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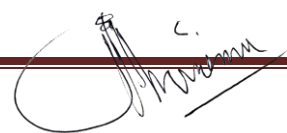
LIST OF ABBREVIATIONS

Approx.	Approximately
°C	Degree Celsius
dB (A)	A weighted Decibel Scale
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EMP	Environmental Management Program
Engr.	Engineer
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
Hons.	Honors
Km	Kilometer
Ltd.	Limited
m ³ /h	Cubic Meter per Hour
NEQS	National Environmental Quality Standards
No.	Number
NOC	No Objection Certificate
PEPA, 1997	Pakistan Environmental Protection Act, 1997
PEPA, 2012	Pakistan Environmental Protection (Amendment) Act, 2012
PKR	Pakistani Rupees
PM	Particulate Matter
PPEs	Personal Protective Equipments
Pvt.	Private
SOPs	Standard Operating Procedures
WAPDA	Water and Power Development Authority
WASA	Water and Sanitation Agency



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EXECUTIVE SUMMARY**1. Title and location of Project**

This executive summary presents an overview of the main findings of Environmental Impact Assessment (EIA) Report for “Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd at Plot No. 272-C, Sunder Industrial Estate, Raiwind road, Lahore. The Proponent has purchased building from Qazi Industries (Pvt) Ltd (Motorcycle Assembly unit). The previous unit has acquired Environmental Approval in 2013. The main goal of this project is to provide quality Mattress & Pillow to customers and explore new markets to promote sales of the Company through good governance. For this instance, EIA Study of aforesaid project has been conducted to accord Environmental Approval/NOC from Environmental Protection Agency (EPA) under Punjab Environmental Protection (Amendment) Act, 2012 and IEE/EIA Regulations 2022. The process for conducting environmental assessment and the results of EIA Study are described in detail in this document.

Introduction

The aforesaid project fall under *Category B* Schedule II i.e., “*Manufacturing and processing*” of review of IEE and EIA Regulations, 2022. Hence, it requires an EIA Study. Thus, an EIA Study has been conducted and report has been prepared for duly submission in EPA to accord Environmental Approval/NOC.

The estimated project cost is **PKR 220 Million approx** the breakdown of the project cost is given in **Chapter 05** of this EIA Report and the environmental budget allocated for the protection of environment is **PKR 02 Million approx**.



A brief outline of Project including name of Proponent and organization preparing report

Project Name	Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd
Location	Plot No. 272-C, Sunder Industrial Estate, Raiwind road, Lahore
Proponent Name	Muhammad Shahid Yousaf
Project Cost	PKR 220 Million Approx.
Total Area	4590.22Sq.M
Final Product	Insulone Sheets & PU foam
Production capacity	Insulone Sheet 250 ton/month PU foam 130 ton/month
Nature of the Area	Industrial
Waste Management	Managed as per standard practices of area
Source of Power	WAPDA supply and standby power generator
Period of Installation of machinery	Approx. 2-3 months
Site Coordinates	31°16'10.2"N 74°10'40.9"E

5. Major Impacts and Recommended Mitigation Measures

Following impacts are likely to occur during machinery installation and operational phase of aforesaid project:

5.1 Machinery installation

As the construction of building has already done therefore, only machinery installation will be done. The building is owned by the proponent. During installation of machinery, safety of the workers will be ensured by adopting all relevant SOPs, training the workers to follow SOPs, discouraging any careless attitude of workers and providing the workers with and encouraging them to use PPEs.

5.2 Operational Phase

Proper ventilation of building will be ensured and use of dust masks by workers will be adopted as a mitigation measures for safety of the worker will be adopted. Domestic solid waste will be handled by the municipality practices of the area, so this is an insignificant issue while process waste will be recycled and reused in process. Empty Packaging waste will be sold out. Machinery will be regularly serviced and tuned to mitigate noise at source, noise barriers will block noise propagation and receptors will be protected by the use of PPEs. An Emergency Response Plan (ERP) will also be in place and the workers will be trained and guided about it.

7. Proposed Monitoring

During machinery installation, ambient air quality for dust level in particular, noise level, solid waste management and community and workers' safety (visual) need to be monitored on regular basis.

During operation, ambient air quality for dust level in particular, noise level, solid waste management and soil contamination, wastewater and community & workers safety need to be monitored on quarterly basis. Monitoring Plan has been included in **Chapter 09**.

1 INTRODUCTION

1.1 Purpose of the Report

For any development project to be initiated in Punjab, it is mandatory to accord Environmental Approval from EPA Punjab under **Section-12** of the *Punjab Environmental Protection (Amendment) Act, 2012* by filing an IEE or EIA before EPA Punjab, as may be defined in *Review of IEE/EIA Regulations, 2022* or recommended by EPA Punjab. This Report represents the Environmental Impact Assessment (EIA) Study for implementation of “*Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd at Plot No. 272-C, Sunder Industrial Estate, Raiwind road, Lahore.* The purpose of this study is to identify the environmental baseline i.e. physical, biological and socio-economic/cultural conditions and assess all possible impacts arising during the machinery installation and operation phase of project and to find out appropriate measures for their mitigation, to either eliminate those impacts or to bring them to acceptable level and formulation of Environmental Management Plan (EMP) for implementation of the project in environment friendly manner.

This EIA Report is prepared by critical examining environmental factors which might be affected due to said project implementation. This report provides the basis for a determination of degree of environmental impacts of project. This report provides relevant information, as required under the officially approved format, to help the decision makers i.e. EPA Punjab before issuing for the Environmental Approval/NOC.

1.2 Identification of the Project & Proponent

The said project is about Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd. The building for aforesaid project was purchased from M/s Qazi Industries (Pvt) Ltd. The previous unit got Environmental Approval in 2013 (copy annexed). The proponent has owned the building in 2024 and now applying for Environmental Approval for Establishment of aforesaid project. The details of proponent of aforesaid project are given below:

Table 1: Details of Proponent

Sr#	Details of Proponent	
1	Name	Muhammad Shahid Yousaf s/o Muhammad Yousaf
2	Designation	Chief Executive M/s Style Styrofoam Industries (Pvt) Ltd

1.3 Details of consultant

The proponent of this project engaged Client Earth Consultancy & Compliance (Rana Shafqat Hussain) Environmental Lawyers & Consultants to carry out Environmental Impact Assessment (EIA) study for the establishment of aforesaid project in accordance with Punjab-EPA guidelines. For this purpose, the company engaged the group of professional which comprises of environmental specialist and environmental engineers.

1.4 Brief description of Nature Size & Project Location

The aforesaid project under study is titled as "*Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd at Plot No. 272-C, Sunder Industrial Estate, Raiwind road, Lahore.*" The total area of aforesaid project is 4590.22 Sq.M.

The coordinates of site are; 31°16'10.2"N 74°10'40.9"E. The location of the aforesaid project is:



Figure 1: Project Location

1.5 Purpose of Report

The main objectives of this EIA Study were:

- To identify machinery installation and operation activities and to assess their impacts on environment.
- Provide assistance to the proponent for implementing the project in a way that would eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in the cost effective manner.
- To present mitigation and monitoring plan for smooth implementation of the suggested mitigation measures and supervises their efficiency and effectiveness.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.
- Prepare an EIA Report for submission to the EPA, Punjab for Environmental Approval (NOC).

2 SCREENING

For the prediction and mitigation of impacts associated with project implementation at an early stage of project development, it is pre-requisite under the environmental laws to undertake Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Study as the case may be. Based on its nature, size and related impacts, the project under consideration has been categorized for EIA Study as stated in **Regulation 03 of Statutory Notification (S.R.O 339(I)/2001)**. As per the statutory notification of Review of IEE and EIA Regulations, 2022 made under Section 12 of Punjab Environmental Protection Act, 1997 (Amended 2012), states;

“No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal Environmental Protection Agency or Provincial Environmental Protection Agencies, as the case may be or where the project is likely to cause an adverse environmental effects an Environmental Impact Assessment (EIA) and has obtained from the Government Agency approval in respect thereof.”

The aforesaid project i.e., **“Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd”** falls under **Category B(Manufacturing and Processing)** mentioned under Schedule II.

Thus, an EIA Study has been conducted and report has been prepared for duly submission in EPA to accord Environmental Approval/NOC.



3 SCOPING

3.1 Spatial and temporal boundaries of Environmental Assessment

Due to installation of machinery in current project building use will change to M/s Style Styrofoam Industries (Pvt) Ltd with environmental friendly operation. The said project is located within designated and approved industrial estate therefore, surrounded by various similar and different nature industries. Current project will be installed by adopting proper mitigation measures. In current project no significant emissions will be observed because operation will be done in controlled environment and wastewater will be treated before disposal to ensure PEQS. PPE's will be provided to workers and their implementation will be ensured. No environmental sensitive area is present within safe distance that could be impacted due to current project installation.

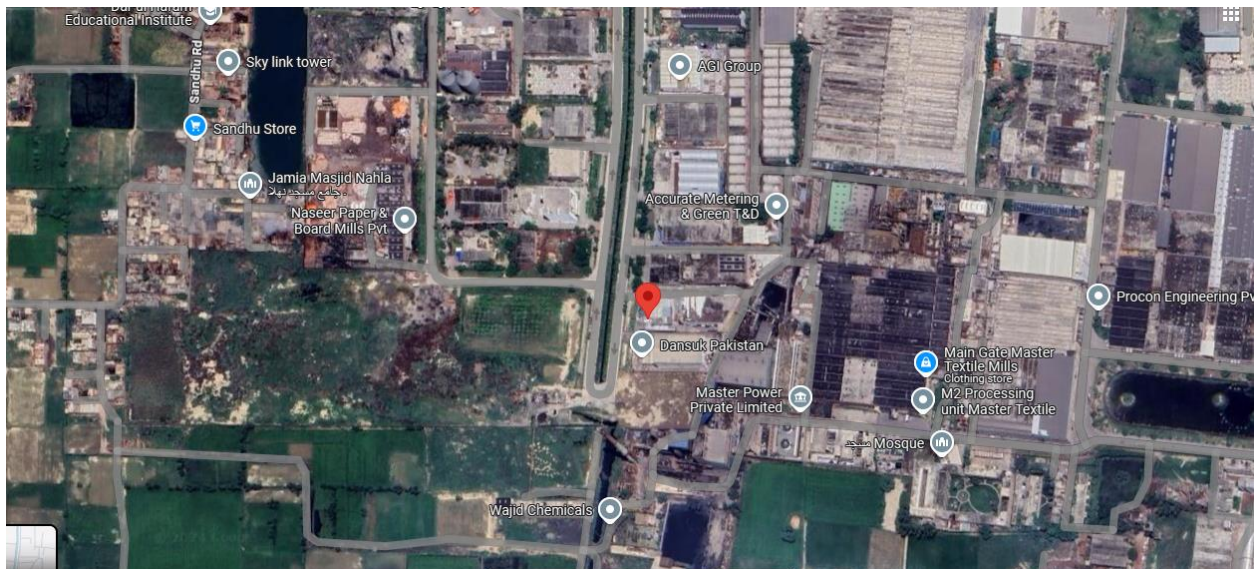


Figure 2: Google earth map of Project site

3.2 Important issues and concerns raised during consultation

During consultation it was observed that maximum of people was in favor of project and following issues and concerns were raised. In chapter 10 Stakeholder Consultation it is mentioned in detail

During survey following concerns of the local community, Government Departments and Environmental Practitioners and experts were noted:

- Air emissions should be controlled effectively.
- Main concern was about jobs, Locals should be preferred for the job opportunities.
- Wastewater should be treated prior to final disposal.
- Solid waste should be recycled and reused.

- Cleanliness of the area should be ensured.
- An effective EMMP should be designed and enforced with true spirit.
- Health of the workers should be ensured.
- Plantation should be carried out at extensive scale.
- Noisy activities should be confined.

3.3 Significant impacts and factors to be determined

Main impacts and factors to be determined are

- Occupational Health and safety
- Traffic Management
- Hygiene management
- Community impacts
- Job opportunities for locals
- Confined noisy activities
- Resource conservation
- Avoid excessive water consumption
- Energy efficient techniques must be adopted
- Tree plantation at designated green areas
- Emergency preparedness

4 CONSIDERATION OF ALTERNATIVES

4.1 Site Alternative their selection and rejection criteria

The selected site for said project is located in industrial area specifically developed for the industries. The area selection was already done by considering the impacts of said project. The area is developed as an industrial and many industries are already in operation in project proximity. The selected project site is ideal from the point of view of compatibility with other land use of the area. The site is also spacious enough to accommodate the proposed facility and its infrastructure. Due to existing infrastructure and its strategic location, it is our considered view that the selected building is ideal and suitable for the proposed development. Additionally, the building is owned by Proponent.

4.2 Design/technology alternatives, their selection and rejection criteria

For Installation of current project state of art technology/machinery will be selected to avoid emissions. Proponent is doing heavy investment for this project so latest/state of art technology will be preferred to ensure good quality products. Good quality raw material will be used to ensure best product. Machinery will be selected after consulting with already running units and their impacts. Used foam will be recycled in current project for manufacturing of new products.

4.3 Environmental Alternatives, their selection and rejection criteria

After project completion, proper landscaping will be done. Trees will be planted at designated green areas. Moreover, the proponent is very concerned and conscious about the quality and equally about the environmental protection and resource conservation. State of art machinery will be selected with minimum power consumptions and less emissions. Maintenance of machinery will be done on regular basis to avoid emissions and noise issues. Extensive Tree plantation will be done in surroundings to control air pollution at maximum level.

4.4 Economic Alternatives, their selection and rejection criteria

- Selected machinery technology is economically efficient.
- Tree plantation will be done that will reduce temperature of the area and also act as noise barrier, also control particulate matter.
- Cost effective technology has adopted for operation of aforementioned unit.

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5 DESCRIPTION OF THE PROJECT

General

This section covers the project comprehensively. It holds salient features including; location, project site layout, objectives, process employed, site alternatives, cost and magnitude of operation, etc.

5.1 Objective of Project

The objective of aforesaid project i.e., Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd is to forward integration and manufacture high quality Foam with good market potential. The project will encompass modern state-of-the-art facility with the objective of producing superior quality products. The project will have following advantages:

- The project will provide additional income and gainful employment to local people.
- It will help to produce superior quality products for end consumers.
- The said project is itself value addition project.
- Socio-economic up-lift of the proponent
- Creation of new job opportunities and promoting income prospects for those engaged in the allied activities associated with operation of project is considered as indirect objectives of the project.

5.2 Project Location and Layout

The site under consideration for the “Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd at Plot No. 272-C,Sunder Industrial Estate,Raiwind road, Lahore. The coordinates of site are; 31°16'10.2"N 74°10'40.9"E.

The location of aforesaid project is given below and the layout of aforesaid project is attached as **Annex-VII**

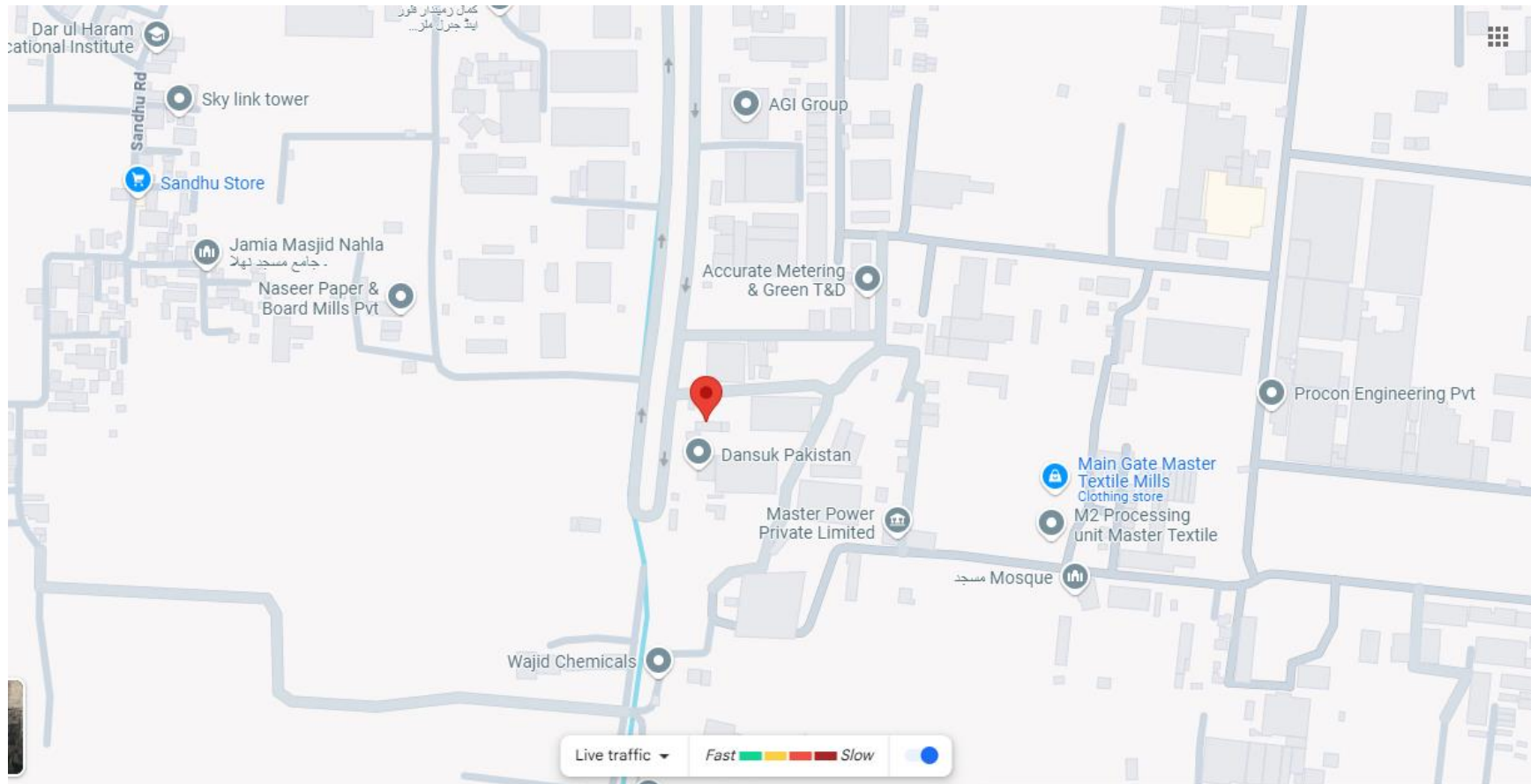


Figure 3: Google Map showing distance of various Receptors from Proposed Site

5.3 Land use on the site

Previously, building was under ownership of M/s Qazi industries (Pvt) Ltd now M/s Style Styrofoam (Pvt) Ltd has purchased the building and they will install their machinery and start their operation after acquiring Environmental Approval of both construction and operation from EPA-Punjab. No alteration/machinery installation activity has started yet.

5.4 Road Access

The building is accessible through various main and connected roads. The road access map of project is attached below:

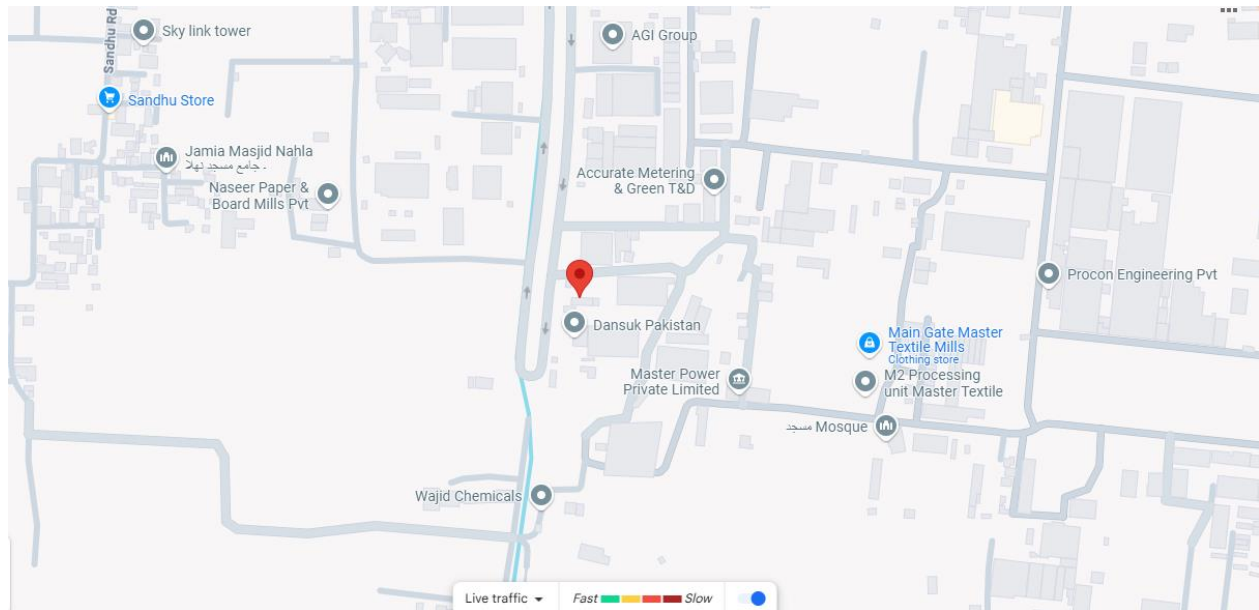


Figure 4: Road Access Map of Proposed Site

5.5 Vegetation Features

The building has already constructed so no vegetation removal will be done for establishment of aforesaid project. Moreover, tree plantation will be done at designated green areas.

5.6 Cost and Magnitude of Operation

The estimated initial capital cost of aforesaid project is **approximately PKR 220 Million**. Purchase of raw material, operation and maintenance of production machinery are the costly activities involved in the operation phase of said project. Equipment safety will be assured if these operations are carefully managed. No separate fund allocation is required.

Figure 5: Cost Breakup

Sr#	Components	Cost (PKR)
1	Building Cost	100 Million approx
2	Equipment/Machinery	118 Million approx
3	Environmental Budget	02 Million approx
Total		220 Million Approx.

However, budget will be allocated for purchase and maintenance of standardized PPEs for workers and for waste management and environmental enhancement. Despite these costs, this project was found to be financially feasible in the feasibility report. Magnitude of operations includes:

- Applying for and getting all necessary approvals and contracts
- Installation of machinery
- Tree plantation and landscaping

The allocated environmental budget is **PKR 02 Million approx.** as mentioned in project cost breakup. The allocated environmental budget will be spent on landscape/green zone management and solid waste management. The proponent will plant indigenous and ornamental plants to increase the aesthetic value of the area. Thus, the project is also a source of employment for locals and would help in economic development activities of the area.

5.7 Schedule of Implementation

The proponent intended to complete the installation in a period of 2-3 months.

Table 2: Schedule of Implementation

Sr. #	Activity	Duration
1	Minor alterations and machinery installation	2-3 months

5.8 Project Description

The proponent has planned to Establish Mattress, Pillows, Insulone sheets and allied products manufacturing unit to fulfill the need of market. Process flow and complete process description has mentioned below;

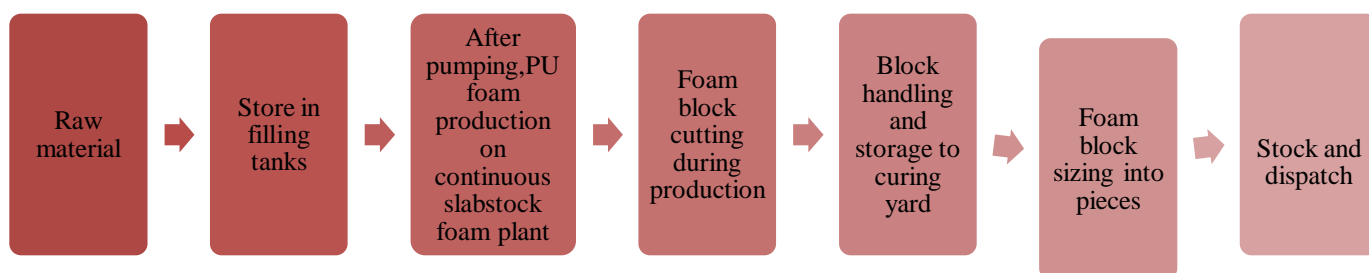


Figure 6: PU foam production process

PU Foam Raw Materials:

1. Polypropylene Glycol (PPG):

A polyether compound used as a building block for polyurethane foams.

Contributes to foam flexibility.

Source: PPG & POP (Polyols): Often imported from multinational chemical manufacturers.

2. Polymer Polyol (POP):

A reactive ingredient used in PU foam manufacturing for strength and resilience.

3. Toluene Diisocyanate (TDI):

A chemical used in the production of polyurethanes.

Essential for creating foam structure and rigidity.

Source: TDI (Isocyanate): Imported, as it's a specialized chemical not produced locally in most cases

4. Methylene Chloride (MCL):

A solvent used as a blowing agent in PU foam production.

Source: Sourced both locally and internationally.

5. Stannous Octate (T-9):

A catalyst that accelerates the reaction between polyols and isocyanates, ensuring even foam formation.

Source: Usually imported for industrial-grade quality.

6. Calcium Carbonate:

A filler material used to reduce production costs and enhance foam properties, such as stiffness.

Source: Locally available fillers and pigments

7. Amine Catalysts:

Accelerate the polyurethane reaction, helping control foam structure and density.

8. Silicon:

Used as a surfactant to stabilize cell structures in foams.

9. Color Paste:

Added to achieve the desired color in the final product

- Local and imported chemicals are segregated and checked for quality.
- Batch-specific quantities of all chemicals are mixed, reacted, and processed into foam blocks/sheets

List of PU Machinery

- Tanks (3 tons×1,10 tons×1)
- Continuous slabstock PU foam plant×1
- Block cutter×1
- Foam Cutter×2
- Horizontal/Carrousel foam cutter×2

- CNC cutter×1
- Recycle Machine(Small)×2
- Recycle Machine (Large)×2
- Compressor (Large)×2
- Water Chiller×2

Process Steps are given below:

1. Purchase of Imported Foam Scrap

Obtain scrap foam, generally from unused or pre-cut foam materials.

2. Shredding/Trimming (via Crushing Machine)

Foam scrap is fed into a crushing machine to shred and trim it into smaller, uniform pieces.

3. Filling (via Filling Machine)

The shredded foam is filled into pillow cases using a filling machine. This process ensures the foam is evenly distributed inside the pillow case.

4. Stitching (via Stitching Machine)

The pillow case is sewn using a stitching machine to ensure the foam is securely contained within and the pillow is properly sealed.

5. Final Quality Check

Perform a thorough quality inspection to check stitching, padding, and overall finish of the pillow. Make necessary adjustments if there are any defects.

The machine commonly used to produce Expanded Polyethylene (EPE) foam is known as an EPE Foam Extrusion Machine or EPE Foam Sheet Extrusion Line.

Insulone Sheets Raw Materials:

1. Low-Density Polyethylene (LDPE):

A thermoplastic made from the monomer ethylene.

Used for its flexibility, strength, and moisture-resistant properties.

Source: Typically imported from petrochemical manufacturers

2. Mono- and Diglycerides of Fatty Acids (GMS 99):

Emulsifying agents derived from fatty acids.

Used to improve blending and stability in production processes.

Source: Can be locally sourced or imported, commonly from chemical suppliers.

3. Master Batch Talcum:

A pre-mixed concentrate containing talc, used to improve the physical properties of plastics, such as stiffness and heat resistance.

Source: Master Batch Talcum & Master Batch Color: Locally sourced from plastic additive suppliers.

4. Master Batch Color:

Concentrated pigments or additives added to give plastics the desired color and appearance.

- Materials are received, inspected, and stored based on local or imported categories.
- Fed into the extrusion process for sheet formation.

Key Components of the Machine:

1. Extruder: Melts and mixes polyethylene with blowing agents.

2. Foaming System: Introduces a gas (like butane) or chemical agent to create the foam structure.

3. Cooling System: Helps solidify the foam material after extrusion.

4. Cutting Unit: Shapes the EPE foam into sheets, rods, or other desired forms.

5. Rewinder or Stacker: Rolls or stacks the sheets for further processing or packaging.

These machines are designed for continuous production and often allow for customization in foam density, thickness, and width. Some brands also include laminating capabilities to add protective layers or coatings to the EPE foam sheets.

Machinery for Insulone Sheets Production

1. Raw Material Silos and Feeders:

Store LDPE, GMS 99, Master Batch Talcum, and Master Batch Color.

Automatically feed the raw materials in controlled proportions to the extruder.

2. Extrusion Machine:

Melts and mixes raw materials to form a uniform polymer blend.

Equipped with temperature and pressure controls to ensure material consistency.

3. Cooling Rollers:

Solidify the extruded molten sheet by rapidly cooling it.

Ensure a smooth and even surface for the sheet.

4. Cutting Machine:

Precisely cuts sheets into specified dimensions or rolls.

May include rotary or guillotine-style cutters for accuracy.

5. Packaging Machine:

Rolls or stacks sheets for final packaging.

Prepares the products for storage or shipment.

Machinery for PU Foam Production

1. Chemical Storage Tanks:

Hold and store raw materials like PPG, POP, TDI, and others in temperature-controlled conditions.

Prevent chemical contamination and degradation.

2. High-Speed Mixer:

Mixes polyols, isocyanates, catalysts, and other additives.

Ensures uniform chemical distribution before the foam reaction.

3. Foam Formation Chamber (Reaction Chamber):

Allows chemical reactions to occur between the components (e.g., TDI and PPG).

Foam expands and forms its structure as gases are released.

4. Curing Chamber:

Maintains controlled conditions (temperature and humidity) to allow the foam to harden.

Essential for achieving desired strength and texture.

5. Cutting Machines:

Trims foam blocks, sheets, or panels into the required sizes.

May include horizontal or vertical blade cutters.

6. Packaging Machine:

Compresses, wraps, or packs foam sheets or blocks for storage or transportation.

Ensures products are safe and protected during delivery

Process Flow Diagram (PFD) for producing EPE foam using an extrusion process**1. Raw Material Feeding**

Input: LDPE pellets and additives (e.g., colorants, lubricants).

Equipment: Hopper/Feeder.

2. Extrusion

LDPE is melted and mixed with blowing agents (e.g., butane gas) under high temperature and pressure.

Equipment: Extruder.

3. Foaming and Expansion

The blowing agent reacts, expanding the melted polymer into foam.

Equipment: Foaming die or nozzle.

4. Cooling

The expanded foam is cooled to solidify its structure.

Equipment: Cooling water bath or air cooling system.

5. Shaping and Cutting

Foam is shaped into sheets, rolls, or rods of desired dimensions.

Equipment: Cutter, shaping rollers.

6. Winding or Stacking

Sheets are rolled or stacked for storage and transport.

Equipment: Rewinder or stacker.

5.9 Relocation and Rehabilitation Plans

There exists no human settlement within a safe radius of the selected project site to be displaced owing to the commencement of the Project as the building has already constructed and located within designated and approved industrial estate. Building is under proponent's ownership hence, no relocation and rehabilitation is required.

6 DESCRIPTION OF THE ENVIRONMENT

This chapter provides baseline data (physical, biological and socio-economic parameters) related to the project and study area. The information has been compiled by using primary and secondary data resources. This chapter also refers to the theoretical analysis of the methodology adopted for collection of primary and secondary baseline data. The underlying principles and practices adopted in this regard are also discussed.

Methodology

The methodology employed to collect the baseline data and information regarding the social structure and various related parameters as discussed in sub-sections below:

Data Collection

The primary data was collected by visiting the project area and its nearby communities. The secondary data regarding physical parameters (topography, geology, seismology, and climate) was obtained by visiting relevant various government departments and their official websites. The biological parameters such as flora and fauna were studied by preparing a floristic list based on visual observation and fauna was studied by using opportunistic approach. The species were recorded with reference to their existence in the project area. Information on wildlife fauna (mammals, amphibians, reptiles, birds, etc.) in the assessment area was compiled based on opportunistic observation, gathering the existing information and consultation with local experts, community members and government and Non-Government Organizations (NGOs). The socio-economic aspects were studied and analyzed by conducting socio-economic surveys.

6.1 BASELINE PHYSICAL ENVIRONMENT

Baseline conditions refer to the existing physical, environmental and socio-economic status of the project and study area. On the basis of baseline information, the project interventions are assessed and mitigation measures are proposed accordingly. The baseline information also helps to indicate the specific issues to be monitored during machinery installation and operational phases of project development. The baseline data (physical, biological and socio-economic parameters) related to the project and study area is described in sub-sections below. Information provided is based on primary and secondary data collected by site visits, desk studies and consultation with locals respectively. This section gives the overview of the topography, geology, seismology and meteorological conditions whereas, it gives detailed information about the surface water, ground water (if present in the project area vicinity) and air quality of project area. The detail of each parameter is discussed in sub-sections below:

6.1.1 Geography

Lying between 31°15'—31°45' N and 74°01'—74°39' E, Lahore is bounded on the north and west by the Sheikhpura 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 404 square kilometers (156 sq mi). Lahore is the capital city of the Pakistani province of Punjab. It is the second-most populous city in Pakistan after Karachi.¹ The city is located in the north-eastern end of Pakistan's Punjab province, near the border with the Indian state of Punjab. Lahore is

¹ [POPULATION OF MAJOR CITIES CENSUS - 2017 \[PDF\]](#) (PDF). Pakistan Bureau of Statistics. Retrieved August 30, 2017

ranked as a beta-world city,² and is one of Pakistan's wealthiest cities with an estimated GDP of \$58.14 billion (PPP) as of 2014.

6.1.2 Seismicity

Study area is located in the tectonic zone of down wrap and platform slop in the seismic zone of noticeable earthquake from 3.1 to 4.9 on Richter scale (Atlas for Pakistan). According to building code of Pakistan prepared by NESPAK recently, it is located in Seismic Zone 2A of Pakistan (Lower limit of moderate damage). Zone 2A represents peak ground acceleration (PGA) from 0.08 to 0.16g. Figure shows the seismic zoning map of Punjab with the Project Area falling under Seismic Zone-2A.³

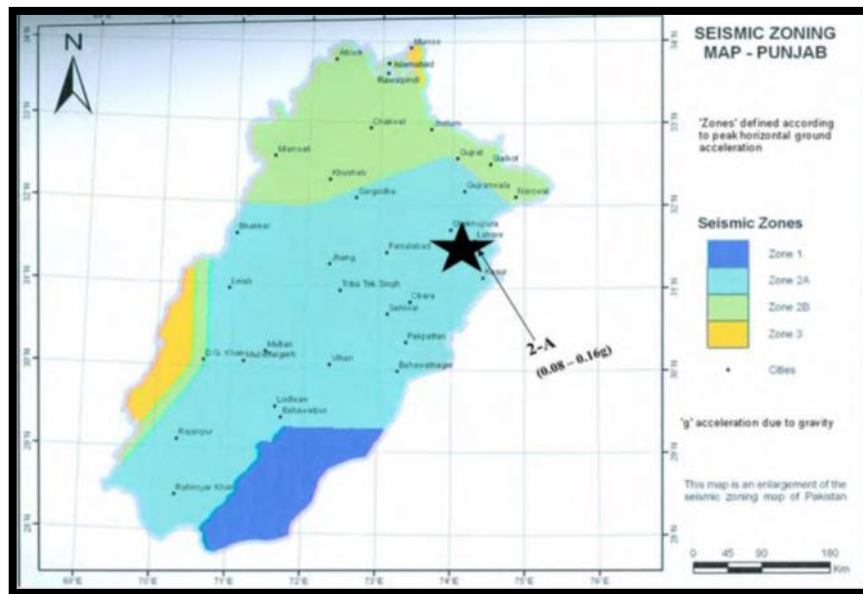


Figure 7: Seismic Map

² GaWC - The World According to GaWC 2016. Iboro.ac.uk. 24 April 2017. Retrieved 30 April 2017

³ "EIA of Construction of Lahore Orange Line Metro Train Project (Ali Town -Dera Gujran)" prepared and submitted by NESPAK

6.1.3 Regional Geology

The soil deposits at the project site belong to Chung Fun formation indicating the last glacial cycle. It was followed by the period of melting of glaciers, resulting in deposition of clay, silt and sand deposits in late Pleistocene to recent. With gradual withdrawal of the sea during the late territory time, shallow water and possibly deltaic deposits were laid down. It became a vast flood plain on which debris of numerous streams have mingled to load it with huge thickness of alluvial material derived from the Himalaya. Though, there is no evidence of any glaciations in the area, the series of great climatic changes during the Pleistocene period had impact on the sedimentation in physiography of this region. The presence of old channels of Ravi River indicates conformity of the stream oscillation to terrestrial rotation in the deflection of streams. However, abrupt migration indicate period of excessive flooding during which earlier channels were choked with sediments and the streams were forced to create new channels (Kamzi 1964).

These alluvial deposits comprise earthy brown to brown silt, clay and sand. The beds are largely hard, laminated and sandy with inter-beds of clay and layers or lenses of sand. Geological map of the Study Area is given in Figure Project site is located in meander belt deposits.

The Project Area does not have any valuable minerals. Although, scientific in depth, investigations haven't been carried out, yet the surveys conducted have failed to discover any minerals worth the name till to- date.

The only minerals worth to value are kallar and kankar in the district Lahore. Kallar is the grey powdery substance collected and taken out from the old village sites and other deserted abodes in the district. It is used for the manufacture of crude saltpeter and also as manure for the top dressing of young cotton and tobacco plants (no longer in the line of extensive cultivation). With the passage of time the demand for Kallar diminished and its use as a trading commodity is on the decline. Kankar is used for metaling roads and its smaller particulars are burnt for lime. It is a kind of limestone gravel and is found, after being dug out at a depth varying from one to eight feet, in many parts of the district particularly the uplands.⁴



Figure 8: Location of the City

⁴ "EIA of Construction of Lahore Orange Line Metro Train Project (Ali Town -Dera Gujran)" prepared and submitted by NESPAK

6.1.4 Topography

The topography of the project area is flat. The General height of the area is approximately 220 meters above the Mean Sea Level (MSL). The district Lahore is divided into two parts. The low lying alluvial soil is along the Ravi River, and the upland in the east. Upland is a plain slope from north-east to south-west. The lowlands are generally inundated during the monsoon season by Ravi River, flowing in the west of district along its boundary with district Sheikhpura. ⁵

6.1.5 Climate

Lahore has a semi-arid climate. The hottest month is June, when average highs routinely exceed 40 °C (104.0 °F). The monsoon season starts in late June, and the wettest month is July,⁶ with heavy rain falls and evening thunderstorms with the possibility of cloudbursts. The coolest month is January with dense fog.

Table 3: Average Monthly Temperature, Precipitation and Relative humidity

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
Average	30.8	17.8	66.6	70.34	47.4

The city's record high temperature was 48.3 °C (118.9 °F), recorded on 30 May 1944.⁷ 48 °C (118 °F) was recorded on 10 June 2007. At the time the meteorological office recorded this official temperature in the shade, it reported a heat index in direct sunlight of 55 °C (131 °F). The record low is -1 °C (30 °F), recorded on 13 January 1967⁸. The highest rainfall in a 24-hour period is 221 millimeters (8.7 in), recorded on 13 August 2008.⁹ On 26 February 2011¹⁰, Lahore

⁵ "EIA of Construction of Lahore Orange Line Metro Train Project (Ali Town -Dera Gujran)" prepared and submitted by NESPAK

⁶ "Climatological Normals of Lahore". Hong Kong Observatory. Retrieved 6 May 2010

⁷ "QUETTA". Pakmet.com.pk. Retrieved 15 March 2011

⁸ Archived 13 June 2010 at the Wayback Machine

⁹ Archived 16 July 2011 at the Wayback Machine. The template Wayback is being considered for merging

¹⁰ Highest temperature in 78 years: Four die as city sizzles at 48o C". Daily Times. 10 June 2007. Retrieved 15 March 2011

received heavy rain and hail measuring 4.5 mm (0.18 in), which carpeted roads and sidewalks with measurable hail for the first time in the city's recorded history.¹¹¹²

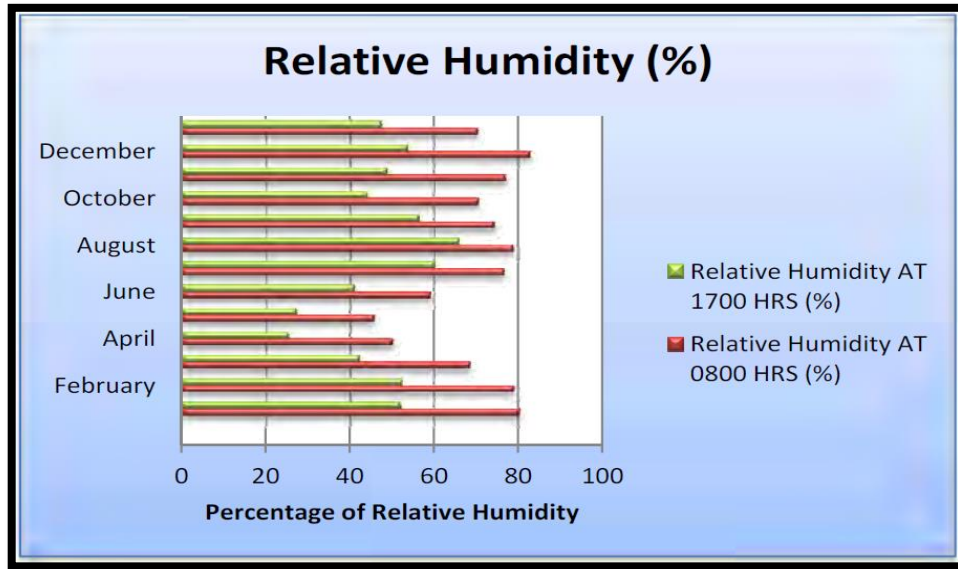


Figure 9: Relative humidity in project area

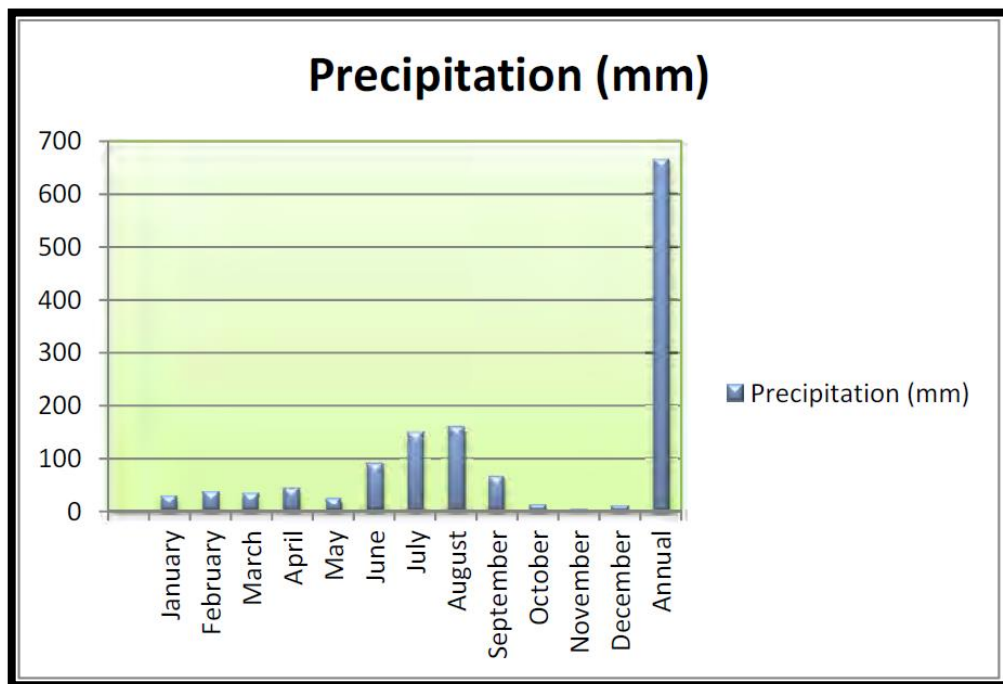


Figure 10: Average Rainfall in the Project Area (2004-2008)

Most of the time June, July and August are the months of maximum wind speed in project area whereas from November to January, wind speed is minimum. June is the month of highest wind speed in project area (8.26 km/h) whereas the minimum wind speed is recorded during the month of January when wind speed reaches to 1.52 km/h.

¹¹ Daily Times - Citizens cheer as hail turns city white

¹² "Lahore becomes Murree!". Youtube.com. Retrieved 15 March 2011

6.1.6 Wind study

Data about wind direction and wind speed for the year 2004, 2005, 2006, and 2007 is available on the format of average daily basis. While, on hourly basis it is available for the year 2008 Only. Table¹³ below shows the average wind speed and wind direction for the year 2004-2007.

Table 4: Average Wind Speed (m/sec) (2004-2007)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2004	0.57	0.93	0.77	0.98	0.98	1.13	1.08	0.82	0.72	0.72	0.21	0.46
2005	0.62	0.72	1.03	1.49	1.44	1.34	0.87	0.51	0.514	0.51	0.51	0.36
2006	0.67	0.67	1.03	1.08	1.23	1.13	0.72	0.57	0.668	0.62	0.51	0.57
2007	0.51	0.82	1.03	1.08	1.39	1.29	1.03	0.82	0.72	0.46	0.15	0.36

Table 5: Wind direction at 0800(2004-2007)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2004	N56W	N55W	N78W	N44W	S71W	S13E	S16E	N56E	S80W	N69W	S75W	W
2005	N80W	N62W	N44W	N67W	N63W	S52W	E	S71W	N54E	W	N68W	N68W
2006	N55W	N47W	N41W	N51W	S46W	S30W	S61E	N67E	N61W	N76W	N71W	N65W
2007	N77W	N55W	N70W	N82W	N39W	S47W	S36E	N67E	N32W	N61W	W	N65W

Table 6: Wind direction at 1700 (2004-2007)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2004	N56W	N55W	N78W	N44W	S71W	S13E	S16E	N56E	S80W	N69W	S75W	W
2005	N80W	N62W	N44W	N67W	N63W	S52W	E	S71W	N54E	W	N68W	N68W
2006	N55W	N47W	N41W	N51W	S46W	S30W	S61E	N67E	N61W	N76W	N71W	N65W
2007	N77W	N55W	N70W	N82W	N39W	S47W	S36E	N67E	N32W	N61W	W	N65W

Calm wind was observed 56 percent of the time and wind speed 3 meter per second was recorded 15 percent of the time. The predominant directions are South-East and North-West in the speed ranges of 3 to 6 m/sec. Wind rose¹⁴ for the year 2008 for Lahore city is given in Figure.

¹³ Meteorology Department Lahore

¹⁴ Meteorology Department Lahore

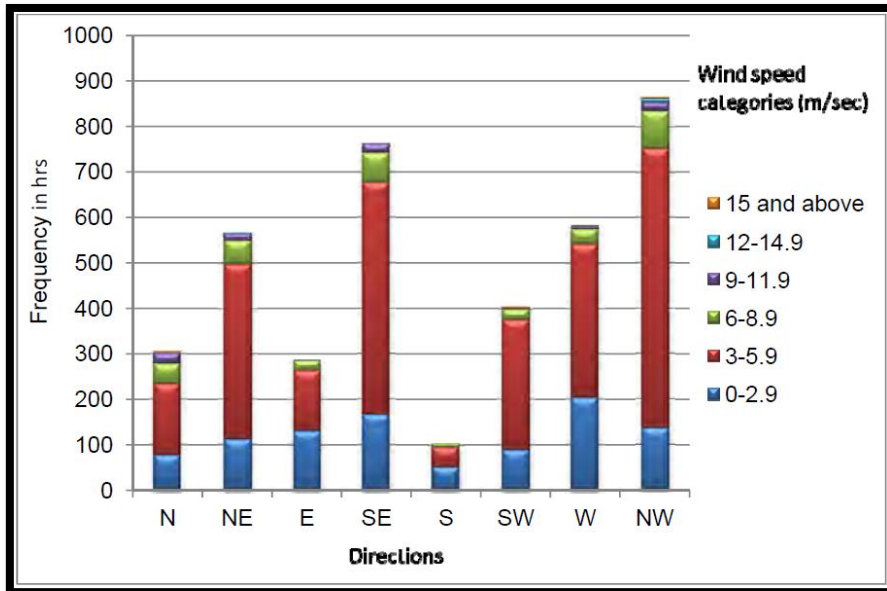


Figure 11: Wind Speed and wind direction in the city of Lahore 2008.

In winter (November-February) the predominant direction are West and North West, in summer (March-June) the predominant direction is South-East while in Moon soon/ summer season (July-October) the predominant direction is South East. Seasonal wise direction and wind speed is shown in Figure

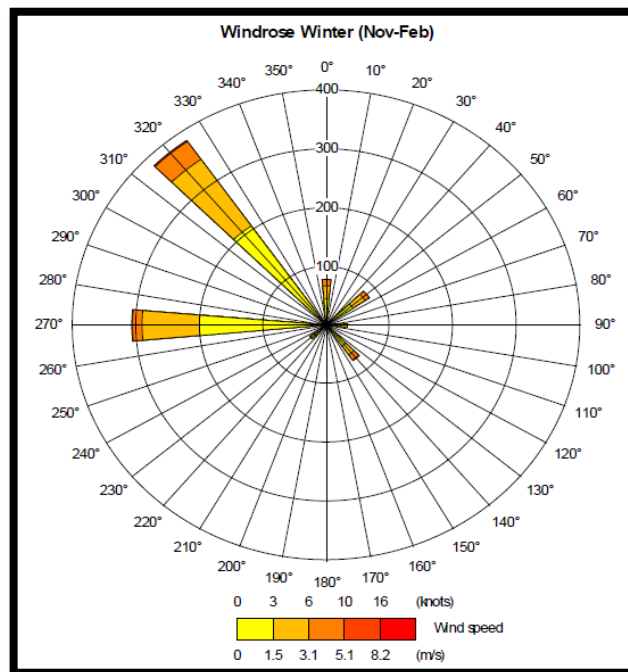


Figure 12: Wind Rose for the winter 2008, Lahore

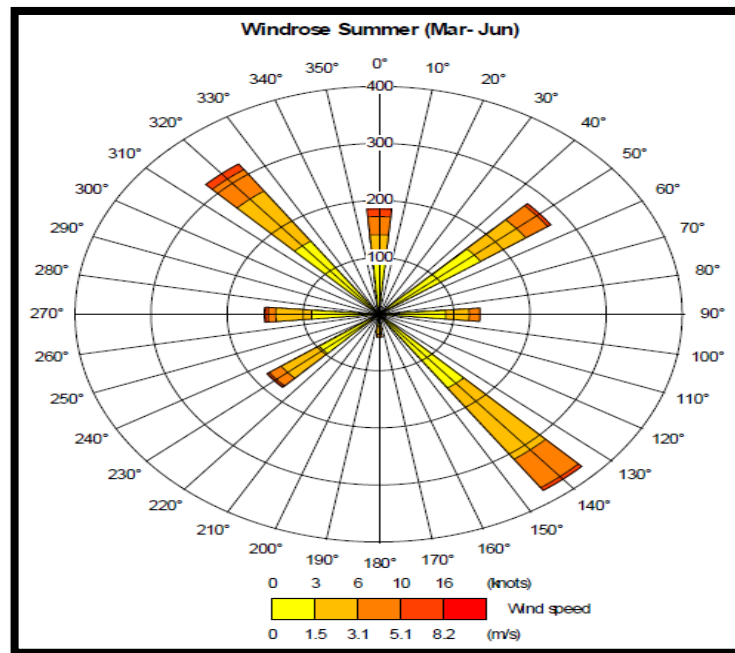


Figure 13: Wind Rose for the summer (MAR-JUNE) 2008, Lahore

6.2 BASELINE ECOLOGICAL ENVIRONMENT

Mainly a country's wilderness areas and scenic landscapes with their associated flora and fauna form natural capital of a country. Both collectively and within each level, the range or variety of the resources is referred to as the "Biological Diversity". The contribution of the "Natural capital" is recognized at three distinct levels including genera, species, and community -habitat and ecosystem.

Pakistan comprises of a total of nine major ecological zones and the term has relevance for each of Pakistan's administrative units—district, province, and particularly country. The greater the number of genera, species and habitats and ecosystems present within these units, the greater is the Biodiversity. It is in this background that the biodiversity of the area is discussed below:

City is enriched with the presence of natural flora and fauna; although with the growing population and development activities, the presence of some has been somewhat affected.

There are however no significant or well-shaped trees and shrubs on the project site. There are some trees only along the main roads.

6.2.1 Flora

Lahore, the city of gardens is heart of Pakistan. The city has seen the heydays of the Mughals, Sikhs and the British; all left their footprints on the history and cultural mosaic of the city. Resultantly Lahore is a treasure-trove of monuments, historical relics and remains which these nations have left in this historical metropolis of Punjab.

Though an ancient city; over the years Lahore has considerably expanded. However, along these modern additions, the ancient monuments, old gardens, trees, graveyards and traditional bungalows having attached gardens, large expanses of lawn and old roadside trees some of them can still be seen, are gradually disappearing. These green areas and old endemic trees of Lahore are home to many resident bird species as well as many summer, winter and transit migrants. So, Lahore is also very important due to its ecological conditions.

Several types of floral species are present in Lahore, however, some of the principal trees, shrubs (plants) and herbs (ground covering plants) are given below in Table, which illustrates their nomenclature including local names, English names and Botanical names.

Table 7: Inventory of Plants present in Lahore

No.	Common Names	Botanical Names
1	Arjun	<i>Terminaliaarjuna</i>
2	Dhak	<i>Buteafrondosa</i>
3	Mahwa	<i>Bassialatifolia</i>
4	Bahara	<i>Terminaliabellerica</i>
5	Amaltas	<i>Cassia fistula</i>
6	Gul-e-nishter	<i>Erytrinasubrosa</i>
7	Barringtonia	<i>Barringtoniaacutengula</i>
8	Nim	<i>Meliaindica</i>
9	Gab	<i>Diospyroresembryopteris</i>
10	Berna	<i>Cratevareligiosa</i>
11	Khark	<i>Celtusaustralis</i>
12	Putajan	<i>Putranjivaroxburgi</i>
13	Fiddle wood/Kashmir Lagotis	<i>Eithryllumruberratum</i>

14	Gul-e-mast	<i>Daliniaindica</i>
15	Gul-e-mohr	<i>Poinciana regia</i>
16	Alstonia	<i>Alstoniascholaris</i>
17	Ashoke	<i>Saracaindica</i>
18	Sheesham	<i>Dalbergiasisso</i>
19	Alata	<i>Stercoliacolorata</i>
20	Kenair	<i>Neriumgrandiflora</i>
21	Weeping Willow	<i>Salix babylonica</i>
22	Keekar	<i>Parkinsoniaaculeata</i>
23	Nilem	<i>Jacaranda mimosfolia</i>
24	Kachnar	<i>Bauhinia purpurea</i>
25	Molsary	<i>Mimosopelengi</i>
26	Bel	<i>Aeglemarmelos</i>
27	Siris	<i>Albizialebbek</i>

6.2.2Fauna

In urban Lahore, there are areas which can truly be classified as places of breeding, nesting and roosting for several bird species. The grounds of different habitats such as Lahore Zoo and the Lawrence Garden, Mayo and Jinnah Gardens, GOR, JalloPark, Kinnaird College, Aitcheson College and many others are home to various bird species.

Ornithologists of preceding times documented the number of bird species in Lahore. According to one study conducted in 1965 there were 240 bird species in Lahore. In another study (1992) only 101 bird species from the parks of Lahore were recorded.

However, with an increase in the rate of urbanization, the ecology of Lahore has been considerably affected and population of birds in Lahore has reduced to just 85 including the

resident and migratory ones. The resident species of Lahore are Grey Hornbill, Yellow-footed Green Pigeon, Parakeet, Bulbuls, Doves, Spotted Owlet, Babblers, Flycatchers, Mynas, Woodpeckers, Crows, Kites, Ashy Prynina, Red Start, Warblers, Red Wattled Lapwing, Kingfishers, and the Oriental White Eye.

Three types of migratory birds are regular visitors of Punjab's provincial metropolis. These are winter visitors, summer visitors and transit migrants.

Not only the birds, but different other classes of the animal species also play an important role for the habitat of the area.

Table 8: List of Different Classes of Animals¹⁵

Mammals	Reptiles	Amphibians	Insects
Stray dogs	Monitor Lizard	Indus valley bullfrog	Dragonfly
Feral cats	Geckos	Common frogs	Damselfly
Donkeys		Toads	Butterflies
Cows			Honey bees
Bats			Earthworms
Goats			Centipedes
Small Indian			
Indian palm squirrel			
Buffalo			
Mole			
Horse			
Sheep etc.			

Besides all these, as Lahore does not contain any of the wildlife species. If it was containing a time ago but it has become extinct now. The reason for extinction and the rising number of endangered species, according to the wildlife authorities are steady conversion of the forests into agricultural lands and urban areas to meet the food and housing requirements of the increasing population, reduction in the wetland areas due to the water shortage in rivers and canals, cutting of trees in forest areas and of course, unauthorized killing of birds and animals

PROJECT SITE:

With an increase in the rate of urbanization, the ecology of City has been considerably affected but there is no threatened or endangered species found in the project site. Similarly no wildlife is present within the project corridor.

6.3 BASELINE SOCIOECONOMIC ENVIRONMENT

Socioeconomic environment is represented by the human and economic development and quality of life values. For the study of socio-economic environment of the project area, field surveys were conducted and interviews were held with the general public and neighbors.

6.3.1 Political and Administrative Setup

The project area falls in Lahore City of the Lahore District. District Co-ordination Officer is the highest ranked administrator of the district. For the collection of revenue and administration, the districts are subdivided into Tehsils. Local governments also administer the area through Union Councils and Tehsils. The total area of the district Lahore is 2,300 square kilometers

¹⁵ WWF

6.3.2 Demographic Profile

The total population of Lahore District was 6,318,745 as enumerated in March 1998 with an intercensal percentage increase of 78.3 since March 1981 when it was 3,544,942 souls. The average annual growth rate of population in the district during intercensal period 1981-1998 was 3.5 percent. The total area of the district is 1772 square kilometers, which gives population density of 3,566 persons per square kilometer as against 2000 persons observed in 1981 indicating a fast growth rate of the district.

The results of the 2017 Census determined the population to be at 11,126,285¹⁶, with an annual growth rate of 4.07% since 1998¹⁷. Gender-wise, 52.35% of the population is male, while 47.64% is female and transgenders make only 0.01% of the population.

6.3.3 Health Facilities

Ample medical and health facilities are available in the Lahore Metropolitan Corporation area and its suburbs. Shaukat Khanam Hospital is the latest addition in the medical care facilities in Lahore for the most dangerous disease in the country i.e. Cancer. There are also other hospitals of voluntary organizations which provide health cover to the general public. King Zaid Bin Sultan Hospital is also a very advanced addition in the medical care for Lahore. Among the prominent hospitals are General Hospital, Lady Willington Hospital, Mayo Hospital, Fatima Jinnah Hospital, The Children Hospital, Services Hospital, and Ganga Ram Hospital etc. Besides, a number of private medical practitioners, Hakims and homeopathic doctors are also practicing in the city. Some famous Health facilities located in the Project vicinity are Hameed Latif Hospital, Wapda Hospital, and Lady Willington. Google map below shows the existing health facilities near project site.

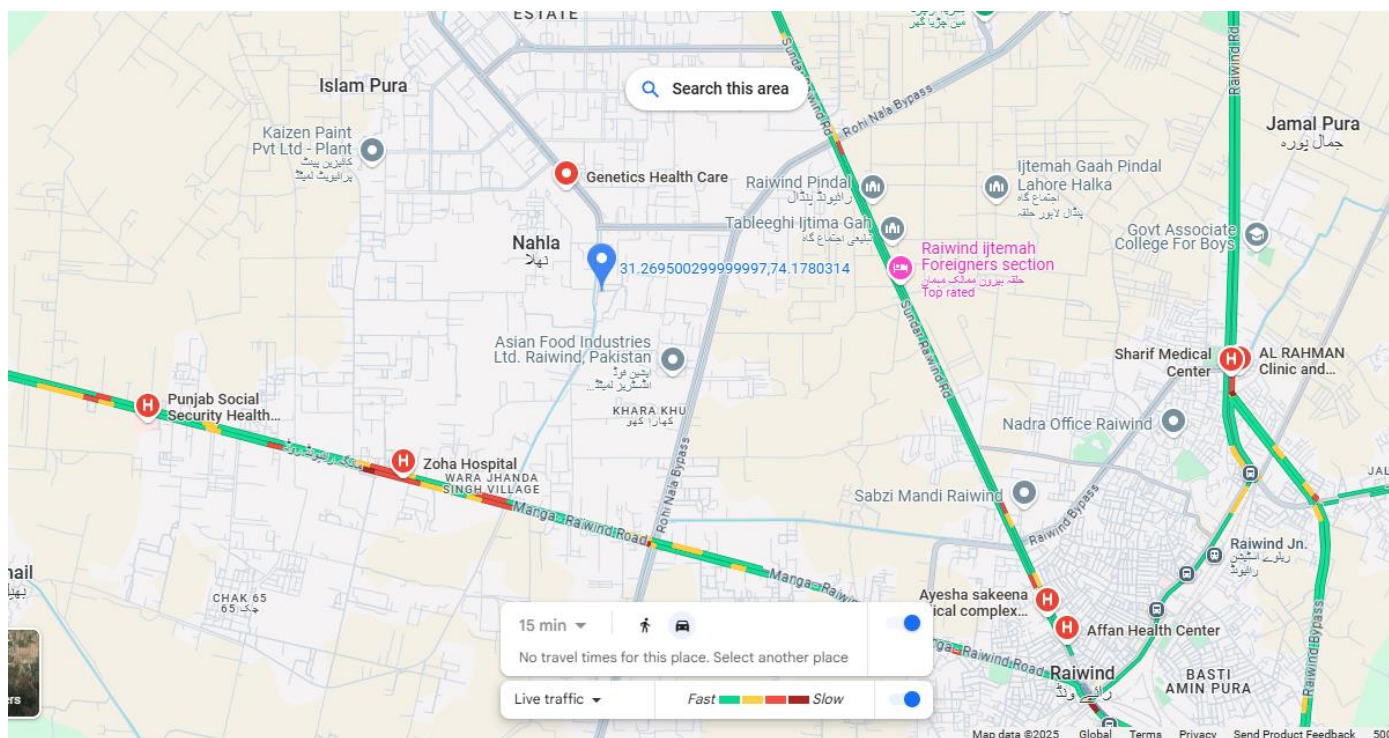


Figure 14: Health facilities nearby project site

¹⁶"[POPULATION OF MAJOR CITIES CENSUS - 2017](#)". Pakistan Bureau of Statistics. Retrieved August 30, 2017

¹⁷"[DISTRICT WISE POPULATION BY SEX AND RURAL/URBAN - CENSUS 2017](#)". Pakistan Bureau of Statistics. Retrieved August 30, 2017

6.3.4 Educational Facilities

Lahore is known as Pakistan's educational capital, with more colleges and universities than any other city in Pakistan. Lahore is Pakistan's largest producer of professionals in the fields of science, technology, IT, engineering, medicine, nuclear sciences, pharmacology, telecommunication, biotechnology and microelectronics, nanotechnology and the only future hyper high tech centre of Pakistan. 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 74%.¹⁸Google Map below shows the nearest schools, colleges and Universities near proposed site.

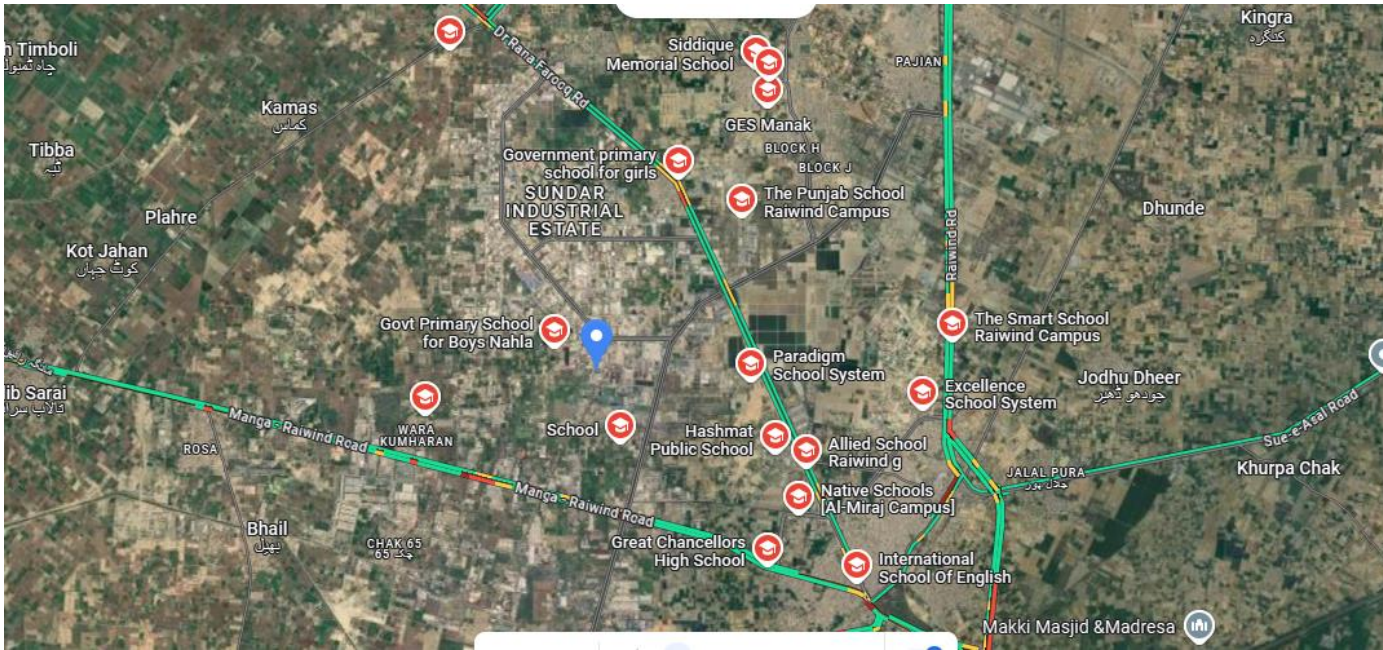


Figure 15: Educational facilities nearby project site

6.3.5 Industries

Lahore being an industrial area as well as the project site is located in sunder industrial estate. Many industries are present near the project site and are shown in map below.

¹⁸ en.wikipedia.org/wiki/Education_in_Lahore

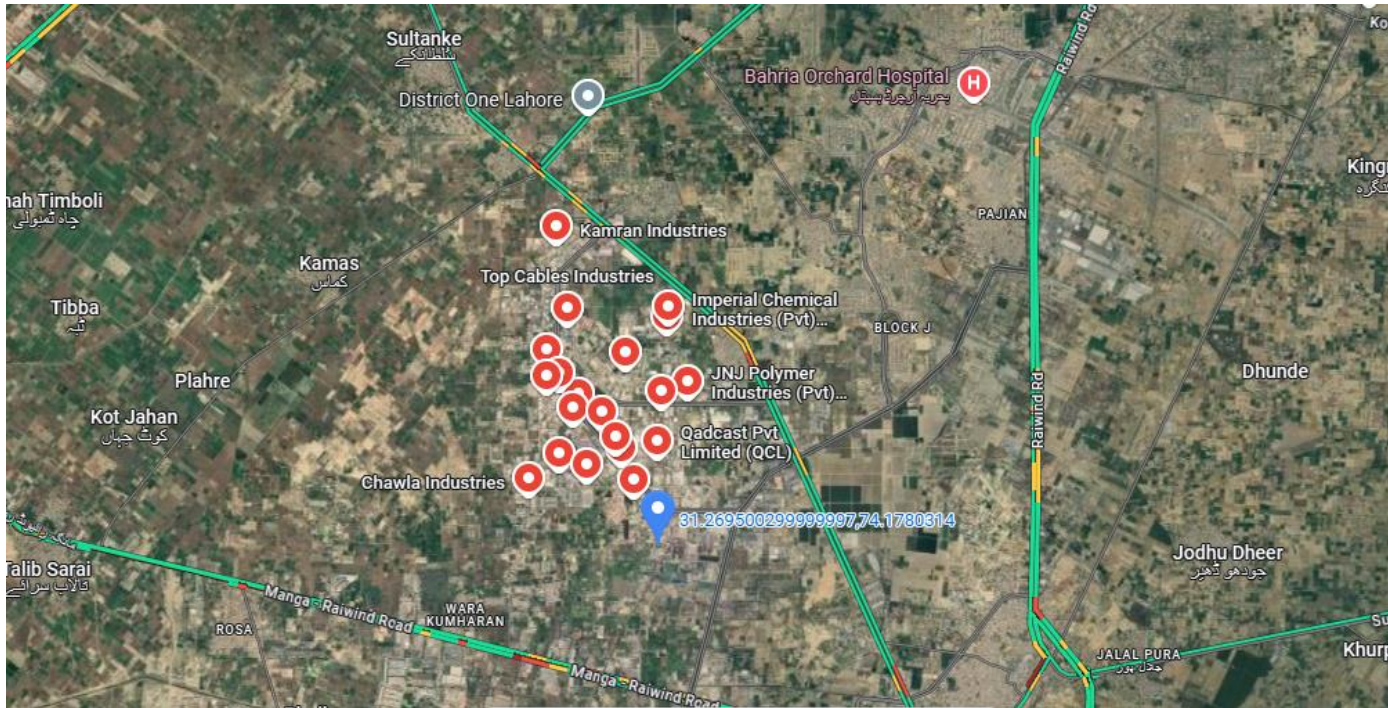


Figure 16: Industries nearby project site

6.3.6 Public Amenities

Nearby proposed project there are different public amenities like mosques and as the project is located at sunder industrial estate. Distances from sunder estate mosque is 130m from project location.

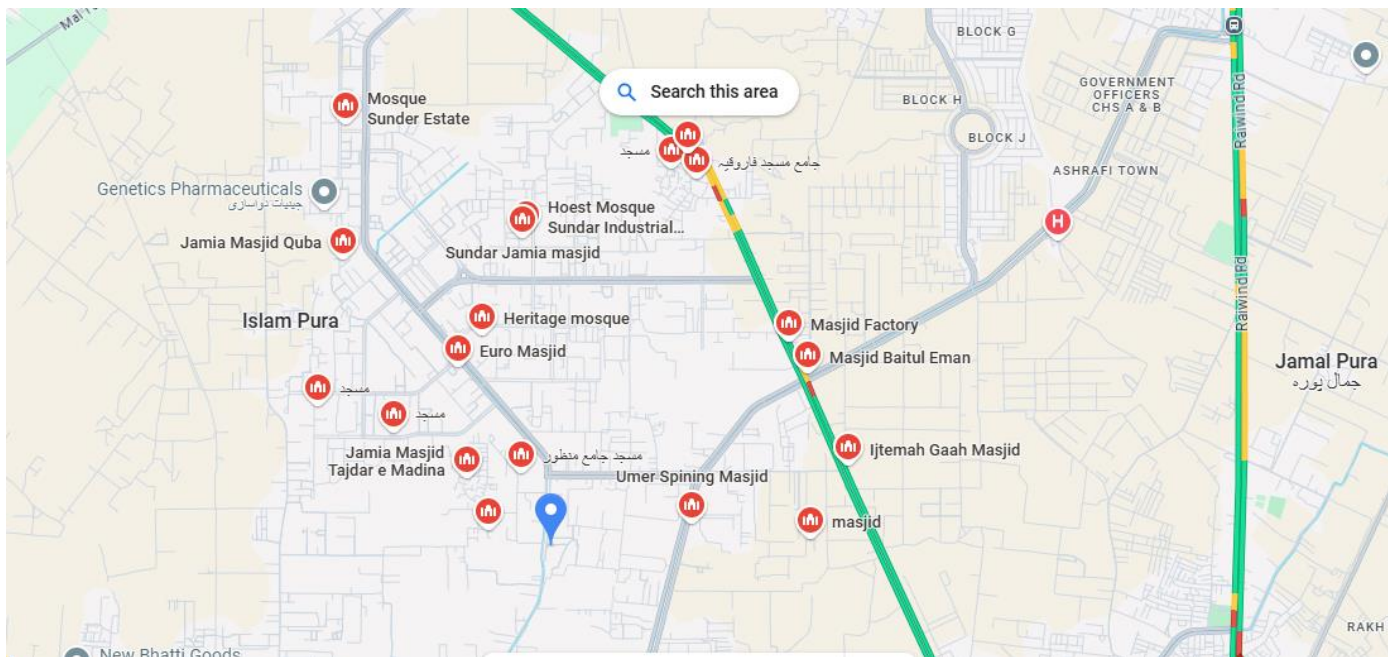


Figure 17: Public amenities near project location

QUALITY OF LIFE VALUES

Settlement Patterns

The field surveys have shown that the settlement pattern of the project area and its vicinity is mostly urban with some partially urban settlements exist in the close vicinity of the project site. The project site is located in “Sundar Industrial estate, Raiwind Road”, which comes under the jurisdiction of District Lahore.

Demographic Characteristics of the Population

The field survey (including interviews, focus group discussions, census, and area profile) was carried out to collect the socioeconomic data from the project affected people as well as other general population to accomplish the baseline information, which will provide the basis for subsequent monitoring and evaluation studies.

The demographic features include the information on household's profile, gender composition, occupations, and literacy status of the population residing in the project area. The information relating to the demographic profile of the people in the project area are described below.

Individuals and workers from nearby areas were interviewed. Most of the people have sound earning sources. Most of the people were reluctant in providing a figure of their total family income. The diseases prevalent in the community were stomach disorders, fatigue, headache etc.

Social and Public Amenities Available

The social and public amenities present in the area are given below:

a. Physical structures

There is no population living in the project area but the study area is semi populated. The land use on the project site is industrial.

b. Cultural Heritage and Community Structure

As stated earlier that the project area has no population and physical structure that may be damaged due to the establishment of aforesaid unit as the building has already constructed. Consultant team also visited the study area but did not find any cultural heritage and community structure within the study area that could be impacted due to the proposed project.

Socio-Economic Questionnaire and Environmental Checklist were used as survey tools by the consultant survey team to collect desired information. Graphical representation of results of Socio-Economic Survey is given below:

Common Diseases

According to the survey the common diseases recorded in the project area were, Diabetes, Fever, Hepatitis, Hypertension, stomach problems, Malaria, Typhoid, Nephritis and Diarrhea

• Favor for the Project

Respondents were inquired about their views regarding the proposed project. Out of total 14 respondents 90% of the respondents knew about the project whereas, rest of the respondents doesn't have prior knowledge of the project planning and commencement. Almost 95% respondents of were in favor of the establishment of aforesaid unit in their vicinity as this will increase the employment opportunities and raise the overall socio-economic status of the area.

Table 9: Concerns and Solutions

Main Theme	Concerns	Solutions
Employment	The hiring during machinery installation and operational phase, local should be considered realistically	The proponent will try to engage local people on priority basis
Environmental Impact	Air pollution, improper handling of wastewater and mitigation of noise impacts	<ul style="list-style-type: none"> Based on the result of ambient air and noise sampling, necessary mitigation measures will be adopted

		<ul style="list-style-type: none"> • To mitigate the impact of the contamination from the generation of wastewater, waste will be handled properly • Tree plantation will be carried out in the designated green space
Social Impact	Public nuisances issues may arise due to the spread of diseases in the case of improper disposal of the solid waste and the air emission may cause issues	<ul style="list-style-type: none"> • Proper handling of the waste such as segregation of the solid waste will be carried out to reduce the public nuisance and to improve the public health • A register will be maintained to register the complaints of the local community

6.4 LAB REPORTS OF ENVIRONMENTAL ANALYSIS

Testing of different parameters was done from a certified laboratory to check the quality of different environmental parameters. The copy of the lab reports of these parameters (ambient air analysis, water quality analysis) is given in Annexure IV.

This section covenants with the prevailing environmental conditions of the project area. Information that has been collected from different sources, including public literature, reports of other studies conducted in this area, knowledge with the proponent and the concerned government departments and the first-hand surveys and field measurements has been presented in this section. This chapter of Environmental Impact Assessment (EIA) encompasses all the important aspects of local environment; such as biological resources, socioeconomic development and quality of living values. A Social survey in the Project Area was also carried out through consultation with the various communities. Local residents living in the Project Area were interviewed to obtain their feedback regarding the installation of the Project and its impacts on their daily life/future in the short and long term.

6.4.1 Noise Level

A common form of noise pollution is from transportation, principally motor vehicles. The source of most noise worldwide is transportation systems, motor vehicle noise, along with aircraft noise and rail noise. Poor urban planning may give rise to noise pollution, since side-by-side industrial and residential buildings can result in noise pollution in the residential area. Other sources are car alarms, office equipment, factory machinery, audio entertainment systems, loudspeaker etc. Noise monitoring of the project area is annexed with report.

6.4.2 Ambient Air Quality

Atmospheric pollution, particularly in urban areas like Lahore, has a strong impact on daily life. Motor vehicles are a major source of air pollution. Factories and cottage industry inside the Lahore City are also contributing to air pollution. Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂), Carbon dioxide (CO₂), Carbon monoxide (CO), Ozone (O₃) and particulate matter (PM₁₀) are considered pollution indicators.

Air quality Monitoring was conducted its reports has attached with EIA report

6.4.3 Water Resources:

6.4.3.1 Hydrogeology

The Study Area forms the upper part of Punjab plain, which is a part of the Indo-Gangetic depression. This depression is of a synclinal nature. Synclinal depression is a fore deep downward of the Himalayan foreland of variable depth, converted into flat plains by simple process of alluvial deposition.

- The aquifer underlying the Study Area comprise unconfined alluvium with a thickness of about 1050 feet (rock has been encountered at depth 1050 ft in the deepest test bore hole drilled near Thokhar Niaz Bag in Punjab) as a part of regional groundwater investigation.

- It is part of the large inter alluvial upper Bari Doab, which is bounded by the Ravi River in northwest and the Sutlej River to the southeast. The Bari Doab along with other Doabs like Rechna, and Chaj form the vast alluvial plain of the upper Indus Plain in Punjab.

The alluvium is derived from the erosion of mountain ranges in north. It has been deposited and reworked by the large meandering rivers and tributaries of the Indus River and comprises a random distribution of fine to coarse sand with lenses of silty clay and clay of varying thickness and extension. Borehole logs for tube-wells shows that the lenses of less permeable material are neither thick nor continuous so, in spite of their heterogeneity, the alluvial sediments constitute an aquifer which on regional basis behaves as a single homogeneous unconfined water body.

6.4.3.2 Ground Water

The aquifer underlain the Study Area is highly potential with more than 1000 ft thick saturated column of sand and extends up to the piedmont of Kashmir hills located in north east at a distance of more than 100 km. The regional groundwater flow starts from the piedmonts of Kashmir's mountains and passing through the Rechna Doab enters into the Bari Doab and forms one large water body (aquifer). The River Ravi divides the area into Bari Doab in south and Rechna Doab in north.

PROJECT LOCATION:

Lab reports of water quality Analysis is annexed with report.

6.5 SUITABILITY OF THE SITE

As the building is surrounded by various other industrial activities and no relocation is required for establishment of current project. The project area do no fall in environmental sensitive area and all commodities are at a suitable distance from project site as they will not impacted by the installation activities even locals will get more benefits and job opportunities. No replacement, relocation and rehabilitation is required for the development of above-said project.

7 IMPACT ASSESSMENT METHODOLOGY

This section discusses the potential environmental impact for the Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd. The impacts may include; soil contamination, water resources depletion, biological resources disturbance and socio-economic impacts and, where applicable, identifies mitigation measures that will reduce significantly, if not eliminate, its adverse impact. The assessment carried out in this Section is based on potential impacts on overall environmental receptors within the project area.

Objectives

The objective of screening is identification of the adverse as well as beneficial impacts and then mitigating the effect of adverse impacts up to acceptable limits or within PEQS. Following are the objectives of screening out all significant environmental and social impacts:

- To find different alternatives and ways of carrying out the project activities, this may cause adverse environmental and social impacts on the surroundings.
- To enhance the Environmental and Social benefits of project.
- To avoid, minimize and remediate adverse impacts.
- To ensure that residual adverse impacts are kept within acceptable limits.

In the sub-sections below the impacts assessment methodology for the operation of above stated project has been defined. It includes the magnitude, the extent of the impact and the nature of the anticipated impact that is likely to be occurred from the proposed project activity.

Methodology

This Section discusses the project's potential environmental impact of aforementioned project. The adverse impact may occur on; the area's geomorphology, soil, water resources, air resource, biological resources and socio-economic condition and where applicable, identifies mitigation measures that will reduce significantly, if not eliminate, its adverse impact. The assessment carried out in the sub-sections below is based on potential impacts on overall environmental receptors within the project area. Impacts are evaluated on the basis of magnitude, immediacy and sustainability.

Evaluation of the Residual Impacts

Incorporation of suggested mitigation measures may reduce the magnitude of the environmental impacts of above stated project but sometimes, it may fail in bringing them within the acceptable limits. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied.

It can be concluded in view of these reasons that the selected site is best suited for the project and the technology adopted for the production of passenger vehicles. The said project will not pose any adverse impact or threat on any component of the environment. The impact assessment criteria are given below along with their impacts:

Table 10: Impact Significance Criteria

Impact	Criteria
No Impact	When the proposed activity will have no impact
Long Term	When the impact is of high intensity with high spread and high duration or of high intensity with medium spread and medium duration
Moderate Term	When the impact is of moderate intensity with high spread and high duration or of high intensity with low/ moderate spread and low duration
Short Term	When the impact is of low intensity but with moderate spread and moderate duration or of moderate intensity
Insignificant	When the impact is of low intensity, low spread and low duration
Adverse	When the impact is of large intensity, spread easily and long-term
Beneficial	When the impacts are positive and improve the environmental conditions

Impact Matrix Checklist for Designing and construction Phase

The project construction has completed only machinery installation will be done.

Table 11: Impact Matrix Checklist for Operational Phase

Environmental Sensitivities	Intensity of Impact						Impact Nature		Impact Significance				
	Low Intensity	Moderate Intensity	High Intensity	Local	Moderate	Regional	Beneficial	Adverse	Insignificant	No Impact	Short Term	Moderate	Long Term
Physical Parameters													
Noise									Insignificant				
Water Quality								Adverse				Moderate	
Biological Parameters													
Land Environment									Insignificant				
Flora							Beneficial			No Impact			
Fauna							Beneficial			No Impact			
Physical Parameters													
Local Economy							Beneficial					Moderate	
Social Impacts							Beneficial					Moderate	
Health & Safety								Adverse				Moderate	

Identification of Monitoring Requirements

The last step in the assessment process is the identification of minimum monitoring requirements. The scope and frequency of monitoring depends on the residual impacts. The purpose of monitoring is to confirm that the impact is within the prescribed limits and to provide timely information if acceptable limits are being breached.

Methodology for Impact Evaluation

These tools have been used to identify the significance and magnitude of the impact as well as the nature, reversibility and extent:

- An Impact Screening Checklist
- Project Impact Evaluation Matrix

Following is given a brief description of assessment tools:

a. Impact Screening Checklist

The impact screening checklist is developed to screen out potentially insignificant environmental and social impacts from potentially significant adverse environmental and social impacts during machinery installation and operational phases of the project. The objective of impact screening process is to assess the significance of issues related to the air, water, noise, soil, transportation, communication, the hazards and external constraints. The beneficial and adverse impacts of project during machinery installation and operational phases are identified based on their duration, location, frequency, extent, significance and reversibility. The impact of each activity on various environmental parameters is given below:

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Table 12: Characteristics of Impacts

Sr#	Environmental Component	Impact Characteristics												
		Duration		Location		Frequency		Extent		Significance			Reversibility	
		Long	Short	Direct	Indirect	Cont.	Intermittent	Wide	Local	Large	Moderate	Minor	Rev.	Irrev.
Beneficial Impacts														
1	Employment Opportunity	☑		☑		☑			☑		☑		☑	
2	Export of finished goods	☑		☑		☑			☑		☑		☑	
3	Appreciation in Land Value	☑			☑	☑			☑			☑		☑
4	Tree Plantation	☑		☑		☑			☑		☑		☑	
Adverse Impacts														
1	Air Pollution		•	•			•		•			•	•	
2	Wastewater		•	•		•			•			•		•
3	Solid Waste and By-Products	•		•		•			•		•			•
4	Health and Safety		•		•		•		•			•		•
5	Physical Hazards		•	•			•		•			•		•
6	Security Risks		•		•		•		•		•		•	

b. Project Impact Evaluation Matrix

The Project Impact Evaluation Matrix was developed by placing different environmental parameters that are likely to be affected by the proposed project actions, grouped into categories i.e., physical, ecological, socio-economic environment and hazards. For assessment of associated impact risk assessment methodology was used. Moreover, the risk assessment was done on the basis of project phases (machinery instalaltion and operation). A Project Impact Evaluation Matrix is attached as **Table 15** below:

Table 13: Impact Evaluation Matrix

Environmental Parameters	Impact Assessment
	Operational
A: : Physical	
1. Land Resources	
i. Soil Erosion and Contamination	NA
ii. Transportation	-1t
iii. Solid Waste and By-Products	-2p
iv. Land Use	NA
2. Air Resources	
i. Noise Pollution	-1t
ii. Air Pollution	-1t
iii. Dust Emissions	NA
i. Ground Water	-2p
ii. Surface Water	NA
iii. Wastewater	-1p
i. Tree Cutting	+1p
Fauna	
ii. Terrestrial Fauna	NA
C: Socio-Economic	
i. Employment Opportunities	+3p
ii. Land Value Appreciation	+2t
iii. Economic Uplift of Study Area	+3p
D: Hazards	
i. Physical Hazards	-1p
ii. Health and Safety	-1p
Legends: 1= Low; 2= Medium; 3= High; 4= Extremely High; NA= Not Applicable; t= Temporary; p= Permanent; app= Applicable; 0= Negligible	

8 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

General

This Chapter identifies the potential impacts (positive and adverse) on the physical, biological and socio-economic environment of project area due to the Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd. It also identifies measures that will help to mitigate the adverse environmental and social impacts as well as it will enhance positive impacts of aforesaid project. Impacts are assessed by analyzing their magnitude and sensitivity, which is a legal requirement as discussed in **Chapter 07**

Objectives

Objectives of screening all possible impacts and then providing their mitigation measures are:

- To find different alternatives and ways of doing the project activities.
- To enhance the environmental and social benefits of proposal.
- To avoid, minimize and remediate adverse impacts.
- To ensure that residual adverse impacts are kept in acceptable limits

Impact and Mitigation Management

Purpose of mitigation is to evade, reduce or balance the expected antagonistic effects in suitable way and to integrate these for devising environmental management strategy or plan. At every stage of project, mitigation plan for all the adverse impacts should be predicted to find out the best alternative. The objectives of mitigation are to:

- Invent of best substitution, better alternatives and ways to reduce the adverse environmental and social impacts in immediate surroundings.
- To improve the environmental and societal payback of project.
- To prevaricate, remedy/reduce and pro-vocative impacts.
- To certify that remaining negative influences are kept within permissible limits.

In this part of the EIA Report, a number of complications including; cleanliness, environmental health and safety, societal and environmental managing and inspection, industrial vulnerability, tools and apparatuses and during operational activities, influx of workers and procurement of land have been deeply elaborated.

Approaches for Mitigation Measures

Following approaches may be used to mitigate the impacts of the project:

Table 14: Approaches for Mitigation Measures

Avoid: Change of route or site details, to avoid damage important ecological or archaeological features.

Replace: Regenerate similar habitat of equivalent ecological value in different location.

Reduce: noise barriers, dust, enclosures, visual screening, wildlife corridors and changed time of activities to reduce the impact.

Restore: Site restoration at the end of installation of machinery.

Compensate: Relocation of displaced communities, facilities for the affected communities, financial compensation for the affected individuals, etc.

Expected Positive Impacts

Following are the expected outcome for installation of above stated project:

a) Increase in Employment Opportunities

Due to installation of aforesaid project, the employment opportunity will be enhanced. During machinery installation, 5-8 workers will be hired for machinery installation include; skilled and un-skilled workers. During operational phase, approximately 25-30 persons will be required. It will include hiring of technical and non-technical staff. Locals will also have the opportunity to diversify their income by being employed. Hence, there will be an increased employment opportunity for the local people which will have a positive impact on the socio-economic status of the area.

b) Tree Plantation

After completion of project different tree species will be planted at designated green areas, this will enhance the aesthetic beauty of the area.

c) Adverse Impacts and Mitigation Measures

This section identifies the potentially significant and in-significant adverse environmental and social impacts anticipated during the operation phase of said unit. Appropriate mitigation and management measures, where applicable, have also been suggested to reduce the severity of anticipated impact up to the extent possible.

8.1 Impacts and Mitigations due to Project Location and Design

The selected building has located within designated and approved industrial estate i.e. sunder industrial estate. Building design has already done therefore no construction activities will be carried out. Only machinery installation will be done. There is no human settlement, heritage building, social structure, grassland or preserved area in the project vicinity that could be damaged, dislocated or dismantled due to the project activity in proposed area. Hence, the impact of location is considered to be in-significant as the project site is away from the surface water

body (within 2.0 km of project area), residential area (at safe distance) and no protected area (is reported in 5.0 km vicinity of the project area).

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigation Measures

Following mitigation measures has been adopted to reduce the impact of said project location on sensitive receptors:

- The selected building located at adequate distance from the various sensitive receptors.
- The building is accessible through metaled road network.
- The building is located in industrial area and due to establishment of aforesaid project no change in the land use of area is being envisaged.
- The building is owned by the proponent and no dispute is associated.
- No significant air emissions from proposed project.
- The generated solid waste will be disposed off through the standard practices of area. Process waste will be recycled and reused.

It is envisaged that no mitigation measures will required as the said project had been constructed in industrial area and no adverse impacts on its surroundings due to significant distances from all sensitive receptors.

8.3 Impacts and Mitigation during Construction Phase

The proponent has purchased constructed building from Qazi Industries. The said unit will be operational after machinery installation. By the implementation of said project, a positive impact on the socio-economic culture for the people will be observed. The chance for local employment for machinery erection works will be increased.

Impacts of Noise

During machinery installation, noise will be generated. As the project is located in the industrial zone so the noise related impacts will cause significant impact on the nearby community.

Nature of Impact

The nature of the impact will be low, short-term, permanent and hence insignificant.

Mitigation

Following mitigation measure will be adopted to reduce the noise;

- The noise related activities should be done during the day time to ensure minimum disturbance to the local community
- Proper tuning of the vehicles should be done on the regular basis, so that the noise level will be reduce up to the acceptable limits

- Make sure all the workers wear Personal Protective Equipment (PPEs) while working
- Wearing of the PPEs should be enforced strictly by the contractor
- Noise related activities should be done speedily and completed as soon as practically possible

Impacts on Land-Use and Surrounding Environment

The land-use around the project site is characterized as industrial. No impact is anticipated as the unit is going to be established in the vicinity of the other industries of the same nature. The establishment of the M/s Style Styrofoam Industries (Pvt) Ltd will not change the land use of the area as the building has already constructed the said unit will be established after few changes. This impact is considered to be of negligible magnitude.

Nature of Impact

The nature of the impact will be low, short-term, permanent and hence insignificant.

Mitigation

Following mitigation measures will be adopted to reduce the impact:

- Trees will be planted in the designated green areas
- Native trees will be planted extensively to preserve the local flora of the area

Impacts on Socio-Economic Environment

During this phase, skilled and unskilled labour will be required. Employment opportunities for the un-skilled workers will therefore increase which will enhance the positive benefits for the local people who are in dire need of income for sustenance. In this sense the establishment of the aforesaid project will have a positive impact on the employment situation of the nearby communities.

Nature of Impact

The nature of the impact will be low, short-term, permanent and hence insignificant.

Impacts on Cultural and Historic Sites

There is no adverse impact anticipated on the cultural and historical sites as there are no cultural and historical sites located within the study area that could be impacted due to establishment of this project.

Impacts on Human Settlements

The building is owned by M/s Style Styrofoam Industries (Pvt) Ltd and there is no dispute related to the ownership and dislocation of any human settlements. The project is located within Sunder Industrial estate, residential areas are at safe distance. Moreover, there will be no possibilities of demolition and relocation of any physical infrastructure. Moreover, machinery instalation work will be confined to the specified area. The potential adverse impact is considered insignificant in nature because the project area is located in industrial estate and

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establishment of the unit will not cause any adverse impact or may not a cause of public nuisances.

8.4 Impacts & Mitigation during Operational Phase

This section delineates the potential impacts during operation phase of the project and the mitigation measures to counteract these impacts. The summary of the impacts and possible mitigation measures are as follows:

i. Impact on Ecology

Currently, the building located in designated and approved industrial estate. After the completion of said project different native and ornamental plants species will be planted in designated green spaces and along boundary of project site. The overall aesthetic beauty of the area will be enhanced and it will have a significant impact on the overall ecology, aesthetic and landscape of the area.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigation Measures

This impact is considered to be positive, long-term and significant. Hence, it doesn't require any mitigation measure.

ii. Impact on Air Environment

This would be the source of air emissions that would deteriorate the project area air quality. Moreover, dust will be generated due to the frequent movement of vehicles carrying the raw-material and finished goods. During operational phase, suspended particulate matter and gaseous emissions will be the main pollutant.

Due to increased vehicular movement increase in NO_x, SO_x, VOC and CO concentrations will be observed at the project site. As the impacts will be localized in nature, the areas outside the said project boundary are not likely to face any significant adverse impacts with respect to ambient air quality.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigation Measures

Following mitigation measures will be adopted:

- For dust suppression regular sprinkling of water will be carried out.
- Vehicles used for transportation of raw material as well as finished product and the utility vehicles will be regularly serviced and maintained in order to keep the environmental impact on account of their exhaust emissions to its minimum level.

- Native tree would be planted along the boundary of project area to keep environment healthy. For removal one tree, 3-5 trees will be planted.

iii. Noise Environment

Noise, an unwanted sound, affects human being. Excessive exposure to noise produces varying degree of damage to hearing system. It leads to headache, fatigue, etc. Continuous exposure of increased level of noise will have an adverse impact on the health of workers as well as the people residing in surrounding area.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence in-significant.

Mitigation Measures

In general the following methods will be adopted to control the noise pollution from the proposed units;

- Residential area is located at safe distance from project site.
- Proper encasement of noise generating sources will be done to control the noise levels within prescribe PEQS limits.
- A thick greenbelt will be developed all around the plant which will be acting as noise barrier.
- The use of complete or partial enclosures, as and if required.
- Attenuation by use of sound absorbents on walls and fixed or suspended ceilings.
- The use of mufflers, sound attenuation and acoustic louvers in air flow paths, taking particular care to direct inlet and discharge an opening away from critical areas wherever possible, so as to take advantage of direct effects.
- All the workers will be provided with ear plugs/ear muffs, masks, gloves and safety shoes.
- All the transporters will be advised to carry out regular maintenance of their vehicles

iv. Solid Waste Management

The key solid wastes and by-products that is recyclable matter (such as; containers, waste papers, used materials, waste packaging materials, foam, plastic waste, foam scrap) will be recycled or reuse. The domestic solid waste will be handled as per practices of area.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigation

Following mitigations should be adopted to manage generated solid waste:

- Waste bins will be placed in the facility at the strategic position for the collection of solid waste.
- The installed bins will be covered in order to reduce the chances of the disease vector production.
- Record of generated waste during the project activity should be maintained on the regular basis. Quantity of the waste disposed, recycled or reuse will be logged on a waste tracking register.
- Regular training will be given to the workers dealing with the waste management it will include; identification, segregation and management of waste.

v. Water Environment

Wastewater will be generated only from domestic activities that will be treated through septic tank then dispose off in sewerage of designated industrial area. This generated wastewater has no impact on surface & ground water quality.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigation

Following mitigations should be adopted to manage generated wastewater:

- The domestic wastewater will be treated prior to disposing off
- Water conservation activities will be adopted for the preservation of water.
- Wastewater will be reuse for horticultural activities.
- Water conserving methods will be applied by placing taps and toilets.
- All faults will be monitored and fixed.
- Freshwater conservation techniques should be adopted to ensure sustainable development
- Monitoring of effluents shall be carried out as per requirement of Self-Monitoring and Reporting Tools (SMART) to ensure compliance with the PEQS.
- It will be ensured that no solid waste will be entered in the wastewater.

vi. Health & Safety of Workers

Improper handling of machinery may cause various health issues. It can cause of severe accidents. To ensure the safety of workers these impacts need to be managed effectively.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigation

Following mitigations should be adopted to improve the health and safety:

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- Regular inspection and maintenance of the plant will be carried out to eliminate the risk and associated hazards of any unfortunate incident.
- Workers will be trained on the regular basis regarding personal safety, disaster management and physical hazards.
- Operators operating the plant should be fully trained and equipped.
- Training regarding HSE should be given on the regular basis.
- Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, etc.
- It should be strictly enforced to wear PPEs while working.
- Incidents should be reported directly to the concerned authority.
- Spillage prevention plan should be adopted and it should be implemented effectively.
- Floor surfaces shall be maintained and cleaned on regular basis.
- Floor should be kept clean and free of oil spills, other slippery fluids or materials and obstructions.
- The effective use of hearing-protection devices shall be ensured.
- Protective measures and emergency rescue procedures should be followed strictly.
- Only authorized persons shall be allowed in the processing areas.
- Unloading of the raw-material and loads of the final products should be controlled, supervised, slow and smooth.

viii. Security Risks

A large number of workers will be hired including; skilled and un-skilled laborers. The increase in the number of the individuals residing in the area, may lead to an increase in crime and violence in surrounding areas. The nature of the impact is considered to be low as the locals will be preferred for hiring.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigation Measures

Following mitigation measures will be adopted:

- Proper security will be provided to the workers working in the premises of proposed project.
- Before hiring any worker and his criminal record may be checked.
- CNIC of all the workers will be kept by the proponent.
- Strict law will be enforced to control the crime at site.
- Security to the workers should be provided.

ix. Emergency Response

Emergency response preparedness committee will be formulated consisted of heads of all the departments. Emergency Response Leader will be the head of the team assisted by safety team and safety supervisors. Emergency Response Leader along with his team will ensure that in the

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case of emergency, team is prepared for fire-fighting and the first aid kits will be provided which may include; blankets, hot water bottles, stretchers, benches, sterilized dressing, snake bite kit, cotton and iodine (2% alcohol).

Incidents and accidents may take place unexpectedly during project operations no matter how effective, strong and efficient the mitigation measures for all adverse impacts; especially the safety issues may be adopted. These may include; accident and natural disasters.

Nature of Impact

The nature of impact will be direct, low, long-term and significant.

Mitigation

Following mitigation measure will be adopted:

- Site in-charge should be responsible to ensure that fire-fighting plan has been implemented with true spirit.
- Safety team will be responsible to monitor the activities and to act on the approved firefighting plan in the case of fire.
- Designated area fire marshals will be responsible to monitor their respective areas and act on firefighting plan in case of fire.
- Workers should be given adequate training of handling machinery.
- Emergency call service must be made available.
- The drills to check the response of the workers against any emergency situation will be carried out on the regular basis.
- Safety and hazards signs will be displayed with the facility to avoid any unfortunate incident.
- Only authorized persons will be allowed for the handling of the machinery.

Socioeconomic Impact

It is envisaged that the adverse impacts associated with the operation of said project includes; local community will be disturbed due to increase in the traffic load (i.e., vehicles carrying raw material and final products), wastewater management, solid waste management & disposal, soil pollution, etc. The intensity of the aforesaid project will be quite low. The commencement of the aforesaid project will have a beneficial impact on the surrounding community such as; increase in employment opportunity, increase in the wages of the local area employees, increase in revenue generation, provision of social welfare funds of the employees and appreciation of land value.

The aforesaid impact is considered to be positive and will have a direct, medium, long-term and significant impact.

Mitigation Measure

No mitigation measures will be required.

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8.5 Environmental Enhancement Measures

The said project will result in following benefits:

- Direct and indirect employment opportunities,
- Gains in the local and national economy,
- Industrial development in region
- Business spin-offs in the factory area,

Tree plantation along boundary of project will act as environmental enhancement measure. Trees including; Shatoot, Jaman, Moor Pankh, Fish Paam, Trysenia, etc. will be grown on all open spaces and along boundary of project.

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9 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

This EIA Report provides the Environmental Management and Monitoring Plan (EMMP) for implementation of aforesaid project in order to keep anticipated environmental and social impacts in check by adopting suggested mitigation measures and monitoring of the certain parameters moreover, to ensure the compliance of EMMP. As per the environmental legislation in Pakistan, the EMMP for the operations phase, along with other documents, is to be submitted in EPA, Punjab to obtain confirmation for compliance and Environmental Approval/NOC for project execution. Even after implementation of the suggested mitigation measures, the impact may remain significant and require regular environmental monitoring. This section also underlines the monitoring framework for operation phase to check compliance of EMMP and to take timely actions for correction in case any negligence & accident of significant criteria, requirements or goals is found.

Objectives of Environmental Management Program

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified in this EIA Study.
- Define the responsibilities of the project proponent and contractor and provide a means of effective communication of environmental issues between them.
- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

Components of EMMP

Components of EMP are as follows

- Management plan
- Monitoring Plan
- Communication and documentation
- Institutional capacity
- Environmental

training

9.1 Proposed Mitigation actions

It lists all the mitigation measures identified in the EIA and the associated environmental or social aspect in line during operational phase with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures and monitor it accordingly. It enhances project benefits by reducing its impacts and making it environmental friendly.

Table 15: Environmental Management Plan

Project Activities	Type of Impact	Potential Impacts On Environment	Extent / Magnitude	Proposed Mitigation actions	Institutional Responsibility	
					Implementing Body	Supervision
POST-CONSTRUCTION/OPERATION						
Wastewater management	Physical/social	Degradation of water quality	Moderate/local	<ul style="list-style-type: none"> Wastewater generated from domestic activities will be treated through septic tank and dispose off in sewerage system of designated and approved industrial estate. 	Environment officer	Proponent
Air quality management	Physical	Dust and PM	Moderate/adjacent areas	<ul style="list-style-type: none"> No waste should be burnt at the premises. Regular monitoring of ambient air and maintenance of machinery should be done on regular interval. 	Environment officer	Proponent
Noise generation	Physical, social, biological	Psychological and hearing problems	Moderate/local	<ul style="list-style-type: none"> There will be ban on the use of horn in the area. Proponent has planned a proper plantation plan which will also act as barrier for noise. 	Environment officer	Proponent

				<ul style="list-style-type: none"> ▪ Regular maintenance of machinery will be done 		
Solid Waste Generation	Physical, Biological, Social	Soil Contamination, effecting GW Quality, vectors production, odor, Health, Welfare	Severe/ local and global	<ul style="list-style-type: none"> • The solid waste from the project should not be allowed to pile up. • Solid waste should be disposed off properly as per local practice • Recyclable waste should be dispose off through certified contractor 	Environment officer	Proponent
Health and safety	Biological	Injury may happen while handling machines	Severe	<ul style="list-style-type: none"> • First aid kits and other necessary equipment will be kept available at site. • COVID-19 SOP's must be implemented 	HSE Manager	Proponent
DECOMISSIONING PHASE						
Solid waste	Physical, Biological, social	Soil Contamination, vectors production, odor, Health, Welfare	Local	<ul style="list-style-type: none"> • Used building materials and other waste from decommissioning must be transported and dumped in approved sites. 	Contractor	Proponent
Dust emissions	Physical, Biological, social	Dust and PM	Local	<ul style="list-style-type: none"> • Ensure strict enforcement of on-site speed limit regulations. • Avoid demolition work in extremely dry weathers. • Sprinkle water on graded access routes when necessary to reduce dust 	Contractor/HS E manager	Proponent

				<p>generation by machines.</p> <ul style="list-style-type: none"> • Personal Protective equipment to be worn. • Demolished materials on site to be covered to prevent to be blown off by wind. 		
Exhaust emissions	Physical, Biological, social	Enhance air pollution	Moderate/at the site	<ul style="list-style-type: none"> • Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas, and to switch off or keep vehicle engines at these points, using mufflers. • Vehicle idling time shall be minimized. 	Contractor/Engineer	Proponent
Noise and vibration	Biological, Social	Effect human health	Adjacent areas	<ul style="list-style-type: none"> • Sensitize machinery drivers and machinery operators to switch off engines of vehicles or machinery not being used. 	HSE manager/contractor	Proponent
Rehabilitation of project site	Physical, Social, Aesthetical, Biological	Site clearance	Positive	<ul style="list-style-type: none"> • Average lifespan of a well-constructed building is about 80 years after that rehabilitation of site will be done if needed. • Implement an appropriate re-vegetation program to restore the site to its original status. • Consider use of indigenous plant species in re-vegetation. • Trees should be planted at suitable locations so as to interrupt slight lines 	Contractor	Proponent

				(screen planting), between the adjacent area and the development.		
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9.2 Schedule for Implementation of Environmental Budget

The allocated environmental budget is **PKR 02 Million approx.** as mentioned in project cost breakup. The allocated environmental budget will be spent on landscape/green zone management and solid waste management. The proponent will plant indigenous and ornamental plants to increase the aesthetic value of the area. Thus, the project is also a source of employment for locals and would help in economic development activities of the area. Cost breakup will be,

Air emission=0.7 Million

Wastewater treatment=0.5 Million

Health and safety=0.2 Million

Environmental monitoring=0.6 Million

9.3 Environmental Management Team along with their roles and responsibilities

The organizational roles and responsibilities of the key players are summarized below:

Table 16: Environmental management team along with roles and responsibilities

Sr.#	Managers	Responsibilities
1.	Contract Manager	<ul style="list-style-type: none"> • Ensure EMP development. • Maintenance of EMP • Environmental issues identification at any stage. • Communication of EMP with other employees.
2.	Contractor	<ul style="list-style-type: none"> • Ensuring that the control measures identified from environmental surveys are implemented as they are relevant to their work/visit. • Ensuring that the project management team is notified of any non-conformance of control measures or environmental incident where the environment has been put at risk.
3.	Site Manager	<ul style="list-style-type: none"> • Ensure material is safe

		<ul style="list-style-type: none"> • Controlled access arrangement to avoid hazards • Emergency egress arrangements to avoid dangerous situation. • Provide first aid facilities.
4.	Site HSE Advisor	<ul style="list-style-type: none"> • Ensure work is carried out in safe manner • Ensure good standards of workmanship • Health and safety advisor to complete the site waste management plan to be followed. • Ensure EMP implementation • Daily checks • Weekly checks • Consultation with workers
5.	Site Environment Advisor	<ul style="list-style-type: none"> • According to legislation and consent develop EMP • Ensure application of EMP • Carry out area inspection
6.	Public Contact Officer	<ul style="list-style-type: none"> • First point of contact for members of the public • Arrange and manage public forums • Maintain relation with stakeholders • Door to door surveys as appropriate • Coordination with work

9.4 Proposed Monitoring Program to assess output of EMP

Proposed monitoring has been mentioned in Environmental Management Plan. Moreover, during machinery installation, monitoring of ambient air, noise and water quality will be done by EPA certified Lab as per requirement/condition of Environmental Approval/NOC. Health and safety will be monitored by HSE manager. The proponent will cross check all the parameters. Waste collection on daily basis and proper cleanliness will be ensured by the proponent.

9.5 Proposed EMP reporting and reviewing procedure**Reporting Mechanism**

Environmental Specialist of contractor will prepare and submit the environmental compliance reports to the proponent. Environmental Specialist of M/s Style Styrofoam Industries (Pvt) Ltd after reviewing the reports will submit the Due Diligence reports to DD Environment for onward submission to EPA, Punjab. At the completion of the project, Environmental Specialist of M/s Style Styrofoam Industries (Pvt) Ltd will prepare the project completion report based on the periodical progress reports for submission to DD Environment for onward submission to EPA, Punjab.

Non-Compliance of the EMP

The contractor will be primarily responsible for ensuring implementation of the mitigation measures proposed in the EMP, which will be part of the contract documents. The provision of the environmental mitigation cost will be made in the total cost of project. However, if the contractor fails to comply with the implementation of EMP and submission of the monthly compliance reports, deductions will be made from the payments to the contractor's claimed under the heads of environmental components.

Change Management Plan (CMP)

The present EIA has been carried out on the basis of the Project information available at this stage. It is however possible that the changes are made in some components of the Project during machinery installation.

Information regarding changes will be shared with EPA-Punjab.

Additions to the EMP

The EMP has been developed based on the best possible information available at the time of the study. However, it is possible that during the execution of proposed project, additional mitigation measures based on the findings of environmental monitoring during machinery installation and operation may have to be included in the EMP. In such cases following actions will be taken for changes during machinery installation stage:

- A meeting will be held between Contractor and the M/s Style Styrofoam Industries (Pvt) Ltd representatives. During the meeting, the proposed addition to the EMP will be discussed and agreed upon by all parties.
 - Based on the discussion during the meeting, a change report will be produced collectively, which will include the additional EMP clause and the reasons for the addition.
 - The report will be signed by all parties and will be finalized at the site office. A copy of the report will be sent to Contractor and M/s Style Styrofoam Industries (Pvt) Ltd office.
- All relevant project personnel will be given information about the addition/change.

Machinery installation of aforementioned project will start after obtaining Environmental Approval/NOC from EPA-Punjab. Monitoring will be done on regular basis as per requirement. Moreover, PEQS compliance of ambient air, noise and drinking water will be ensured.

During machinery installation & operation, EMP reporting and reviewing will be done by the contractor/HSE manager. Regular monitoring will be done and reports will be submitted in EPA as per condition of Environmental Approval.

Monitoring reports will be reviewed by EMP team and then will be shared by EPA.

Photographic records will also be maintained

Recorded data will be reviewed by supervisory contractor/proponent so that it can be further improved if required.

9.6 Environmental Training

Training is an integral part of a preventive strategy. Environmental and disaster management training will be required to ensure proper implementation of effective environmental management and monitoring plan; and disaster management plan. However, training could be organized by proponent involving relevant staff. As a trainer, competent Consultant can be outsourced. Important training under the spectrum needs to include:

- Training on fire fighting and safety management;
- Training on environmental safeguards and compliance;
- Staff training on environmental monitoring and reporting;
- Training on occupational health and safety measure.

Table 17: Training Schedule

Target Audience	Trainers	Contents	Schedule
Selected Management Staff	Subject Expert	Key finding of mitigation measure	After every five months

All Personnel	HSE Officer	Mitigation measures especially firefighting, safety, health and environment (emissions & discharges) etc.	Monthly
Technical Staff	HSE Officer	Waste disposal, vehicle movement restriction and other mitigation measures	After every three month
Other Staff	HSE Officer	Waste disposal, resource conservation and other mitigation workers	Monthly

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10 PUBLIC CONSULTATION AND PUBLIC DISCLOSURE

Public consultation refers to the process by which the concerns of various stakeholders and local community who have a plausible stake in the environmental management & associated impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. According to the Review of IEE and EIA Review Regulations, 2022 public consultation is mandatory for any socio-environmental study for the commencement of any project.

General

Impact assessment survey and public consultation sessions held with different stakeholder groups that may be impacted by the proposed project commencement were carried out. The consultation process was carried out in accordance with the guidelines laid by EPA, Punjab. The objectives of this process were to:

- Share information with stakeholders on proposed project establishment.
- Access the impacts on the physical, biological and socio-economic environment.
- Understand stakeholder concerns regarding various aspects of the project commencement.
- Note valuable suggestions of local stakeholders to improve the proposed project.
- Understand the perceptions, assessment of social impacts and concerns of the affected people/communities of the project area.
- Find out the awareness level and situation of acceptability to identify any issues for the implementation of the proposed project.
- Invite people to express their views about the positive/negative impacts on their lifestyles and environment.
- Disclose information about contact offices/officers for any complaints/queries.

It is envisaged, there will be no social impact being foreseen due to the commencement of aforesaid project at aforesaid location, the nearest community is located at safe distance from the project area. This EIA Report includes all the comments, which were taken into account during the social survey and preparing the definitive development concept for the installation and operation of proposed project. Public consultation performas is attached as **Annex-IX** of this EIA Report.

Objectives of Consultation

Public consultation plays a vital role in studying the impacts of the proposed project on stakeholders in successful implementation and execution of project. It provides an opportunity to exchange knowledge with the beneficiaries and affected parties. Referring particularly to a project related to environmental assessment, involvement of the public is all the more essential, as it leads to better and more acceptable decision-making. The overall objective of consultation

with stakeholders is to help verify the environmental and social issues, besides technical ones, that have been presumed to arise and to identify those which are not known or are specific to project. In fact, discourse with many who have thoroughly observed the site conditions in the pre-development phase, goes a long way in updating the knowledge and understanding.

Consultation Process

Information disclosure, public consultation and discussion regarding the various aspects of project with the people of area are necessary. This process is intensified during the EIA Studies and separate rounds of public consultations were held with local community and various government departments as listed below. Surveys were carried out in order to investigate physical, biological and socio-economic resources falling within the immediate AOI of the project. Primary data collection included:

- Data collection regarding the socio-economic condition of study area.
- Pre-testing of socioeconomic survey tools in the field.
- To consult the locals for collection of information on biological environment.

Various meetings with the stakeholders were held the following objectives:

- Share information with stakeholders regarding said project and expected impacts on community in project vicinity.
- Understand stakeholders' concerns regarding various aspects of the project, including the existing condition of the upgrading requirements, and the likely impact of machinery installation and operation activities.
- Provide an opportunity to the public to influence the project in a positive manner.
- Obtain local and traditional knowledge, before decision making.
- Increase public confidence about the proponent, reviewers and decision makers.
- Reduce conflict through the early identification of controversial issues and work through them to find acceptable solutions.
- Dissemination of information through discussions, education and liaison.
- Documentation of information narrated by the stakeholders and mitigation measures proposed by the stakeholders.
- Incorporation of public concerns and their address in the EIA and eliciting their comments and feedback.
- Create a sense of ownership of the proposal in the mind of the stakeholders.

10.1 Proponent's Environmental Management Team

Consultation regarding "Establishment of manufacturing unit (Mattress, Pillows, Insulone sheets and allied products by M/s Style Styrofoam Industries (Pvt) Ltd" was done with Proponent's Environmental management Team and anticipated impacts were discussed. Concerns of locals, Environmental Practitioners & experts and Government departments were discussed and asked

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to consider them while establishment of above-said project. Locals will be preferred for employment after providing proper training. Mitigations measures mentioned in EMP will be truly implemented.

10.2 The responsible authority

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

10.3 Other department and agencies

Following officers of government departments were consulted by the socio-environmental team of the consultants and concerned details about the project were noted down through personal interviews, group meetings, etc., in their offices, for instance, see **Table 18** below.

Table 18: Views of Participants of Public Sector Stakeholders

S#	Participant	CNIC/Designation	Concerns/Remarks
Environmental Protection Department			
1	Inspector Environment LHR (Mr. Husnain)		<p>Following comments are summarized to control the pollution generation during the operational phase of aforesaid project:</p> <ul style="list-style-type: none"> • It should be ensured that the pollution abatement technique must be applied where needed • Process waste should be managed effectively. It should be recycled and reused. • Wastewater should be treated effectively before disposing off in the drain • Environmental friendly operation must be implemented
Forest Department			
2	Rana Zahid Ali Khan	DFO Planning	<p>Following recommendation were suggested by the forest department:</p> <ul style="list-style-type: none"> • Lack of collaboration within the departments such as; environment, planning, industries, forest, etc. • CSR cells should be established • Payback the cost of loss to environment

			<ul style="list-style-type: none"> • 10 trees should be planted for the removal of 01 tree to compensate the loss. • Natives trees such as; Sheesham, kikar, popular, Neem, Dherak, Amaltas and Alostonia should be planted extensively.
**SIE			
3	Zainab Asghar	35202-8866582-8 Administration	<p>Following are the remarks of SIE :</p> <ul style="list-style-type: none"> • Environmental regulation should be complied and its mandatory • NOC from environment. Department should be obtained and it's necessary before commencing the installation. • It will help in boosting the economy of Pakistan. • End consumer will be benefited • Job opportunities will be created at the local scale. • Environmental friendly activities should be adopted. • Native trees should be planted at extensive scale. • Health and safety of the workers should be ensured. • Wastewater should be disposed off after necessary treatment.
4	Rana Azeem	36501-3270250-1 HR Manager	
Industries Department			
5	Farhan Ahmed	0332-4681862 AD Planning	<p>Following measures should be adopted while designing the project:</p> <ul style="list-style-type: none"> • Industries Department regulates establishment of industrial units according to Industrial location policy 2002 which states, "Services Industry (In Schedule B of that policy) can be established in positive areas specialized by Government. • The social concern should be addressed accordingly, if any. • It will help in obtaining the foreign investment.
<p>* HSE= Health, Safety and Environment, **SIE = Sundar Industrial Estate</p>			

10.4 Environmental Practitioners and experts

Consultation with Environmental Practitioners and experts was done and following comments and suggestions were noticed.

Sr. No	Name	Designation	Comments/Suggestions
1.	Ms. Mehwish	Environmentalist	<ul style="list-style-type: none"> • She said that Installation of aforementioned unit will have positive impact on economy but its installation should be done in Environmental Friendly way • During machinery installation and operation emissions must be controlled properly • Basic facilities should be provided to local community
2.	Dr. Rabbia	Ph.D. Environmental Sciences	<p>Following mitigation measures should be adopted:</p> <ul style="list-style-type: none"> • Tree plantation in designated green zones should be carried out • Proper disposal of the solid waste • HSE management measures should be adopted and implemented effectively.
3.	Mr. Taha Raheem	Environmentalist	<ul style="list-style-type: none"> • He said that locals should be preferred for employment. • Value addition of area • In case of outsiders residence must be provided • Proper mitigation measures must be adopted while machinery installation and operation of this project

10.5 Consultation with Affected and wider community

In addition, to the use of direct methods to evince the response of the various stakeholders in targeted population residing in study area was ascertained by conducting a sample survey, through specially formatted questionnaires (attached in the **Annex-IV** of this EIA Report). Questions posed to the public were related to creation of possible impacts, adverse impacts and beneficial impacts, including; employment opportunities, income generation activities, change in living standards and provision of the basic amenity.

Personal views of the respondents on the establishment of aforementioned unit possible disturbance to the residents near the AOI and infringement of their privacy were also recorded. The various rounds of public meetings and consultations were arranged in project and study area. The objectives of consultation with the affected persons are given in the table below:

- Disclose the proponent plan for the machinery installation and operation of said facility.

- To share information and specifications of project works.
- To analyze the expected impact on the socio-economic environment.
- To understand their concerns regarding various aspects of project commencement.

4.8 Views, Concerns and Suggestions of Various Stakeholders

The major socio-economic concerns and problems of the affected persons of various communities have been given in tabulated form below (**Table 19**) along with their main concerns and remarks. Community showed a lot of concerns; a few are being mentioned here:

- Removal of shrubs and trees should be avoided to the extent possible in the case of clearance green zones should be established within the facility.
- Indigenous trees around the facility should be planted to control air pollution and as the compensation of removed trees.
- The project will become the source of income for local to earn their livelihood easily and honorably, so locals should be preferred.
- The area will inhabit and will be used for the beneficial purposes.
- For the solid waste management and waste disposal, proper disposal techniques should be adopted.
- Water spraying/sprinkling should be done on the regular basis for dust suppression.
- Employment opportunities will be generated and locals should be hired on the priority basis.
- The air pollution is one of the major impact from which Punjab is being affected at the large scale. So, ambient air quality should be monitored regularly and air pollution expected to generate from the operation should be mitigated beforehand.
- Good relations with the local communities will be promoted by encouraging Contractor to provide opportunities for skilled and unskilled employment to the locals as well as on-job training.
- Noise generated activities should be carried out during day hours.

The views and the concerns of the local communities, direct and indirect stakeholders has been compiled and are presented in the tabular form below:

Table 19: Views and Concerns of Stakeholders

Sr#	Respondents	CNIC/Contact Nos.	Concerns
1	M Ishfaq	35202-9157511-9	During the survey in the study area following concerns of the local community were noted: <ul style="list-style-type: none"> • Air pollution should be controlled effectively such as emissions generated from power generating activities.
2	Amir Shehzad	33302-0208243-1	
3	Abid Saeed	31202-8438641-7	
4	M Waris	35102-7983672-5	
5	Ali Husnain	35301-0317948-7	

6	M.Imran	35301-9007752-5	<ul style="list-style-type: none"> • Locals should be preferred for the job opportunities. • Wastewater should be treated prior to final disposal in nearby drain. • Solid waste should be managed effectively by adopting the standard practices of the area. • Cleanliness of the area should be ensured. • An effective EMMP should be designed and enforced with true spirit. • Health of the workers should be ensured. • Planation should be carried out at extensive scale. • Noisy activities should be confined. • Workers should be hired from local community. • Proper disposal of solid waste should be practiced. • Indigenous tress around the facility should be planted to control air pollution.
7	Muhammad Shahid	31303-2385567-7	
8	Majid Hussain Shah	38302-5376486-9	
9	Tauqeer Ahmad	34502-1586454-3	
10	Faizan Tariq	34502-7672989-5	
11	Nasir Mehmood	38401-6629620-7	
12	M Islam	35102-9575165-3	
13	Ali Umair Rasheed	36401-6703271-5	
14	Sher Muhammad	38202-8115589-3	
15	Parvaiz Akhtar	31102-4201253-7	