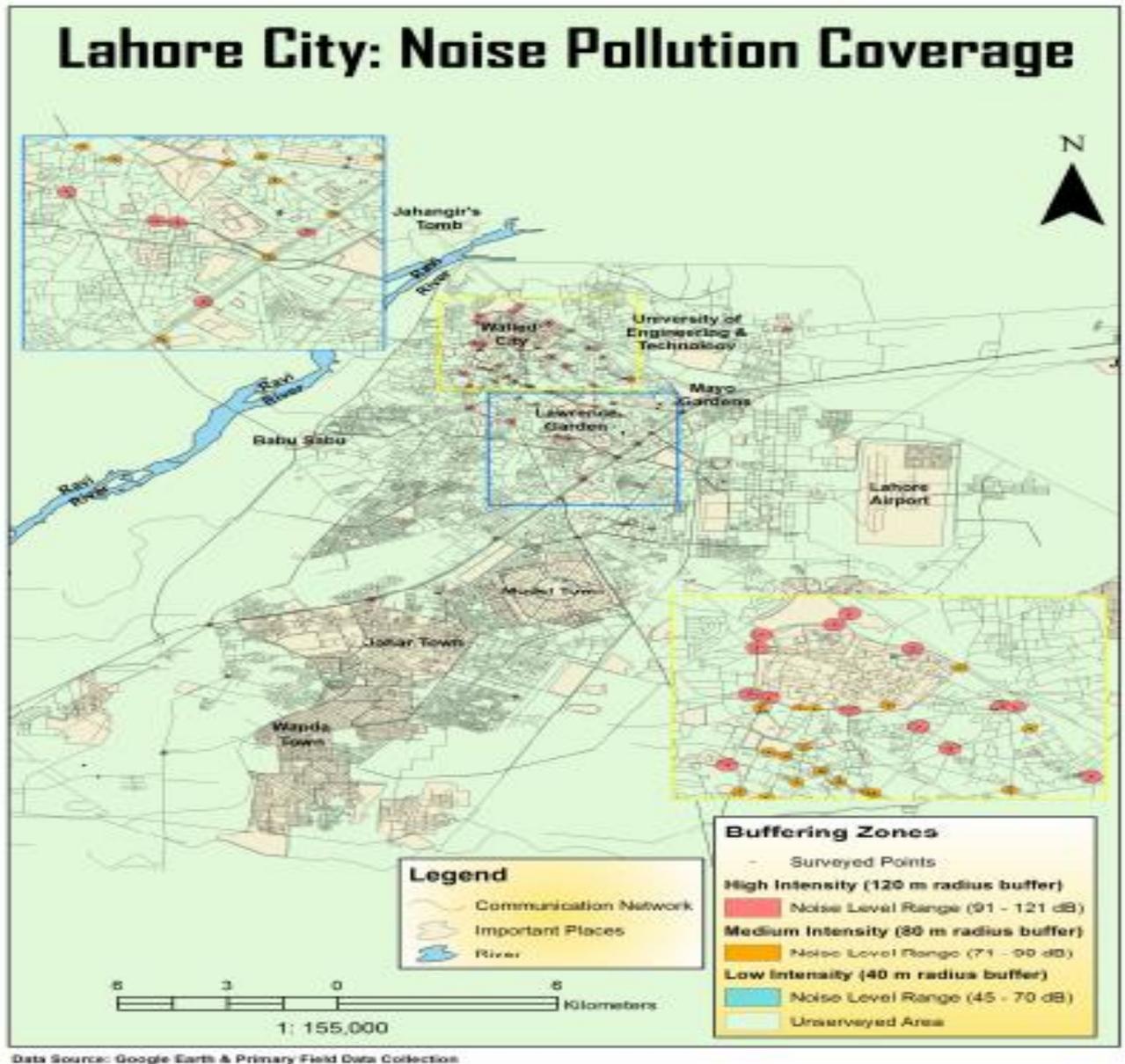


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he project area, Particulate Matter (SPM & PM10) and Oxides of Nitrogen (NOx), Sulphur Dioxide (SO2) and Carbon Monoxide (CO) are the major air pollutants. Traffic on road is the main source of air pollutants including NOx, SO2, CO, PM, HCs, smoke, etc. Factories and industries are also contributing to the pollution in the district

#### Ambient Noise

A common form of noise pollution is from transportation, principally motor vehicles. Other sources are car alarms, office equipment, factory machinery, construction work, audio entertainment systems, loudspeaker etc.



**Ground Water**

The water table depth in the central part of the city has fallen below 130 feet (40 metres) approximately and is projected to drop below 230 feet (70 metres) in most areas by 2025. The total

surface water diverted to Lahore is 6.02 million cubic metre per day (MCM/day) and is mainly used for agricultural purposes. The Bambawala-Ravi-Badian-Deplapur (BRBD) Canal mainly feeds the command area of Upper Bari Doab Canal on the Pakistan side of the Pak-India border. The Upper Bari Doab Canal irrigates command areas of Lahore Branch, Canal, Butcher Khana distributary, Main Branch Lower and other smaller channels. The remaining flow of the BRBD

Canal supplements Depalpur Canal. The Lahore aquifer is broadly viewed as a single contiguous, unconfined aquifer. Groundwater for drinking purposes is extracted from a depth of 120-200 meters (m). It is pumped for Lahore's domestic, industrial and commercial purposes. In order to deal with the vagaries of surface water supplies, more than 10,000 tube wells have been installed for agricultural purposes. The average annual rainfall of Lahore is 715 mm. However, its recharge to groundwater in urban areas is minimal due to urbanization. In general, groundwater discharge is higher than recharge, which is the main reason for the rapid depletion of groundwater in the city.

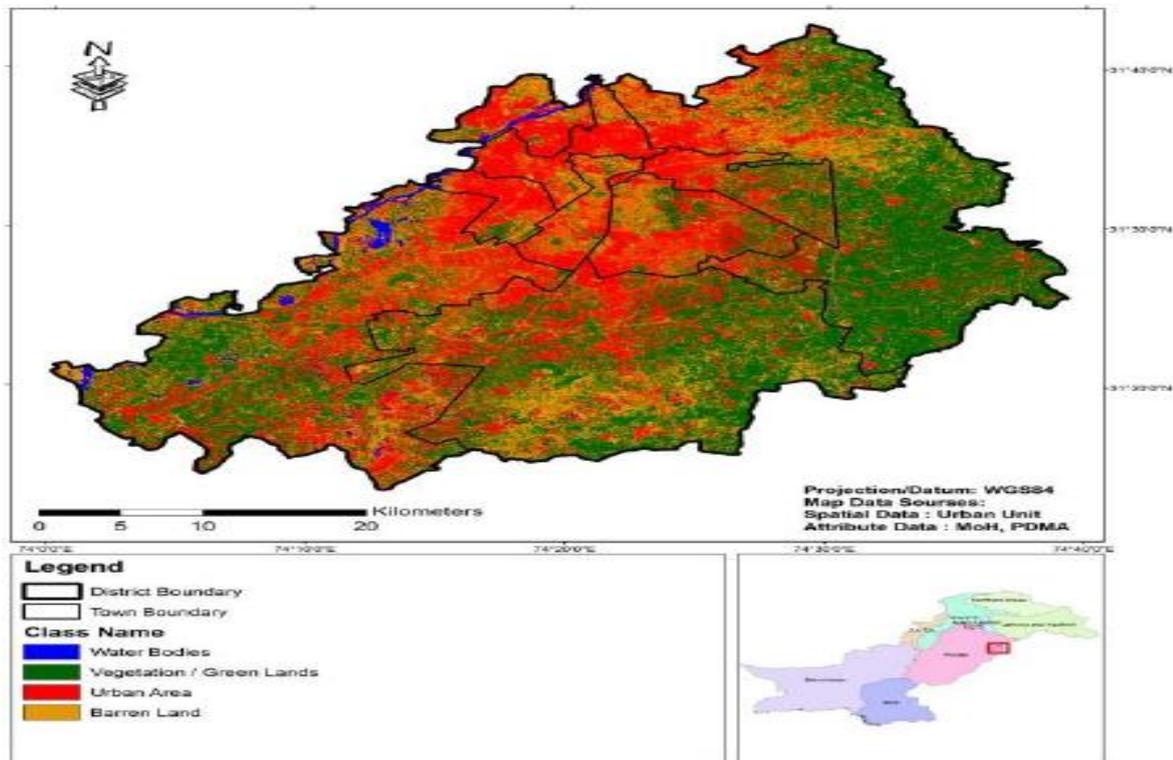
### **Geology**

Lahore city is situated at an average elevation of 210 meters above mean sea level. Lahore city lies on the alluvial plain called Bari Doab. Doab is a local word for area between rivers. Bari Doab is a part of the Indo-Gangatic alluvial plain formed by the Indus River and its tributaries. It is bounded by Ravi and Chanab rivers in the northwest and west and by Sutlej River in the southeast. North eastern boundaries of Doab lie near the foothills of the Himalayan Ranges. The Bari Doab is covered by Quaternary alluvium which overlies semi-consolidated Tertiary rocks or Metamorphic and igneous rocks of Precambrian age. Except for a small area in the northeastern part of Doab where basement rock was encountered no information is available at present regarding the distribution of Tertiary and Precambrian rocks in the Doab. Probabilistic seismic hazard assessment recently carried out for Lahore area as part of the revision of Seismic Provisions of the Building Code of Pakistan shows that the Project area falls in Zone 2A.

### **Land Use**

Limited and its surrounding area fall in industrial area. The growth and spread of the city is seen towards south-west direction. The reason is that the availability of well-constructed and connected roads provides means to residents for having residences far away from the main city center. This condition will have adverse repercussions in the area because of the allied difficulties connected to the urban sprawling, environmental issues, and transportation problems, lack of civic amenities, crime and associated social issues.

*Land Use Map Lahore:*



**1. Ecological Environment**

A detail of ecological account of the Project and Study Area is given below:

**Flora**

The area in which the project site is located was once covered with native vegetation, mostly consisting of trees like Kikar (*Acacia nilotica*) and Shisham (*Dalbergia sissoo*). With the onslaught of civilization and industrialization, this vegetation was cleared for agricultural, commercial or industrial land use purposes. The current ecological details of the area in general and study area in particular are given below:

**Trees**

A field study related to the identification of tree species in the study area was also conducted. A vast majority of trees were observed in the localities visited as well as open fields. These are Tali/Sheeshum (*Dalbergia sissoo*), Kikar (*Acacia nilotica*), Safeda (*Eucalyptus cinerea*), Neem (*Azadirachta indica*), Papaya (*Carica papaya*), Bottle Brush (*Callistemon citrinus*) and Borh (*Ficus bengalensis*).

A tabular comparison is given hereunder to explicit frequency of each species in three zones of study area:

**List of Trees Identified in the Project Area**

<b>Serial Number</b>	<b>Common Name</b>	<b>Scientific Name</b>
1	Tali/Sheshum	Dalbergia sissoo
2	Kikar	Acacianilotica
3	Safeda	Eucalyptus cinerea
4	Neem	Azadirachta indica
5	Piple	Ficus religiosa
6	Papaya	Caricapapaya
7	Shree	Acaciagreggii

**Grasses**

A number of grass species were identified. These are Crow Foot Grass (*Dactyloctenium aegyptium*), Dabri Grass (*Dichanthium annulatum*) and Indian Dab (*Cynadone dactylone*).

**Grasses in Study Area**

Different types of grass species were also identified outside the project site during our visits to the nearer localities, these species include Dabri Grass (*Dichanthium annulatum*), Lesser Bulrush (*Typha angustifolia*) and Indian Dab (*Cynadone dactylone*).

Frequency (of occurrence) of these species in different zones of the study area is as under:

**List of Grasses Identified in the Project Area**

<b>Common Name</b>	<b>Scientific Name</b>
IndianDab	Cynadonedactyl one
Dabri Grass	Dichanthium
LesserBulrus	Typhaangustifol

**Herbs and Shrubs**

A large number of herbs and shrubs species were identified in the area. Among these species, the most dominant were Jangli Booti (Parthenium hysterophorus), Bathu (Chenopodium album) and Ak (Calotropis procera). Frequency of these species in different zones of the study area is as under:

**List of Herbs and Shrubs Identified in and Around the Project Area**

<b>Common Name</b>	<b>Scientific Name</b>
JangliButi	Partheniumhyste ronhorus
Puth canda	Achyranthesaspe ra
Bathu	Chenopodiumalb um
Ak	Calotropis Procera
Bhang	Canibus sativa

**Medicinal Plants****Medicinal Plants within project site**

A number of medicinal plants in the area were identified which are AK (Calotropis procera), Amaltas (Cassia fistula), Pilak, Jangli kashni and Itsit (Boerhavia diffusa).

**List of Medicinal Plants Identified in the Project Area**

Sr #	Study Area	
	Common Name	Scientific Name
	AK	Calotropis procera
	Amaltas	Cassia fistula
	Itesit	Boerhavia diffusa
	Ajwain	Hyoscyamus niger

**Ornamental Plants****Ornamental Plants Project Site**

During our ecological survey to the nearby localities, a number of ornamental plants were identified at some houses and Deras, which are listed in table below.

**List of Ornamental Plants Identified in and Around the Project Area**

Sr #	Study Area	
	Common Name	Scientific Name
1	Bottle Brush	Callistemon citrinus
2	Araucaria	Araucaria heterophylla
3	Bougainvillea	Bougainvillea spectabilis
4	Milkwood pine	Alstonia scholaris

**Vegetables****Vegetables in around and Project Site**

No vegetables are grown in or around project site.

**Vegetables in Study Area**

Some important of these are Phool Gobhi/cauliflower (*Brassica oleracea* Ver. botrytis), Band Gobhi (*Brassica oleracea* Ver. capitata) Turnip, Raddish (*Raphanus sativus*), Carrot (*Daucus carota*), Bhindi, Tomato (*Lycopersicon esculentum*), Vegetable Marrow (*Cucurbita pepo*), Baingan, etc.

**List of vegetables Identified in and Around the Project Area**

Sr #	Study Area	
	Common Name	Scientific
1	Bangun	Solanum melongena
2	Bhendi	Abelmoschus esculentus
3	Karela	Momordica charantia
4	Phool Gobhi	BrassicaoleraceaVer. Botrytis
5	Raddish	Raphanus sativus
6	Tomato	Lycopersicum esculentum
7	Marrow	Cucurbitapepo

**Agriculture**

The soil of the area is quite suitable for all kinds of vegetation including fodder, orchards, vegetables and other seasonal crops. The pattern mainly consists of wheat-rice system, while other agriculture practices include the cultivation of sugarcane, Maize, etc.

**Farm Traction Power**

Tractor is the sole source of farm traction power. No farmer was found using animal traction power. There was significant variation in tractor ownership across farm size groups. However, more than half of the farmers owned tractor while rest were hiring the services for land preparation.

**Irrigation**

The tube-wells and canal water are the main source of irrigation water for wheat, rice and other crops and fodder. Also, many farmers irrigate their fields with contaminated water of drain and also many studies have been conducted to assess the level of toxic heavy metals in the soil and vegetables irrigated by drain water and their ultimate impacts on human health. It has been highly recommended during these studies not to use the contaminated water of drains for agricultural practices. On the other hand plenty of ground water is easily accessible for agriculture use.

## Fauna

The area provides healthy environment for the growth and reproduction of a diverse nature of fauna. A short description is given in the following paragraphs

### Mammals

#### Mammals within project site

During our survey to the project site, some mammals were identified evidently while some were reported by the workers like Cats (*Felis catus*), Rats (*Rattus rattus*) and Squirrel (*Sciurus carolinensis*).

#### Mammals in Study Area

The wild and common or domesticated mammals found in the study area are Dogs (*Canis familiaris*), Cats, House Rats (*Rattus rattus*), Bats, Horses (*Equus caballus*), Donkeys (*Equus africanus asinus*), Mules, Buffaloes, Cows (*Heracleum lanatum*), Goats (*Copra hircus*) and Sheep.

#### List of Mammals Present in and Around the Project Area

Project Site		Study Area	
Common	Scientific	Common	Scientific
Cat	<i>Felis catus</i>	Cats	<i>Felis catus</i>
Rat	<i>Rattus rattus</i>	Dogs	<i>Canis familiaris</i>
Squirrel	<i>Sciurus carolinensis</i>	Cows	<i>Heracleum lanatum</i>
		Goats	<i>Copra hircus</i>
		Horses	<i>Equus caballus</i>
		Donkeys	<i>Equus africanus asinus</i>
		Sheep	

## Reptiles

### Reptiles within Project Site

No reptiles were identified within the project site

### Reptiles in Study Area

Above reptiles were also seen in study area in localities and field. The most common reptiles include Snakes, Pakistani Cobra (*Naja naja karachiensis*), Lizards, Varanis (Goh/large lizard), Spiders and Scorpions, etc.

**List of Reptiles Present in and Around the Project Area**

<b>Common Name</b>	<b>Scientific Name</b>
Lizards	
Spiders	
Scorpions	
Pakistani cobra	Naja naja karachiensis
Goh/large lizard	Varanis

**Amphibians**

A number of Amphibians found in the tract include Common Frog (*Rana tigrina*), Common Toad (*Bufo bufo*) and Tortoise (*Chitra indica*).

**List of Amphibians Present in and Around the Project Area**

<b>Project Site</b>		<b>Study Area</b>	
Common Name	ScientificName	Common Name	ScientificName
Common Frog	Ranatigrina	Common Frog	Ranatigrina
Common Toad	Bufo bufo	Common Toad	Bufo bufo
		Tortoise	Chitraindica

**Birds**

Different types of birds' species were identified within the project site. The bird's species identified in these areas include House Sparrow (*Passer domesticus*), House Crow (*Corvus splendens*), Common Mynah (*Acredotheres tristis*), Tatiri (*Vanellus indicus*), Cheel, Bagle, Bulbul (*Pycnon tus cafer*), Parrots (*Psittacula krameri*), Pigeons (*Columbia livia*), Dove (*Stigmatopelia senegalensis*), Surkhab, Ullu, etc. are also seen in the area.

List of Birds Present in and Around the Project Area

Sr #	Project Site		Study Area	
	Common Name	Scientific Name	Common Name	Scientific Name
1	House Sparrow	Passerdomesticus	Parrots	Psittacula krameri
2	HouseCrow	Corvus splendens	HouseSparrow	Passerdomesticus
3	Common Mynah	Acredotheres Tristis	HouseCrow	Corvus splendens
4	Tatiri	Vanellus indicus	Common Mynah	Acredotheres tristis
5	Pigeons	Columbia livia	Tatiri	Vanellus indicus
6			Pigeons	Columbia livia
7			Dove	Stigmatopelia Senegalensis
8			Bulbul	Pycnon tus cafer
9			Cheel	

**Wildlife Sanctuaries and Game Reservoirs**

The Safari Zoo Park & Wildlife Park Lahore is present in the Lahore for the conservation of endangered species. However, no wild life sanctuary or game reservoir is located in the vicinity of the project area or in the project influenced area.

**Rare or Endangered Species**

There are no rare or endangered species in the study area.

**3. Socioeconomic Environment**

Human settlements are symbol of typical haphazard rural growth based on ill planned developmental procedures showing common indicators of all the unorganized procedure of rural settlement of the province. These localities were developed on need oriented basis. No bye-laws, rules and obligations necessary for human settlement, construction or expansion and

infrastructure development were considered. These localities are also the picture of stereotype rural residential areas which lack basic amenities, improper roads, and poor drainage system, deteriorating hygienic and sanitary conditions causing bad effects on human health.

### **Objectives of the Study**

The main objectives of socio- economic study of the project area were:

- To furnish appropriate information about the baseline socio-economic conditions
- To identify and assess significant social impacts of the Project activities on the surrounding area and people
- To propose suitable means for probable mitigation of the significant adverse social impacts

### **An Overview of Socio-economic Conditions**

This section describes the status of overall socio-economic baseline conditions prevailing in the study area. It deals with various socio-economic and cultural aspects of the community including income, employment, professions, basic facilities, education and health, social structure, culture, women's status, traditions, ethnics, sectarian status and residential needs of the local people.

Area represents lacking some basic amenities of an urban area. Improper social structure, deprived status of youth and aged are common social factors in the area.

### **Analysis of Socio-economic Conditions**

This section presents a locality-wise analysis of existing status of various socioeconomic parameters such as income, employment, basic facilities, education, health, recreation, migration, conflicts, ethnic status, role of women, professions, residential conditions, etc.

#### **A) Sources of Income**

The economy of Lahore has a diversified base spanning from telecommunication, information technology, manufacturing industry, engineering, pharmaceuticals, steel, chemicals and construction material. As a major urban center, the economy of Lahore has relatively prospered. Lahore is hailed as the industrial belt of Pakistan and is home to the largest IT Park in Pakistan. It is the country's second largest economic hub and the commercial capital of Punjab. In 2008, the city was ranked with high efficiency to be classified as a gamma world city. Majority of the people are working as labors in industries, and many do their own common business (shopkeepers).

#### **B) Basic Facilities**

Basic facilities like electricity, roads, transport etc. are present in almost every area of the Lahore but are disorganized and mismanaged. Civic amenities like markets are not available in some of

the slum areas.

### **C) Educational Facilities**

Educational facilities up to master level are available in almost all the localities and are easily approachable. Lahore is Pakistan's largest producer of professionals in the fields of science, technology, IT, engineering, medicine, nuclear sciences, pharmacology, telecommunication, biotechnology and microelectronics. Most of the reputable universities are public, but in recent years there has also been an upsurge in the number of private universities. The current literacy rate of Lahore is 64%.

The system is divided into five levels: primary (grades one through five); middle (grades six

through eight); high (grades nine and ten, leading to the Secondary School Certificate); intermediate (grades eleven and twelve, leading to a Higher Secondary School Certificate); and university programs leading to graduate and advanced degrees.

### **D) Medical Facilities**

The proper health care facilities are present in the area for both male and female population.

### **E) Recreational Facilities**

Lahore is the hub of cultural & religious recreational places. Many famous recreational places such as Badshahi Mosque, Shahi Qila, Tomb of Jahangir, Shalimar Garden, Minar-e-Pakistan, Lahore Zoo, Lahore Museum, Safari Park, Jallo Park, etc. are present for recreational activities. Urs and Melas are playing a vital role to provide some recreational opportunities to the locals. Religious, ethnic, political and tribal conflicts do not exist among the people of the study area.

### **G) Types of Community**

The main religion in Lahore is Muslim – mostly Sunni or Shia- which makes up 94% of the population. The remaining 6% are nearly all Christians. There are also a small number of minority religions such as Sikh and Hindu. The Lahoris are a cultural bunch of people celebrating many festivals around in the year – some religious, some historical and some are combinations of ancient and modern- even western – celebrations.

### **H) Types of Family**

The joint/extended family system is generally prevailing among people of the whole area; however, nuclear family system is also observable in the area.

### **I) Ethnic Status**

The main castes and groups of the Lahore district are Arain, Jat, Rajput, Malik, Pathan, Mughal, Sheikh, Komboh and Gujjar. Besides, there are also village artisans, which include Lohars

(blacksmiths), Tarkhan (carpenter), Kumhars (potters), Mochis (cobblers), Machhis (water-carries), barbers and weavers etc.

#### **J) Status of Women Literacy**

A vast majority of the females of the Study Area are illiterate which shows very low educational trend among females; however, young females have high literacy rate showing positive trend in female education.

#### **K) Decision Making Authority**

Majority of the females have no authority in decision-making process regarding their life. This shows non-participation of the females in decision-making process regarding the females and other issues.

#### **L) Role of Women**

Role of female is conventional and traditional. Most of the females are engaged in housekeeping. However, females also perform outdoor activities and duties. Females are supposed to be responsible to perform all the family activities and are involved in all types of family functions.

### **4.5.3 Quality of Life Values**

If we specifically about the project area then majority of the people has to adopt seasonal occupation to supplement their income due to low-income level and inconsistent income opportunities. Majority of the people were working as labors, farmers and many do their own common business (shopkeepers). A fair number of people work as laborers in the nearby cities.

The locals of this are provided with basic facilities like electricity, roads, transport etc. but are disorganized and mismanaged. If we talk about educational facilities then education up to primary level are available in almost all the localities and are easily approachable. The proper health care facilities are not present in the area for both male and female population. Open and level fields of the localities are used as playgrounds by the youth. Urs and Melas are playing a vital role to provide some recreational opportunities to the locals.

It was observed that being the members of a typical/traditional blend of rural and urban community, almost all the old people are very conservative in their life style. People practice their traditional, social and cultural values strictly in all walks of life. The joint/extended family system is generally prevailing among people of the whole area; however, nuclear family system is also observable in the area.

## **5. Lab Reports of Environmental Analysis**

Testing of different parameters has been done by proponents. The copies of lab reports of different

environmental parameters are given in annexure.

**SITE SUITABILITY:**

The present site for Lahore Poly Propylene Industries Pvt Limited is under the ownership of proponent. All commodities are at a suitable distance from project site as they will not impacted by the construction and operational activities even locals will get more benefits and job opportunities. No replacement, relocation and rehabilitation are required for the development of said project.

All facilities of infrastructure, electricity, roads, and communication facilities are present in current location. The project site is devoid of flora & fauna having significant importance.

**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 Said 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 exists for determining the magnitude of effects, established professional criteria and best practice techniques are used.

## **6.1 Methodology For Impact Evaluation:**

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

### **6.1.1 Leopold Matrix**

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

- 1) On the horizontal axis, the actions which cause environmental impact, and
- 2) 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 5: Scale Table of Importance &amp; Magnitude

Sr. No.	Type of Impact	Scale of Magnitude (0 – 10)	Scale of Importance (0 – 10)
1	No Impact	0	0
2	Low Impact	1 – 4	1 – 4
3	Medium 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 to 10 is placed in the upper left-hand corner to indicate the relative magnitude of the impact 1 is 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's 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's 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.

Table 6: Leopold Matrix

Construction Phase															
Magnitude  Importance			Actions										Total Score of Impact	Average Score of Impact	
			Transportation of raw material	Construction Activities	Operation of generators	Water consumption	Wastewater generation	Storage of raw materials	Social activities	Public welfare	Economic activities	Employment			Infrastructure improvement
PHYSICAL	Soil	Soil Quality	2/1	3/2	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	6/6	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	5/5	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	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	1/1	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	2/1	6/6	0/0	0/0	2/2	1/1	2/1	0/0	1/1	1/1	3/4	18/17	1.6/1.5

		Odors	1 1	1 1	3 3	0 0	5 7	4 6	1 1	0 1	0 1	1 1	1 1	17 23	1.5 2.0
		Noise	5 6	9 10	7 8	0 0	5 4	2 2	5 0	0 1	5 6	4 6	4 6	46 55	4.1 5
BIOLOGICAL	Fauna & Flora	Crops	2 2	5 6	3 2	0 0	4 6	2 2	2 3	4 3	5 7	3 3	3 3	33 37	3 3.3
		Birds	2 2	7 7	5 5	2 1	4 4	1 1	5 4	0 0	5 5	3 4	4 4	34 37	3.4 3.3
		Mammals	5 4	6 7	2 2	2 1	4 3	2 1	3 3	0 0	4 3	3 4	3 3	34 31	3.3 2.8
SOCIO-ECONOMIC	Social	Industrial	5 6	7 7	5 5	4 6	6 7	4 5	6 6	5 6	8 8	9 9	7 7	66 72	6 6.5
		Recreational Use	2 3	3 4	2 3	3 3	3 3	1 1	3 4	4 5	4 5	2 1	4 3	31 35	2.8 3.1
		Historical / Cultural	2 2	7 7	2 2	2 1	4 4	1 1	5 4	4 4	5 5	3 4	4 4	39 38	3.5 3.4

## **6.2 Impact Analysis and Prediction:**

In order to evaluate the socioeconomic and environmental impacts, filed 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:

### **6.2.1 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.

### **6.2.2 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 environmental examination was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed in the following.

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 Said projectsite 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.

## **6.3 Characteristics Of Impacts:**

### **6.3.1 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

Table 7: Impact Assessment criteria

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
<b>Slight effect:</b> Local environmental damage. Within the fence and within systems. Negligible financial consequences	LOW RISK				
<b>Minor effect:</b> 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			
<b>Localized effect:</b> Limited loss of discharges of known toxicity. Repeated exceedence of statutory or prescribed limit. Affecting neighborhood.					
<b>Major effect:</b> 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			
<b>Massive effect:</b> 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	

## 6.4 Analysis of Impacts and Recommended Mitigations

### 6.4.1 Environmental Impacts due to Project Location:

The proponent aims to a establishing a manufacturing plant for production of pharmaceuticals. If the project proponent maintains HSE conditions and comply with the PEQS limits than, there will not be any significant impacts of the project on the environment. If the mitigation measures are effectively implemented, the residual impact of the Subject project activities on the area's geophysical environment is expected to be insignificant.

**Impact significance:** Low to moderate

**Nature of impact:** Direct

**Duration:** Long-term

**Timing:** Construction & Operation phase

**Reversibility:** NA

**Likelihood:** Low

**Consequences:** Mild or may be positive

### **Mitigation Measures**

- Project site will have good and efficient road infrastructure that already exists there at the project site
- Location can be considered as the positive impacts due to enhanced infrastructure.
- The project will also have positive socioeconomic impacts because of provision of jobs to the local residents of the area.
- No human settlement within the radius of the study area
- There would be no issue of congestion of traffic due to presence of good road network in the area.
- Provision of embankments, designed by considering the Geotechnical investigation studies. Due consideration should be given to aesthetic improvement during the design phase.

### **6.4.2 Environmental Impacts Due To The Project Design**

The current project is land development. Area for parking, waste water treatment facility and solid waste management will be reserved within unit. Firefighting plan, health & safety plan, tree plantation plan, emergency response plan will be incorporated during the design phase of the project.

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

- Low utilization of available space
- Soil structure and soil bearing capacity
- Improper road infrastructure design
- Emergency exit in the Said project
- Firefighting system
- Wastewater disposal system design
- Rain water harvesting capacity of the drainage system
- Electricity hazards
- Low social acceptability & functionality of design

**Impact significance:** moderate to high

**Nature of impact:** direct

**Duration:** Long-term

**Timing:** Constructional phase & Operation phase

**Reversibility:** NA

**Likelihood:** moderate to high

**Consequences:** moderate to high

### **Mitigation measures and recommendations**

Following are the mitigation measures and recommendations to minimize the anticipated impacts:

- Each industrial unit will incorporate all HSE measures regarding the design of project.
- Structure stability of the building should be ensured.
- Emergency exist points should be marked within the project building and in overall plan.
- Firefighting system should be designed for the emergency situations.
- Electricity system should be design safe and sound.
- Electricity wires should be covered by thick plastic/electricity resistant covers.
- Design should be professional which accommodate the maximum space and has high social acceptability & functionality.

### **6.4.3 Environmental Impacts During Construction Phase:**

#### **6.4.3.1 Impacts on Physical Environment**

##### **6.4.3.1.1 Topography**

Project has plan land and some digs. In the proposed area there are little trees and excavation and leveling is involved in this construction.

##### **Impact:**

- Change in topography due to excavation
- Land filling of the area
- Construction of roads

**Impact significance:** Low

**Nature of impact:** Direct

**Duration:** Short-term

**Timing:** Constructional phase

**Reversibility:** NA

**Likelihood:** moderate

**Consequences:** Very Low

##### **Mitigation:**

- Cuttings of trees will be avoided
- Use of existing paved tracks as many as possible.
- Working should be in such a way that minimum excavation is involved

##### **6.4.3.1.2 Air Quality:**

Air quality will be affected by fugitive dust emissions from construction machinery; dust from the unpaved surface and construction vehicles. The critical sources of dust pollution

during the construction phase will be:

- Unpaved road surface
- Transportation of materials and other construction activities that create dust emissions

**Impact significance:** Low

**Nature of impact:** Direct

**Duration:** Short-term

**Timing:** Constructional phase

**Reversibility:** NA

**Likelihood:** moderate

**Consequences:** Very Low

**Impact:**

Air quality deterioration, particulate matter/dust emissions due to construction activities; stand by generator, equipment's and vehicle.

**Mitigation:**

- Sprinkling of water on track will reduce dust pollution
- Provision of dust masks for workers.
- Air quality monitoring is recommended on regular base
- Proper paved road infrastructure is recommended
- All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions
- Blowing of dust and particulate matter from stockpiled loose materials (e.g. sand, soil) should be avoided either by sheeting them with tarpaulin or plastic sheets or by sprinkling them with light shower of water
- Open burning of solid waste from the Contractor's should be strictly banned;

**6.4.3.1.3 Noise**

Noise is a by-product of human activity, and area of exposure increases as function of mobility and construction activities. Sources of noise during construction are heavy machinery such as bulldozers, excavators, stabilizers and other equipment. Noise generated by construction machinery is likely to affect sensitive receptors located within 50 meter of the Said project.

**Impact**

- Persistently higher noise levels can produce psychological effects of distraction of attention, irritation and short temperedness in the exposed persons
- Noisy settings and higher background levels can cause temporary threshold shift and the consequent habit of speaking loud, which may cause damage to vocal cords in the persons exposed
- Noise produced from moving construction vehicles and blowing of pressure horns, at times, could be intolerable particularly during quiet hours of night

**Impact significance:** Low

**Nature of impact:** Direct

**Duration:** Short-term

**Timing:** Constructional phase

**Reversibility:** NA

**Likelihood:** moderate

**Consequences:** Low

**Mitigation:**

- Selection of up-to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices
- Confining excessively noisy work to normal working hours in the day, as far as possible
- Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and training them in their use
- Preferably, restricting construction vehicles movement during night time
- Vehicles and equipment used should be fitted, as applicable, with silencers and properly maintained
- Use of low noise machinery, or machinery with noise shielding and absorption
- Contractors should comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures

**6.4.3.1.4 Water Resources**

There is no impact on surface water quality during the construction of the project area. Persistent and prolonged withdrawal of groundwater higher than the safe yield limits of the aquifer can initiate early depletion of aquifer. This situation can result in reduced water supplies for other users who share the same groundwater resource. Abstraction of the groundwater over and above the safe yield limit can produce serious hydrological and environmental consequences.

**Impact:**

- Early depletion of the aquifer resources
- Persistent lowering of the water table
- Reduced availability or non-availability of the groundwater to the neighboring communities sharing the same aquifer

These impacts are temporary and minor negative in nature

**Impact significance:** Low

**Nature of impact:** Direct

**Duration:** Short-term

**Timing:** Constructional phase

**Reversibility:** NA

**Likelihood:** moderate

**Consequences:** Low

**Mitigation:**

- Regular water quality monitoring according to determined sampling schedule
- Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond
- Continuous withdrawal and over pumping of groundwater should be avoided. Instead, intermittent pumping be carried out to conserve the groundwater resources
- Take precautions construct temporary or permanent devices to prevent water pollution due to increased siltation

**6.4.3.1.5 Soil**

The project area is open land with no paved area. Soil erosion and contamination may occur on site due to the following likely impacts:

**Impact:**

- Excavation of earth/cutting operations
- Land leveling activities
- If the excavated area is left unfilled for long, which may lead to rainfall induced soil erosion;
- The unspent materials and debris produced from consumed up materials, if left as such and allowed to mix with soil underneath, can degrade the quality of receiving

soils and may render them unfit for plantation later on

- Leakages of oils, lubricants, chemicals, and other similar substances from their storage sites and from engines of the generators, machines, equipment and vehicles can spoil the receiving soils and may undermine ability of the spoiled soils to support growth of vegetation and plants
- Washing of the gadgets, machinery and equipment without proper drainage of the washout water can adversely affect the soil quality. This impact is, however,

temporary.

**Impact significance:** Low to Moderate

**Nature of impact:** Direct

**Duration:** Short-term

**Timing:** Constructional phase

**Reversibility:** NA

**Likelihood:** moderate

**Consequences:** Low

**Mitigation:**

- Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for dumpsites, and covered at appropriate place.
- As applicable and needed, plantation of grasses and shrubs will be done at unnecessary excavations should be avoided
- Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall and away from any potential source of fire
- Septic tanks of adequate capacities should be constructed for receiving and treating wastewater from all temporary worksite toilets and at the temporary container offices, if any. The toilet wastewater should not be discharged untreated onto the adjacent lands
- All machineries and materials should be stored at the designated areas and compounds
- All the unspent and left over materials should be completely removed offsite upon completion of construction
- Washout from washing of equipment and gadgets should be drained into either a septic tank or a sand-gravel bed for removal of the grit and contaminants

**6.4.3.1.6 Wastewater**

**Impact:**

- Wastewater generation due to construction activities

**Mitigation:**

- Wastewater generated during construction and domestic activities will be stored temporarily in septic systems comprising of septic tanks from where it will be routed to local drain present near the project.
- Waste segregation measures will be employed to minimize entry of solid waste into the wastewater stream.
- An appropriately designed septic tank will be used to treat sewage/waste water to achieve PEQS.
- Periodic cleaning of the septic tank is recommended.

**6.4.3.1.7 Solid Waste**

Due to construction activities waste will be generated at construction and contractors camp site. The construction waste will include wastewater, oil spillage from machinery, domestic waste and solid waste etc. The handling and storage of oil, asphalt/bitumen may be a source of environmental pollution as a hazardous waste. This will result in unhygienic conditions, health risk to work force and public at the camp site.

**Impact**

- Insecure and unhygienic disposal of the solid wastes generated at the worksite, particularly garbage and trash may cause degradation of soil and land
- Insecurely disposed off heaps of wastes containing kitchen garbage and food waste can serve as breeding grounds for the disease spreading vectors and rodents
- Throwing away of solid wastes into water channels and the wastewater network can result into choking of the latter.

**Impact significance:** Low

**Nature of impact:** Direct

**Duration:** Short-term

**Timing:** Constructional phase

**Reversibility:** NA

**Likelihood:** moderate

**Consequences:** Moderate

**Mitigation:**

- An efficient and responsive solid waste management system should be devised for the entire duration of the construction phase. Such a system should provide for separate collection of different categories of constructional wastes. The wastes which will be reusable/recyclable (iron bars, aluminum) should be sold to waste vendors and those which cannot be sold out (brick pieces) may be used as a filling material for

leveling the depressions, subject to technical feasibility

- Training of working force in the storage and handling of materials and chemicals that can potentially cause soil contamination
- Solid waste generated during construction and camp sites will be safely disposed in demarcated waste disposal sites or handed over to the contractor

#### **6.4.3.1.8 Health and Safety**

Health risks and work safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment and due to storage, handling and transport of hazardous construction material. 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 project area. Mitigation measures will include:

**Impact significance:** Low to Moderate

**Nature of impact:** Direct

**Duration:** Short-term

**Timing:** Constructional phase

**Reversibility:** NA

**Likelihood:** moderate

**Consequences:** Moderate

#### **Mitigation:**

- Providing basic medical training to specified work staff and basic medical service and supplies to workers
- 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
- Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for labourers
- Protection devices (ear muffs) should be provided to the workers doing job in the vicinity of high noise generating machines
- Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc.
- Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic at construction sites, haulage and access roads. This is a moderate positive impact.

### **6.4.3.2 Impact On Biological Environment**

There is no any fauna or flora is present on the Said project site. Few trees are there. On their behalf a complete plantation plan has been provided.

### **6.4.3.3 Impact On Socio-Economic Environment**

#### **6.4.3.3.1 Economic Activity**

Due to the construction of the Said project, economic activity will be generated in the project area as the laborers and semi-skilled staff will have an opportunity to work for the construction of the Said project. This will help in developing their skills and capacities.

#### **6.4.3.3.2 Lifestyle And Culture**

There are chances of arising of issues related to cultural differences/conflict between the Contractor's workforce and the local inhabitants, conflicts arising due to the mix of local and migratory job seekers as the use of local resources and products will be increased. In this situation, local residents may resist contractor's workforce attitudes, cultural clashes particularly when local/international contractors are engaged, social disturbance and dissatisfaction with employing outsiders may arise. This impact is temporary and minor negative in nature.

### **6.4.4 Impacts During Operational Phase:**

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

#### **6.4.4.1 Impacts On Physical Environments**

##### **6.4.4.1.1 Solid Waste/ Sludge Management:**

In the operation of Said 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:** operation

**Reversibility:** Not applicable

**Likelihood:** Low (unlikely) if mitigation measures will ensure that Solid waste management in efficient way.

**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:**

- Devise plan & develop guidelines for the safe handling, storage & disposal;
- Sludge is placed at the site after cleaning of wastewater treatment facility;
- PPEs are strongly recommended for workers for the handling of sludge;
- Separate bins at various places must be present for solid waste collection and

segregation;

- Waste will be handed over to EPA approved waste contractor;
- Solid waste will be recycling at maximum level;
- Industrial ecology practices will be implemented wherever possible;
- 7 R's of sustainability is recommended;

#### 6.4.4.1.2 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:** operation

**Reversibility:** Not applicable

**Likelihood:** Low

**Consequences:** Mild

**Impact significance:** Low.

#### Mitigation measure

- Wastewater that is finally disposed off, will be in limits of PEQS
- Septic tank should be available.
- Water conservation approaches will be follow to reduce its wastewater
- Wastewater treatment facility will be installed to treat the wastewater

#### 6.4.4.1.3 Gaseous Emissions:

Emissions will be produced by generators, boilers and vehicles and equipment will similar to those produced by generators in terms of the resulting pollutants (SO<sub>2</sub>, NO<sub>X</sub>, PM, etc.). However, the extent to which they can produce would keep considerably lower, since much smaller engines will use in vehicles and construction machinery.

**Nature of impact:** Direct

**Duration:** long term

**Timing:** operation

**Reversibility:** irreversible

**Likelihood:** moderate if mitigation measures will be ensured.

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

**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.
- For generators, small scrubbers will be install.

#### **6.4.4.1.4 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**

- Do not waste the energy/electricity when there is no need of it.
- Use energy efficient machinery and equipment
- Use energy saving products
- Conduct and maintain records for energy audits
- Do not leave the machinery in running form when there is no working being done
- Machinery must never be left unattended

It is recommended to save and conserve the energy and adopt energy efficient technologies during the construction phase

#### **6.4.4.1.5 Noise Level:**

Noise is the major 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:**

- Machinery and vehicles will be tuned and maintained
- Limits will impose on unnecessary use of horns
- Safety signs will be displayed. public & drivers will be aware of them

- Sound proof wall will be constructed for generator.

#### **6.4.4.1.6 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. Mitigation measures will include:

**Impact significance:** Low to Moderate

**Nature of impact:** Direct

**Duration:** Short-term

**Timing:** Operational phase

**Reversibility:** NA

**Likelihood:** moderate

**Consequences:** Moderate

#### **Mitigation:**

- 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
- Protection devices (ear muffs) should be provided to the workers doing job in the vicinity of high noise generating machines
- Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc.
- Ensure strict use of wearing these protective clothing during work activities
- Instruct foremen to strictly enforce the keeping out of non-working persons, particularly children, off work sites
- Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic at construction sites, haulage and access roads.

#### **6.4.4.2 Impact On Biological Environment**

##### **6.4.4.2.1 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:** construction 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:

- Prohibition to park vehicles on green belts/ grass;
- Unnecessary damage to vegetation is strictly avoided;
- Proponent planted trees and other species after construction phase;
- Proponent will plant 10 trees if he removes a single plant during the construction/ development of the project.

**6.4.4.2 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.

**6.5 Potential Environmental Enhancement Measures**

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

- Sprinkling of water will be done on dusty roads and tracks.
- PPEs will be provided during construction activity.
- Constructional waste and domestic solid waste will be disposed-off or utilized properly.
- Local people will be informed in advance when work is about to start in an area.

- Machinery will never be left unattended. Efforts should also be made to discuss traffic conditions so that regular traffic is not disturbed.
- Transporters engaged for the project would be forced to adhere to the load specifications of the access road.
- No overloading would be allowed in any case.
- Safety signs and boards will be placed during construction.
- Air pollution controlling devices will be installed within the project during operation.
- Machinery will be kept maintained.
- Waste water will be treated through septic tank that will be installed within the premises of the subject project.
- Proper SOPs will be followed with proper schedule along with the HSE conditions.
- Area will be restored with native plants. A proper tree plantation plan will be formulated to save the environment.
- Solid waste will be handed over to contractors and agreement will be made.
- Noise will be controlled by adopting proper measures.
- PPEs will be provided to workers during working.
- Firefighting equipment's and system will be installed.
- Safety signs will be placed at all locations where required.
- Hygienic conditions will be ensured and proper quality will be maintained by quality control testing.
- First aid facilities will be made available.

## **6.6 Purpose of Mitigation Measures**

### **6.6.1 What is the problem i.e. In terms of –major environmental impactsll which may arise by the subject 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 operational phase of the project because the constructional 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 subject project, as different industries will be installed in the industrial estate, 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 the activity, during the activity and post activity to cause minimum impacts to the environment.

### **6.6.2 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. Trainings will be conducted on site prior to start work while other precautionary measures will also be adopted to make the project safe and environmental friendly.

### **6.6.3 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 EMMP 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.

## **6.7 Whys of Achieving Mitigation Measures**

### **6.7.1 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.

### **6.7.2 Improved monitoring and management practices:**

Management shall take appropriate measures to provide pollution free and safe environment during the Said project activity by implementing improved management practices and

monitoring techniques suggested in EMP.

### **6.7.3 Compensation in money terms:**

Site proposed for the subject project is the property of the Government and free of any activity. As the site is the property of the government and vacant that's why there is no need of money in terms of land cost or any other mean. However, rehabilitation will be done in the vicinity of the project site to restore the beauty of the area.

### **6.7.4 Replacement, relocation and rehabilitation:**

Subject project site is the property of the government, there is no need of replacement or relocation of a single person or economic activity. 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.

# **ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM**

The primary objectives of the EMMP are to:

- 1) Facilitate the 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:
- 4) Ensure the complete implementation of all mitigation measures.
- 5) Ensure the effectiveness of the mitigation measures.
- 6) Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- 7) Identify training requirements at various levels.

### **7.1 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 crosschecked.

Following functionaries will be involved in the implementation of EMP:

- Project Proponent
- HSE Officer
- In-Charge Administration
- Supervisor of project

Organogram of authorities involved in the implementation of EMP in the proposed

### **7.2 Training Schedule**

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

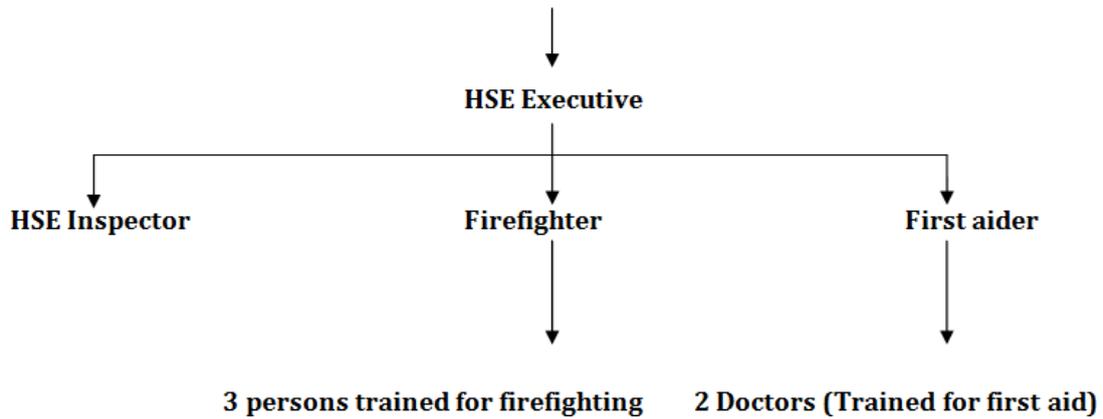


Figure 15: Institutional Capacity for the implementation of EMP

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 8: 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 construction site and affective implementation of the EMMP. The training modules will include air, noise and

water pollution monitoring, social awareness, Environmental Laws, National Environmental Quality Standards (PEQS), Usage of personal protection equipments, and health and safety related issues on the construction site.

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

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

### **7.2.1 Training Of Building Contractor**

Training of building contractor & workers will be the part of the TORs regarding the construction of the scheme.

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

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

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

7.3 Summary Of Impacts and their Mitigation Measures

Table 9: Summary of Impacts and their Mitigation Measures

Impacts	Mitigation Measures
<b>Project Location</b>	
<ul style="list-style-type: none"> <li>• Acquisition of land</li> <li>• Loss of environmentally sensitive areas</li> <li>• Changes in traffic pattern</li> <li>• Potential conflicts with stakeholders</li> <li>• Resettlement issues</li> </ul>	<ul style="list-style-type: none"> <li>✓ There is not any sensitive area near the project site.</li> <li>✓ Many other industries are also working near the project site.</li> <li>✓ The project proponent will achieve the PEQS/ PEQS at the boundary walls of the subject project to avoid the environmental impacts on the nearby industrial unit.</li> <li>✓ There is no need to change the traffic pattern due the development of the subject project because few industries have been developed at the same road.</li> <li>✓ It is recommended to settle the issues through scoping and specific group discussions.</li> <li>✓ No resettlement issues.</li> <li>✓ It is recommended for obtaining of approval from other relevant departments.</li> </ul>
<b>Project Design</b>	

<ul style="list-style-type: none"> <li>• Road infrastructure design</li> <li>• Emergency exits</li> <li>• Firefighting system</li> <li>• Wastewater disposal system design</li> <li>• Electricity hazards</li> </ul>	<ul style="list-style-type: none"> <li>✓ Safe road infrastructure design should be provided at the project site.</li> <li>✓ Emergency exit points should be marked at the project site.</li> <li>✓ Firefighting equipment must be maintained at the site in good working condition to cope with any emergency situation.</li> <li>✓ Efficient wastewater disposal system should be designed for proper treatment of wastewater.</li> <li>✓ Electricity system should be designed safe and sound.</li> </ul>
<b>Construction and Operation phase</b>	
<ul style="list-style-type: none"> <li>• Land or Soil Erosion during the construction phase</li> <li>• Habitat destruction</li> <li>• Scarring of the landscape and aesthetic beauty.</li> <li>• Clearing of native plants will disturb the complexity of the ecosystem of the proposed area. Leakage of oil from storage area may contaminate soil</li> </ul>	<ul style="list-style-type: none"> <li>✓ Sprinkling of water is recommended</li> <li>✓ After construction phase, the project proponent will restore the land by plantation.</li> <li>✓ All spoils will be disposed of as desired and the site will be restored back to its original conditions</li> <li>✓ Aesthetics of the area will be maintained.</li> </ul> <p>Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall and away from any potential source of fire</p>

<ul style="list-style-type: none"> <li>• The transportation of the project machineries and material also may cause dust.</li> <li>• Un-metaled roads may cause dust.</li> <li>• Dust raised on dirt tracks by project-related vehicles.</li> <li>• Dust from drilling of deep holes.</li> <li>• Combustion products from vehicles used for project-related activities</li> </ul>	<ul style="list-style-type: none"> <li>✓ Air emissions-controlled devices must be installed to control the air pollution.</li> <li>✓ Water the construction site periodically to minimize fugitive dust generation while laying foundation.</li> <li>✓ Store all construction materials in a manner to minimize generation of dust and spillage on roads.</li> <li>✓ During excavation works drop heights will be minimized to control the fall of materials reducing dust escape.</li> <li>✓ Sprinkling of water must be done to control the dust or PM</li> <li>✓ Vehicle emissions inspection should be done on regular basis</li> <li>✓ Sprinkling should be done on the unpaved area to avoid dust pollution/ particulate matter.</li> <li>✓ Vehicles/ trucks should be serviced regularly</li> <li>✓ All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.</li> </ul>
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Noise	
<ul style="list-style-type: none"> <li>• The major sources of the noise at Said project site are project related machinery.</li> <li>• High noise level cause hearing loss, deafness, high blood pressure, headache, depression and mental disturbance.</li> <li>• Noise level will not exceed 75 dB(A) at the distance of 2 km radius, activity site is located at a safe distance from the nearest human settlement .</li> <li>• Noise from construction activities from site preparation, earth works, foundation and plant equipment installation</li> </ul>	<ul style="list-style-type: none"> <li>✓ Personal Protective Equipment PPEs including Ear muffs, Ear plugs and other noise abating equipment will be provided to the workers and other staff of the subject project.</li> <li>✓ Proper maintenance and tuning of the vehicles should be done.</li> <li>✓ Sound proof room should be built for generator (if any) to control the noise.</li> <li>✓ A speed restriction of 40 km/h will be imposed on all construction vehicles.</li> </ul>
Waste Water	
<ul style="list-style-type: none"> <li>• Domestic waste water from the camp</li> <li>• Minor generation of waste water from construction activity.</li> <li>• Water Contamination due to improper storage of construction material,</li> <li>• Spread of diseases, underground water contamination</li> </ul>	<ul style="list-style-type: none"> <li>✓ Domestic waste water will be drained out in nearby local drain after treated in septic tanks</li> <li>✓ Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall.</li> </ul>

Solid waste	
<ul style="list-style-type: none"> <li>• Solid waste may generate from construction activity, domestic and packing material of project related machineries.</li> <li>• Solid waste may generate from operation of project.</li> </ul>	<ul style="list-style-type: none"> <li>✓ A solid waste management division should be formulated to deal with the proper disposal of solid waste, supervised by HSE Manager, SW Manager, and other related personnel.</li> <li>✓ Solid waste generated from the construction activity as sand, stones residues etc. that should be utilized in restoration of the quarry area whereas solid waste from the domestic sources should be disposed off properly</li> <li>✓ Proper solid waste management system is recommended for each individual industrial unit.</li> <li>✓ 7 R's of sustainability is recommended</li> <li>✓ Sludge will be removed and dispose off in scientific way.</li> <li>✓ Solid waste related to the operation will also manage in scientific way.</li> </ul>
Health and Safety	
<ul style="list-style-type: none"> <li>• Health and safety issues will be arose during construction activity, handling of material, machinery and improper practices of work</li> <li>• Health and safety issue may arise during regular operations</li> </ul>	<ul style="list-style-type: none"> <li>✓ Use of PPEs should be implemented at workplace.</li> <li>✓ First aid measures/medical facility should be provided to project related employees.</li> <li>✓ Safe drinking water must be provided to workers, staff, and poor people of the area.</li> <li>✓ Water consumption records should be maintained.</li> <li>✓ Safety signs &amp; boards should be placed at during construction activity.</li> <li>✓ Construction site should be fenced properly to avoid any damage to nearby settlements.</li> <li>✓ Smoking or any drugs should be prohibited during working hours or performing work.</li> <li>✓ At the time of earthwork, fencing will be ensured for the area under the exploration.</li> </ul>

#### 7.4 Equipment Maintenance Detail

The proponent of the subject project will maintain records for Health, Safety & Environment and will hire Environmental / unit manager to check and deal with the unit issues.

All mobile equipment is to be inspected and maintained according to the following Equipment Inspection Schedule as a minimum. Records of all inspections and maintenance are completed and maintained for review and approval.

#### 7.5 Environmental Budget

The cost which is required to effectively implement the mitigation measures is important for the sustainability of the Project in operation stage of the Project. Management will allocate 2% of total cost of the project as Environmental Budget for meeting the following purposes:

Table 10: Allocation of Environmental Budget

HSE training	On quarterly basis
Maintenance and management of environment	On regular basis
Maintenance of equipment	On regular basis
Restoration	As per requirement
Plantation	During the operation phase
Availability of PPEs	During construction and operation
Strategic planning to cope with any emergency	As per policy
Formulate the disaster management plan to cope with natural disaster	As per policy

Implementation of all these parameters will be included in the environmental budget. Any equipment failure will not be included in this budget.

### 7.6 Environmental Management Plan:

Sr. #	Aspects	Impact & Mitigations to be taken			
		Impacts	Mitigation measures Construction/Operation	Responsibility	Monitoring
<b>Land acquisition for the Said project</b>					
1	Land acquired for the subject Said project	Nil	The site proposed for the subject project is the property of the proponent.	Proponent	Environmental Consultant/ EPA PUNJAB
<b>Land use &amp; soil erosion</b>					
2	Land Use & Soil	<p>Particulate Matters (PM) pollution, Clearing of the vegetation Scarring of the landscape and aesthetic beauty. Clearing of native plants will disturb the complexity of the ecosystem of the proposed area. Dust emissions will be generated during the construction. Flue gases will be generated due to the involvement of generators and other machinery.</p>	<p>Measures will be taken to avoid soil erosion and dust pollution. Restoration and reclamation plan will be developed to restore the natural landscape of the area. Plant nursery, garden will be developed to rehabilitate the native plants of the area. Project proponent will make all possible efforts to limit the impact on flora and fauna. The Management has serious concern and will take measures to preserve the environment and natural aesthetic beauty of the site.</p>	HSE Department	Environmental Consultant/ EPA PUNJAB

Ambient Air Quality					
3	Air Quality	<p>Particulate matter and fugitive dust emissions.</p> <p>Dust emission due to vehicles on un-metalled roads.</p> <p>Dust due to Construction.</p> <p>Dust raised on dirty tracks by project-related vehicles.</p> <p>Dust emission during earthwork</p> <p>Gaseous emissions from the vehicles &amp; generators</p> <p>Air pollution due to site visiting vehicles/ transporting trucks, hauled trucks, machinery.</p>	<p>Sprinkling of water is recommended on dusty roads and unpaved tracks to control the generation of dust and PM.</p> <p>Air emissions control devices must be installed to control the air pollution.</p> <p>Water the construction site periodically to minimize fugitive dust generation while laying foundation.</p> <p>During excavation works drop heights will be minimized to control the fall of materials reducing dust escape: Temporary cover may be provided for earthwork if necessary.</p> <p>Vehicle emissions inspection should be done on regular basis.</p> <p>Sprinkling should be done on the unpaved area to avoid dust pollution/ particulate matter.</p> <p>Vehicles/ trucks should be serviced regularly.</p> <p>All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.</p>	HSE Department	Environmental Consultant/EPA PUNJAB

Noise & Vibration					
4	Noise	<p>The major sources of the noise at site are project related machinery.</p> <p>High noise level cause hearing loss, deafness, high blood pressure, headache, depression and mental disturbance.</p> <p>Noise level will not exceed 75 dB (A) at the distance of 2 km radius, project site is located at a safe distance from the nearest human settlements.</p> <p>Noise from construction activities from site preparation, earth works, foundation and plant equipment installation.</p>	<p>Personal Protective Equipment PPEs including Ear muffs, Ear plugs and other noise abating equipment will be provided to the workers and other staff of the subject project.</p> <p>Proper maintenance and tuning of the vehicles should be done.</p> <p>Sound proof room should be built for generator (if any) to control the noise.</p> <p>A speed restriction of 40 km/h will be imposed on all construction vehicles.</p> <p>Monthly monitoring is recommended by EPA certified lab to check the compliance with PEQS as per EPA PEQS Rules 2001.</p> <p>Noise level monitoring was conducted at different location and results are attached as Annexure-G with the report.</p>	HSE department	Environmental Consultant/ EPA PUNJAB

Soil Contamination					
5	Soil contamination	<p>Contamination of soil due to oil and other chemicals leakage or spillage Soil contamination due to waste water generated from the project activities</p>	<p>SOPs will be developed for the storage of oil and other chemicals handling and transportations. Soil contamination must be controlled by adopting mitigation measures such as storage of oil, fuels etc. under paved area, by maintaining leakage record of construction vehicles, and by regular inspection (admitted by proponent). Waste water treatment facilities should be installed during construction and operational phases of the project to treat the wastewater. Water from the treatment facility must not be injected into the sub soil. Tarpaulin sheets should be placed under generators and other leaching substances Treated water will be used for plantation. Proper storage of oil, fuel etc. is recommended under paved area.</p>	HSE Department	Environmental Consultant/ EPA PUNJAB

**Health and safety**

6	Health and safety	Health & safety issues of workers and nearby community	<p>Trainings of the workers is recommended for health &amp; safety, first aid and firefighting. Proponent must provide First aid facilities to workers in case of any injury or accident. Safe drinking water must be provided to workers, staff, and poor people of the area. Water consumption records should be maintained. Provision of Proper PPEs must be ensured at workplace. Assembly point and exit points must be available at workplace. Electric wires, D.Bs must be kept covered &amp; closed to avoid any electric hazards. Smoking or any drugs should be prohibited during working hours or performing work. Safety signs &amp; boards will be placed at the time of construction activity. Security guards will be appointed at the construction site. At the time of construction and earthwork, fencing will be ensured for the area under the exploration. Further proper housekeeping and safety arrangements must be ensured at the subject project.</p>	HSE Department	Environmental Consultant/ EPA
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<b>Waste Water</b>					
7	Waste water	Minor generation of waste water from construction activity. Water Contamination due to improper storage of construction material, Water contamination due to improper debris disposal, Waste water pollution, Spread of diseases, underground water contamination	Waste water generated from the constructional activity will be used as sprinkling on the dusty tracks or for restoration of the land. Waste water monitoring is recommended on monthly basis. Waste water treatment facility is recommended. After the treatment in wastewater treatment facility, water will be disposed off in the wastewater drain present near the project site.	HSE department	Environmental Consultant
<b>Solid waste generation</b>					

8	Solid Waste Generation	<p>Land &amp; soil contamination, aesthetic degradation, foul smell etc.</p> <p>Solid waste generation from the construction activity, domestic and project process sources</p>	<p>A solid waste management division will be formulated to deal with the proper disposal of solid waste, supervised by HSE Manager, SW Manager, and other related personnel.</p> <p>Constructional waste must be utilized for road filling or maintenance purposes.</p> <p>Project related solid waste should be handed over to contractors.</p> <p>It is recommended to adopt proper waste management system.</p> <p>Industrial ecology practice will be adopted wherever applicable and possible.</p> <p>7 R's of sustainability is recommended.</p>	HSE Department	Environmental Consultant/ EPA PUNJAB
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Odor					
9	Odor	There will be no source of odor from the both construction and operation of the project	Nil	NA	
Energy requirement					
10	Energy requirement	Resource depletion	<p>Use energy efficient machinery and equipment</p> <p>Use energy saving products</p> <p>Conduct and maintain records for energy audits</p> <p>Do not leave the machinery in running form when there is no working being done</p> <p>Machinery must never be left unattended</p> <p>It is recommended to save and conserve the energy and adopt energy efficient technologies during the construction phase</p>	HSE Department	Environmental Consultant/ EPA PUNJAB
Socio economic impacts					
11	Resettlement	Resettlement issues	The proposed area under the investigation is devoid-off any human settlement and it is the property of the government.	NA	NA

12	Language	Change in cultural language	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	NA
13	Education	Change in social behavior and economic gains	School and colleges exist in the area. The project proponent will initiate an educational awareness program with the coordinator of the local people.	Proponent	NGO survey
14	Health	Social performance of the individuals in the area	The project proponent will assist the local impacted community for the improvement of health services	Proponent	Proponent
15	Culture and norms of the area	Change in culture by the influx of nomadic people	Maximum local employment should be ensured to preserve the culture of the area	Proponent	NGO survey/Environmental Consultant
16	Sewage and waste disposal	Diseases caused by improper sanitation	Subject project will uplift the economic status of the nearest human settlements. Awareness program will be initiated regarding the disposal of waste.	Proponent/ local NGO	NGO survey/Environmental Consultant

### 7.7 Proposed Environmental Monitoring

To oversee the environmental performance of the project through its lifecycle 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 compliances with PEQS and legal obligations. Monitoring for following Environmental Parameters is recommended:

Table 11: Environmental Monitoring

Environmental Aspect	Parameters	Concerned Location	Frequency
<b>Construction Phase</b>			
Ambient Air	CO, SO <sub>x</sub> , NO <sub>x</sub> , O <sub>3</sub> , PM	Project Site	06 Months
Ground Water	All parameters as described in PEQS	Water Connection at site	06 Months
Noise	Industrial Noise	Project Site	06 Months
Solid Waste	Generation Rate according to type of waste	Project Site	Fortnightly
Occupational Health & Safety	Fire, ERP, PPE"s	Project Site	Daily
<b>Operational Phase</b>			
Ambient Air	PM	Production rooms	Annually
Exhaust Air	CO <sub>2</sub> , CO, NO <sub>x</sub> , SO <sub>x</sub> , PM	Electric Generator	Annually
Waste Water	pH, temperature, COD, TSS, TDS	End of pipe effluent	Annually
Noise	Industrial Noise	Production rooms	Annually
Solid Waste	Generation Rate according to type of waste	Solid Waste Bin	Fortnightly
Occupational Health & Safety	Fire, ERP, PPE"s	Whole unit	Daily

# CONCLUSION & RECOMMENDATIONS

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

### **8.1 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.

### **8.2 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.

# Appendices

## REFERENCES

- <https://www.epa.gov/sites/production/files/2015-10/documents/njmc-wpp-2.pdf>
- Schedule I of Punjab Environmental Protection Act 1997 (Amended 2012)
- *section 12 of Punjab Environmental Protection Act 1997 (Amended 2012)*
- Information and data provided by the proponent
- Project feasibility report
- Technical design data related to the project
- Interviews with project related persons of project proponent
- Technical documents of various machinery/equipment
- Meteorological Data from Pakistan Meteorological Department
- Pakistan Environmental protection act 1997
- Punjab Environmental Protection Act 1997 (Amended 2012)
- Guideline for the Environmental Assessment
- Regulations of Environmental Assessment, Regulations 2022
- 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/attock>)
- Attock Chamber of Commerce Industries (<http://www.acci.org.pk/Attock.html>)
- Sectorial Guideline for environmental reports, industrial states
- Pakistan Environmental Protection ordinance (PEPO), 1983
- OSHAS 1800 for health and safety

## GLOSSARY

### **GLOSSARY**

#### **1.1 Annexure: A: Glossary**

- I. **Environment:** means air, water and land; all layers of the atmosphere; all organic and inorganic matter and living organisms; the ecosystem and ecological relationships; buildings, structures, roads, facilities and works; all social and economic conditions affecting community life; and the inter-relationships between any of the factors mentioned
- II. **Environmental Impact Assessment:** means 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 monitoring arrangements, and framing of recommendations and such other components as may be prescribed
- III. **Initial Environmental Examination:** means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an environmental effect for requiring preparation of an environmental impact assessment
- IV. **Effluent:** means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour
- V. **National Environmental Quality Standards:** means the permissible standards for emission of air pollutants and noise and for discharge of effluent and waste

- VI. **Domestic Wastewater:** The wastewater from households' & Sanitary uses
- VII. **Discharge:** means spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping
- VIII. **Waste:** means any material, substance, or by-product eliminated or discarded as no longer useful or required after the completion of a process
- IX. **Sustainability:** means such developments that meet the needs of the present generation without compromising the ability of future generations to meet their needs
- X. **Baseline:** Conditions prevailing at the time of study or before initiation of any project
- XI. **Environment budget:** Monetary assets reserve for environmental activity.
- XII. **pH:** negative log of hydrogen concentration:
- XIII. **Flora:** plant life occurring in particular region or time.
- XIV. **Fauna:** Animal life occurring in particular region or time.
- XV. **Nuisance:** A person, thing or circumstances causing inconvenience or annoyance.
- XVI. **Proponent:** the person who intends to carry-out a proposed project

## LIST OF ABBRIVIATIONS

<b>CO</b>	Carbon monoxide
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>NFPA</b>	National Fire Protection Association
<b>SO<sub>2</sub></b>	Sulphur Dioxide
<b>°C</b>	Degree Celsius
<b>PM<sub>10</sub></b>	Particulate Matter >10
<b>EIA</b>	Environmental Impact Assessment
<b>EMMP</b>	Environment Management & Monitoring Plan
<b>EMP</b>	Environmental Management Plan
<b>EPA</b>	Environmental Protection Agency
<b>EPD</b>	Environment Protection Department
<b>PEQS</b>	Punjab Environmental Quality Standards
<b>SPM</b>	Suspended Particulate Matter
<b>HSE</b>	Health Safety and Environment
<b>UDT</b>	Urban Development and Tourism
<b>SEP</b>	Standard Engineering Practices
<b>ERP</b>	Emergency Response Plan
<b>SWM</b>	Solid Waste Management
<b>IEE</b>	Initial Environmental Examination
<b>Km</b>	Kilometer
<b>CUM</b>	Cubic Unit per Meter
<b>GWT</b>	Ground Water Table
<b>Ltd.</b>	Limited

<b>HC</b>	Hydrocarbon
<b>Mm</b>	Millimeter
<b>NEQS</b>	National Environmental Quality Standards
<b>No.</b>	Number
<b>NOC</b>	No Objection Certificate
<b>NOx</b>	Oxides of Nitrogen
<b>PA</b>	Protected Area
<b>PEPA, 1997</b>	Pakistan Environmental Protection Act, 1997
<b>PEPA, 2012</b>	Punjab Environmental Protection (Amendment) Act, 2012
<b>PEPO</b>	Pakistan Environmental Protection Ordinance
<b>PKR</b>	Pakistani Rupees
<b>PM</b>	Particulate Matter
<b>PPEs</b>	Personal Protective Equipments
<b>Pvt.</b>	Private
<b>SFT</b>	Square Foot
<b>SOPs</b>	Standard Operation Procedures
<b>SOx</b>	Oxides of Sulphur
<b>TMA</b>	Town Municipal Authority
<b>WAPDA</b>	Water and Power Development Authority
<b>WASA</b>	Water and Sanitation Agency
<b>WHO</b>	World Health Organization

**LIST OF EIA STUDY TEAM WITH QUALIFICATION AND POSITION IN TEAM.**

Name	Qualification	Position in the EIA/IEE Team
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Muhammad Afzal Gulzaib	B.sc Environmental Engineering (UET Lahore)	Environmental Engineer
Sadaqat Ali	LLB (Islamia University Bahawalpur)	Research Associate (Author of the Report)