Environmental Impact Assessment Report
M/s Jotun Powder Coatings Pakistan Pvt. Limited

Plot # 260, Sundar Industrial Estate, Raiwind Road, Lahore.

Pak green enviro-engineering (pvt.) Ltd.

DISCLAIMER

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

Author: _____

EIA Team

DETAIL OF EISA TEAM

Sr. No.	Designation	Name/Qualification	Experience
1)	Chief Environmentalist/ Lead Environmental Professional	Abdul Hafeez Nasir PhD Scholar Environmental Management	Ten Years' Experience as Environmentalist
2)	Senior Environmentalist/ Environmental Professional	Iftikhar Ahmed M.Phil Environmental Sciences	Five Years' Experience as Environmentalist
3)	Project Coordinator	Ahmed Raza B.com, PU, Lahore	Eight Years' Experience
4)	**Environmental professional Author of the Report**	**Kiran Irshad M.phil. GCU, Lahore**	**6 Years' Experience as Environmentalist**
5)	Subject matter specialist	Quratulain BS (Hons)(Chemistry) GC University Lahore	4 year Experience as a Lab Analyst
6)	Associate Environmental professional/ Author of the report	Hamza Afzal Environmental Engineering UET Lahore	1 year Experience as Environmentalist

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

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

EXECUTIVE SUMMARY

PROJECT TITLE AND LOCATION

The project is proposed construction and installation of machinery for paint manufacturing unit under the mane of M/S Jotun Powder Coatings (Pvt.) Ltd. Proposed project site is located in Plot # 260, Sundar Industrial Estate, Raiwind Road, Lahore. The land having area of 68000ft^2 while covered area of the project will be 31000 ft^2

PROJECT PROPONENT

Muhammad Siddiq proponent of the proposed project wants to get NOC by compliance of Section 12 to establish its business further.

Table 1: Detail of Proponent

Name	**Muhammad Siddiq**
CNIC	36603-4428605-5
Address	Quaid Block Behria Town, House No, 1025, Sector E Lahore
Mailing Address	Plot # 260, Sundar Industrial Estate, Raiwind Road, Lahore

THE EIA STUDY CONSULTANT

This EIA report has been prepared by a team of Pak Green Enviro-Engineering (Pvt.) Ltd, a registered environmental consultancy from EPA Punjab. The names and expertise of other experts are given in Chapter - 1.

BRIEF DESCRIPTION OF THE PROJECT

The project is proposed construction and Installation of paint manufacturing unit under the mane of M/S Jotun Powder Coating (Pvt.) Ltd. Proposed project site is located in Plot # 260, Sundar Industrial Estate, Raiwind Road, Lahore. The land having area of 68000ft^2 from which covered area will be 31000 ft^2. Total estimated cost of the project is 250 million. Production capacity of the project would be 20 million kilogram of water-based paint per annum.

The paint manufacture involves the assembling of raw materials, mixing, dispersing, thinning and adjusting, filling of containers and warehousing. Paints. Raw materials used to manufacture paints come as liquids, solids, powders, pastes and slurries. These are manually weighed out and premixed.

Land coordinates are given below:

Front ---------- Access Road

Back ---------- Industrial Plot

Left ----------Industrial Plot

Right ----------Open Industrial Plot

Figure 1: Project Site

ENVIRONMENTAL CONDITIONS OF THE SITE

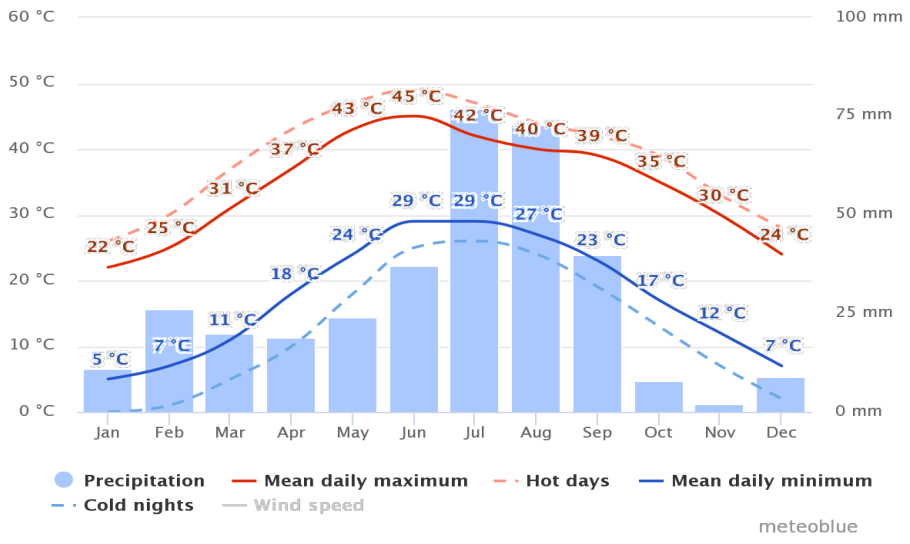


Figure 2: Temperature and Precipitation Data of Proposed Site

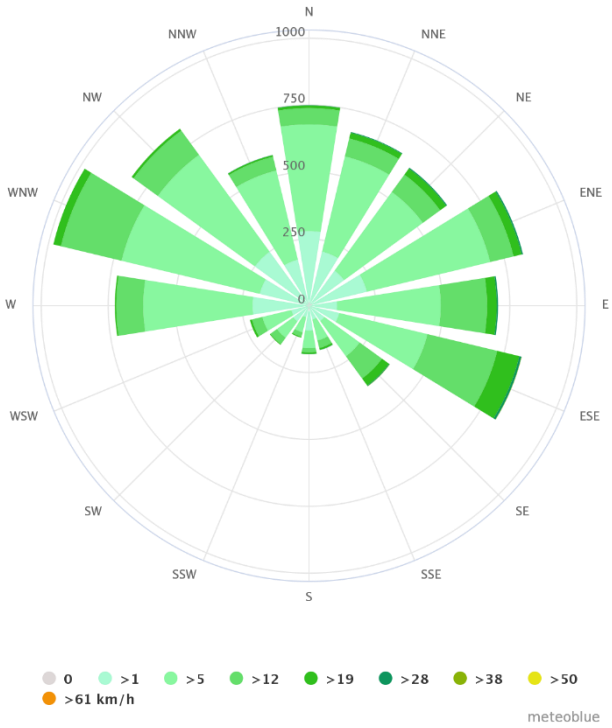


Figure 3: Wind Patterns of Project Site

MAJOR IMPACTS & PROPOSED MITIGATION

The following major impacts associated with the project during constructional and operational phase of the project have been identified and mitigation measures suggested:

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

Potential Impact	Criteria for determining Significance	Key Mitigation Measures
Dust Emissions— Dust and PM may be generated during road construction and excavation activities. Gaseous emissions from site generators and transportation vehicles may affect ambient air quality in the vicinity of the project site.	An increase in visible dust beyond the boundaries of the construction site or Concentration of PM_{10} in excess of 150 $\mu g/m^3$ PEQS for Ambient Air	Sprinkling of water on dusty roads, tracks and surfaces is recommended; During excavation works drop heights will be minimized to control the fall of materials reducing dust escape; Use of wind shield around stockpiles is recommended; Vehicle speed restrictions should be applied in the project area; Raw materials should be transported in covered trucks;
Solid waste Management— If solid waste will not be managed properly, it may cause negative impacts	Generation of excessive waste; Recyclable waste and reusable waste is discarded, Littering, Improper disposal.	Constructional waste should be utilized for road filling and maintenance purposes; Domestic waste should be disposed of properly, handed over to contractors, placed in bins; Proper solid waste management plan should be devised and implemented.
Waste water - water used in construction process and excessive water generate as wastewater and it also produced from campsite domestic activities	PEQS parameters	Wastewater after treatment should be drain out in industrial drain
Construction Noise- Noise may be generated during landscaping activities and from generators and transportation	OSHA standards	Activities generating high levels of noise should be minimized at the project site.

vehicles at the project site; which may be a nuisance for the workers.		If the noise level will exceed the permissible limits with reference to national and OSHA standards, following recommendations are suggested to take action against the high noise levels: • Proper tuning of construction machinery and vehicles is recommended. • Ear muffs and ear plugs are recommended in case of high noise levels. • Rubber wounds should be placed underneath the generator to avoid the vibration.
Vegetation Loss/ Soil erosion— Minor negative impact may arise as only some weeds and grasses are present at the project site which will be cleared for the purpose of construction.	Unnecessary or excessive removal of trees and shrubs.	No tree cutting/ vegetation loss issue will be involved in the subject project as project site is free of any dense vegetation and trees. Preparation of a Reinstatement Plan to restore the land after the constructional activities is recommended.
Soil Contamination—Oil and Chemical spills can contaminate the soil.	Presence of visible amount of hydrocarbon in soil	Provision of spill prevention and control kits; Use of impermeable surfaces in workshops, and storage areas; Contaminated soil will be collected and incinerated.
Traffic issues- Traffic issues may arise due to the constructional activities at the project site if traffic will not be managed properly.	TEPA rules	Speed limit of 10 km/h should be maintained on the access road; Ample parking area must be allocated at the project site. Guards should be hired to manage the traffic at the project site.
Socioeconomic impacts—Inter-cultural		

differences between the project staff from other areas and the local community may arise due to the subject project. Positive socioeconomic impacts due to increased infrastructure, employment opportunities and economic growth.	No community complaints. Increased employment facilities in the area; Increased infrastructure	Training of the non-local project staff on local culture and norms; Avoidance of unnecessary interaction of local population with the non-local project staff. Employment opportunities should be provided to the local people.

Table 3: Summary of Major Impacts & their Proposed Mitigation during Operational Phase

Potential Impact	Criteria for determining Significance	Key Mitigation Measures
Impact due to Location	Seismic Region and flood Zone Specification	There are no significant negative impacts on the environment due to the project location/ selected site, because the project is present in Industrial Estate which is already approved by the EPA.
Gaseous Emissions- During the operational phase of the project, gaseous emissions from project site generator may affect the air quality of the project area.	PEQS for Ambient Air	Industry should ensure the PEQS compliance and should not be allowed to emit hazardous pollutants. Proper tuning of generator should be done to avoid the excessive gaseous emission from the generator. Vehicle emissions inspection should be done on regular basis. Sprinkling should be done on the unpaved area to avoid dust pollution/ particulate matter.
Noise- Noise due to industrial activity, machinery and generators can be a nuisance for the workers in the working area.	OSHA Standards	Activities generating high levels of noise should be minimized at the project site. Personal Protective Equipment PPEs including Ear muffs, Ear plugs

		and other noise abating equipment will be provided to the workers and other staff in case of noise at the project site. Generator should be covered with canopy. Proper maintenance and tuning of the vehicles should be done. Sound proof rooms should be built for generators to be installed at the project site to control the noise.
Discharge of wastewater- The discharge of untreated municipal wastewater may be a negative impact of the subject project.	PEQS for Municipal Effluents (mg/l, unless otherwise defined)	Wastewater must be treated before its discharge. Compliance of PEQS for effluents should be ensured. Monitoring should be conducted as per PEQS and reports should be submitted to EPA.
Health & Safety Issues- different constructional and operational activities at the project site may cause health and safety issues for workers if precautionary measures will not be adopted.	OSHA Standards	Proper training of workers and staff should be conducted to avoid the accidents. Use of PPEs should be implemented at workplace. First aid measures/medical facility should be provided at the project site. Safe drinking water must be provided to workers, staff, and poor people of the area. Safety signs & boards should be placed
Solid waste management- If solid waste will not be managed properly, it may cause negative impacts.	Exposure to potentially hazardous waste; Generation of excessive waste; Recyclable waste and reusable waste is discarded; Littering; Improper disposal.	A solid waste management division should be formulated to deal with the proper disposal of solid waste, supervised by HSE Manager, SW Manager, and other related personnel.

PROPOSED ENVIRONMENTAL MONITORING

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

Table 4: Environmental Monitoring

Sr. No.	Parameters	Monitoring Schedules	Monitoring Duration
1	Ambient Air Monitoring (NOx, COx, SOx, PM_{10})	Quarterly	24 Hours
2	Noise Level	Quarterly	24 hours
3	Water quality	Quarterly	Some parameters on site, Others in lab

CHAPTER # 1

1 INTRODUCTION

1.1 PURPOSE OF REPORT

The development of any Project brings about changes, both positive and negative, in the environmental and social settings of the Project Area. The intensity and level of change, however, depends upon the nature of the Project and the baseline environmental conditions of the area. For the last four decades, this aspect has gained momentum both at official and public level. Because of this, official regulations and laws have been promulgated for the protection and conservation of the physical, biological and social environment. The law makes it mandatory to carry out Initial Environmental Examinations (IEE) or detailed Environmental Impact Assessment (EIA) of the development Projects depending upon the nature and magnitude of the impacts.

Section 12 of Punjab Environmental Protection Act, 1997 (Amended 2012) states that "No proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an Initial Environmental Examination (IEE) or, where the project is likely to cause an adverse environmental effect, an Environmental Impact Assessment (EIA), and has obtained from the Federal Agency approval in respect thereof." Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab for the compliance of Section 12 of Punjab Environmental Protection Act, 1997 (Amended 2012) for obtaining No Objection Certificate (NOC) before starting the construction activity at the project site.

1.2 IDENTIFICATION OF THE PROJECT

According to nature of project, cost of project and by also reviewing the IEE / EIA Regulation 2000, the project falls under Schedule II (List of Projects requiring an EIA), Category B (Manufacturing and Process), Clause 9 (Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except apparel), printing and publishing, ***PAINTS*** and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs. 10 million).

1.3 THE PROPONENT

The M. Abid Waseem of the proposed project want to get NOC by compliance of Section 12 to establish its business further.

Table 5: Detail of Proponent

Name	**M. Muhammad Siddiq**
CNIC	36603-4428605-5
Address	Quaid Block, Bahria Town House No. 1025 Sector E Lahore
Mailing Address	Plot # 260, Sundar Industrial Estate, Raiwind Road, Lahore

TORs of the study between Proponent & Consultant under clause 5 (f) of policy and procedure for the filing, review and approval of environmental assessment are annexed as **Annexure-A.**

1.4 The CONSULTANT

M/S Jotun Powder Coating (Pvt.) Ltd engaged Pak Green Enviro-Engineering (Pvt.) Ltd., as consulting firms to accomplish this task. Pak Green Enviro-Engineering (Pvt.) Ltd is an independent company, who conducts IEE, EIA, EMP and other environmental investigations through its panel of environmental consultants, public participation practitioners and experienced environmental managers.

The names and expertise of all experts is given on page 2 and also annexed in **Annexure-B**. Authority Letter in favor of consultant by M/S Jotun Powder Coating (Pvt.) Ltd is also annexed in **Annexure-B**.

1.5 BRIEF DESCRIPTION OF PROJECT

1.5.1 NATURE & SIZE OF PROJECT

The project proposed construction and installation of paint manufacturing unit under the mane of M/S Jotun Powder Coating (Pvt.) Ltd. The paint manufacture involves the assembling of raw materials, mixing, dispersing, thinning and adjusting, filling of containers and warehousing. Paints. Raw materials used to manufacture paints come as liquids, solids, powders, pastes and slurries. These are manually weighed out and premixed

The total area of the project is 68000ft^2, while covered area of the project would be 31000ft^2. Total estimated cost of the project is 250 million.

1.5.2 LOCATION

Proposed project site is located in Plot # 260, Sundar Industrial Estate, Raiwind Road, Lahore. Land coordinates are given below:

Front ---------- Access Road
Back ---------- Industrial Unit
Left ----------Industrial Unit
Right ----------Industrial Unit

Detailed Project Layout showing all the facilities and details and Google Earth Maps of the project sit and nearby areas are annexed in **Annexure-C**.

Figure 4: Google Earth Map of Project Site

Figure 5: Description of Nearby Areas

1.6 OBJECTIVES OF THE STUDY

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

The objectives of this EIA study are outlined as under;

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

1.7 STRUCTURE OF THE REPORT

The Environmental Impact Assessment (EIA) Study comprises of Executive Summary following nine chapters as detailed below;

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

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

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

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

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

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

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

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

1.8 ENVIRONMENTAL TEAM

Following team of experts were engaged to conduct this EIA.

Abdul Hafeez Nasir	PhD Scholar Environmental Management
Iftikhar Ahmed	Environmental Specialist
Kiran Irshad	Environmental Specialist/ Author of the Report
Ahmad Raza	Marketing Manager
Narmeen Sana	Analyst

CHAPTER # 2

2 DESCRIPTION OF PROJECT

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

2.1 TYPE & CATEGORY OF THE PROJECT

The project is the proposed construction/installation of paint manufacturing unit. The paint manufacture involves the assembling of raw materials, mixing, dispersing, thinning and adjusting, filling of containers and warehousing. Paints. Raw materials used to manufacture paints come as liquids, solids, powders, pastes and slurries. These are manually weighed out and premixed

According to nature of project, cost of project and by also reviewing the IEE / EIA Regulation 2000, the project falls under Schedule II (List of Projects requiring an EIA), Category B (Manufacturing and Process), Clause 9 (Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except apparel), printing and publishing, **PAINTS** and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs.10 million).

2.2 OBJECTIVE OF PROJECT

Objectives of the Project are to provide paint to the markets all over the Pakistan and to make it accessible to everyone. Following are the main objectives of the proposed project:

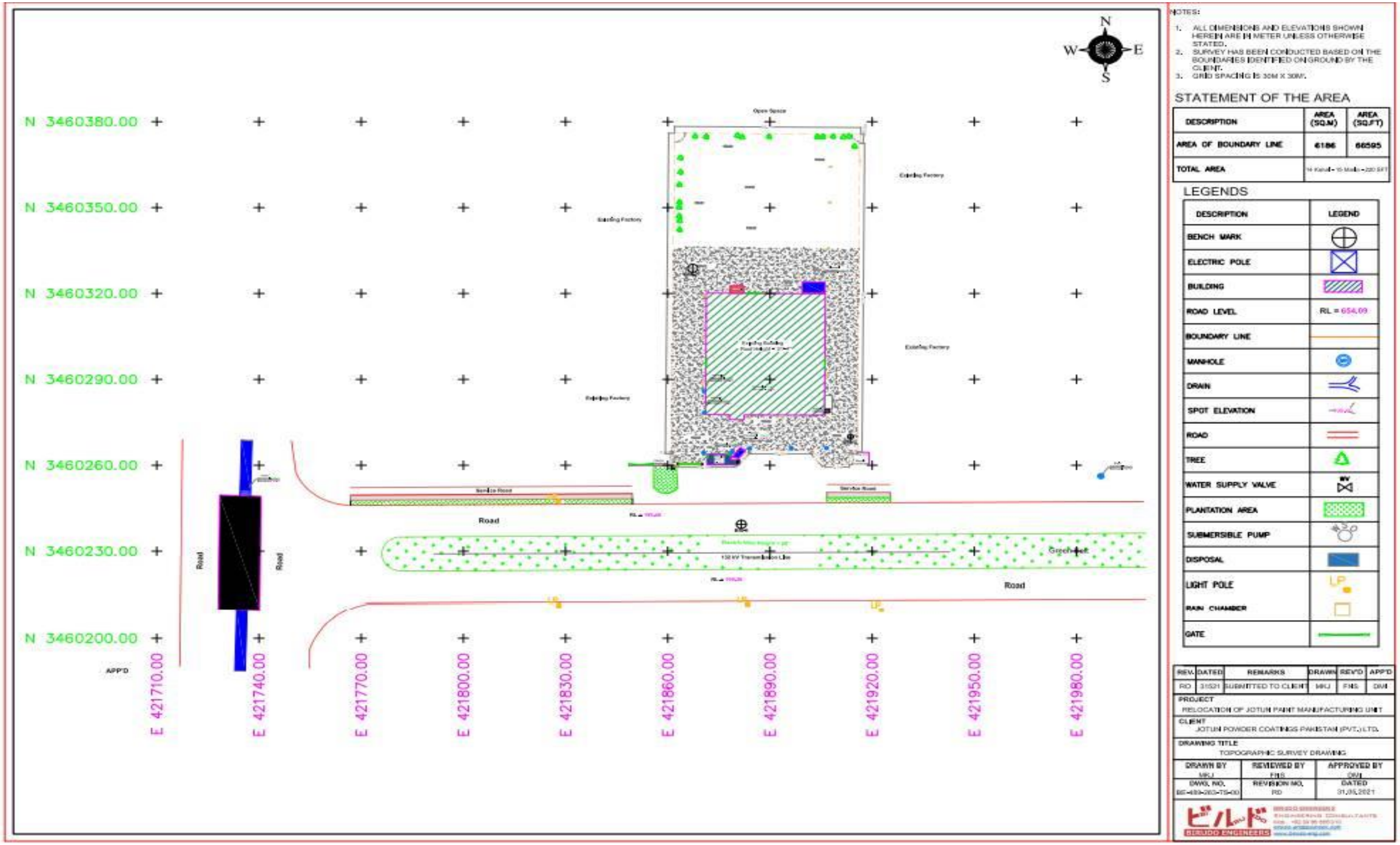
- Established business for the proponent
- Provide the paint all over the Pakistan markets
- Reduce the import
- Take a part in improvement of the GDP of Pakistan.

2.3 LOCATION & SITE LAYOUT OF PROJECT

Considering the space requirement of the proposed project and its implementation, the company acquires Land measuring of 68000ft2 in Sundar Industrial Estate Lahore. Land Purchase documents are annexed in **Annexure-D.**

Land coordinates are given below:

Front ---------- Access Road
Back ---------- Industrial Unit
Left ----------Industrial Unit
Right ----------Industrial Unit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E 421830.00
E 421860.00
E 421890.00
E 421920.00
E 421950.00
E 421980.00
Road
Road
Road
Road
Green belt
NOTES:
1. ALL DIMENSIONS AND ELEVATIONS SHOWN HEREIN ARE IN METER UNLESS OTHERWISE STATED.
2. SURVEY HAS BEEN CONDUCTED BASED ON THE BOUNDARIES IDENTIFIED ON GROUND BY THE CLIENT.
3. GRID SPACING IS 30M X 30M.
STATEMENT OF THE AREA
DESCRIPTION | AREA (SQ.M) | AREA (SQ.FT)
AREA OF BOUNDARY LINE | 6186 | 66595
TOTAL AREA
LEGENDS
DESCRIPTION | LEGEND
BENCH MARK
ELECTRIC POLE
BUILDING
ROAD LEVEL
BOUNDARY LINE
MANHOLE
DRAIN
SPOT ELEVATION
ROAD
TREE
WATER SUPPLY VALVE
PLANTATION AREA
SUBMERSIBLE PUMP
DISPOSAL
LIGHT POLE
RAIN CHAMBER
GATE
REV. | DATED | REMARKS | DRAWN | REV'D | APP'D
R0 | 31521 | SUBMITTED TO CLIENT | MKJ | FNS | DMI
PROJECT
RELOCATION OF JOTUN PAINT MANUFACTURING UNIT
CLIENT
JOTUN POWDER COATINGS PAKISTAN (PVT.) LTD.
DRAWING TITLE
TOPOGRAPHIC SURVEY DRAWING
DRAWN BY | REVIEWED BY | APPROVED BY
MKJ | FNS | DMI
DWG. NO. | REVISION NO. | DATED
R0 | 31.05.2021
ビルド
BIRUDO ENGINEERS

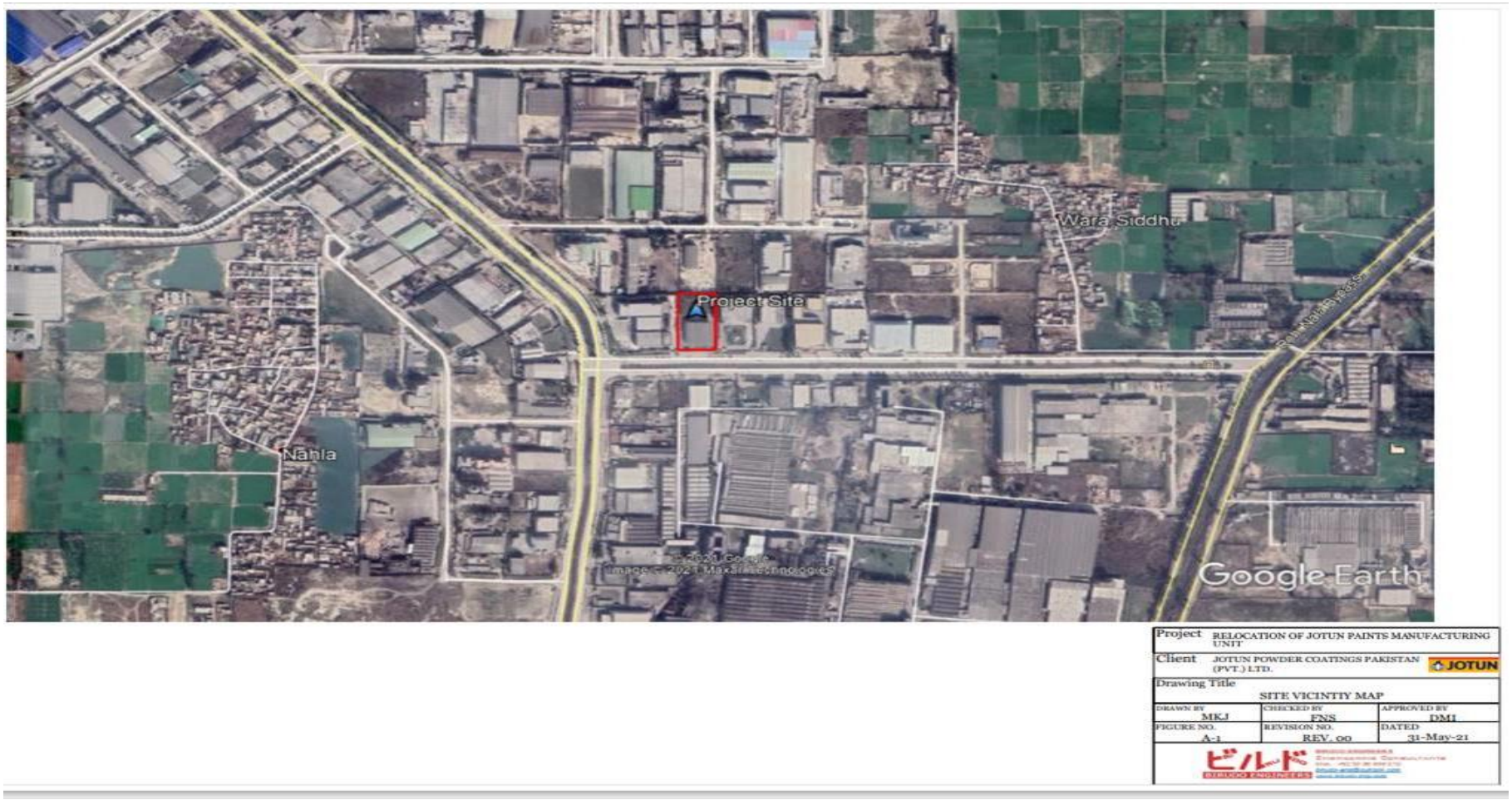

Figure 6: Google earth Map of Project Site

2.4 LAND USE & VEGETATION FEATURES ON SITE

At the present the land is an open plot. There is no vegetation present at the site. There are no trees not any plants exist on site, and site is present in Sundar Industrial Estate Raiwind Road Lahore.

2.5 ROAD ACCESS

The site is located within the Sundar industrial Estate. Site is connected with Manga – Raiwind Road and Raiwind Road.

Figure 9: Access Road Network to project Site

2.6 COST & MAGNITUDE OF OPERATION

Total project cost is estimated at 250 million. Final production capacity of the project will be will be 20 million Kilograms of water-based paint per annum.

2.7 SCHEDULE OF IMPLEMENTATION

Detailed feasibility studies and designing of the project have been completed. Necessary legal, administrative and financial formalities have been also completed upto some extant and remaining are in process. The project is expected to be completed within 12 months from the date of environmental approval. Subsequently the operational and maintenance aspects of the project will be undertaken by the proponent.

Table 6: Proposed Implementation Schedule

Description of Work	Target Time
After Environmental Approval	
Completion of Land leveling	1 month
Construction of Boundary Wall	1 month
Civil Construction Work	6 months
Plant and Machinery	3 months
Trial Run Operation	1 month

2.8 PROJECT DESCRIPTION

2.8.1 PROCESS FLOW FOR JOTUN POWDER COATINGS PVT. LIMITED

Step 1: Receiving of Raw Materials – water based only (powders, liquid extenders)

Step 2: Storage of Raw materials – All raw materials stored in covered raw material warehouse

Step 3: Production / Mixing of Raw materials – Special mixing machines are used to combine powders, liquid extenders and water to produce a mixture/paint.

Step 4: Filling – Mixture/paint is filled in containers of 25 liters, 10 liters and gallons.

Step 5: Storage of Paint Cans – Storage of cans in finished goods warehouse

Step 6: Logistics distribution – Paint is distributed via small trucks to various customers and Jotun paint shops.

Step 7: Waste production consists of;

- Empty cartons and plastic packaging (hazardous and non-hazardous waste)
- Waste water (1% of total product) is chemically pre-treated before disposal according to Punjab Environmental Standards for water.

PROCESS OF PRODUCTION OF POWDER COATING

Paint is one major segment of the surface coatings, which also includes varnishes, enamels, printing inks and polishes. The paint industry produces a huge variety of products that protect, preserve, and also beautify the objects to which they are applied. Typical products include architectural coatings (e.g. house paints), industrial coatings (e.g. automotive finishes, wood furniture and fixture finishes), and special purpose coatings (e.g. traffic paints, roof coatings).

Basic Composition of paints

Solvents (Liquids)

Pigments

Additives

Resins (Binder)

Prime Pigments

- **Titanium Dioxide (TiO2)**
  - Provides excellent hiding power and whiteness.
  - Available as a solid (powder) or liquid (slurry).

- Titanium dioxide is the world's primary pigment for providing whiteness, brightness and opacity

- **Zinc Oxide**
- Controls mildew
- Resists ultra-violet light
- Resists yellowing

Resins

- Binds or glues ingredients (pigments and additives) of paint together.
- Resin provides adhesion to the substrate.
- Resin provides durability & resistance properties

Fillers

- Fillers are a special type of pigment that serve to thicken the film, support its structure and simply increase the volume of the paint.
- Fillers are usually comprised of cheap and inert materials, such as talc, lime, clay, etc.

Solvents

- The main purpose of the solvent is to adjust the viscosity of the paint.
- Water is the main vehicle for water-based paints.
- Solvent-based paints can have various combinations of solvents as the vehicle, including aliphatic, alcohols, etc.
- These include organic solvents such as petroleum distillate, esters, glycol ethers, and the like.

Additives

- Additives are mixed in very small amounts and yet give a very significant effect on the product.
- Additives are used because:
- Modify surface tension.
- Improve flow properties.
- Improve the finished appearance.
- Improve pigment stability.
- Control foaming.
- Control skinning.
- **The manufacturing process**

Raw material

Resin, pigment and additive agents are generally major components of paint.

Mixing:

Resin, pigment and solvent are mixed to produce an even mill base.

Milling:

Mill base produced at the pre-mixing process is sent to the disperser to finely disperse the pigment particles.

Blending:

Resin, additive agents and so on are added to the mill base, the dispersion of which is completed. Also, the color phase is adjusted with color materials.

Filtering:

Blended and toned paint is filtrated.

Packing:

Filtrated paint is packed into a container.

2.8.2 Machinery Detail:

List of machinery is attached at the end of this chapter.

2.8.3 Power Requirement

Power requirement would be 1000Kva, Load list is attached herewith.

2.8.4 WATER CONSUMPTION & WASTEWATER DISPOSAL

In constructional phase, 1200 l/d water will be used. In operational phase, water will be used Waste water produced from domestic usage and from operational activities will be treated in wastewater treatment plant prior to the disposal into industrial drain. Detail Design of Septic wastewater treatment plant annexed in **Annexure-F**.

2.8.5 Solid Waste:

In constructional phase all waste materials such as landscape and land clearing debris, gravel and aggregate products, concrete, masonry scrap and rubble (brick, concrete masonry, stone), and plastics and paper from cement bags will be handed over to local contractor during the construction activities or may be used as road filling and maintenance purposes. Solid waste by domestic sources will be generated during construction phase which will be placed in designated area from where it will be handed over to contractor fir safe disposal. In operational phase, waste will be produced that will be collected in waste bins from where ultimately it will be handed over to contractor for disposal.

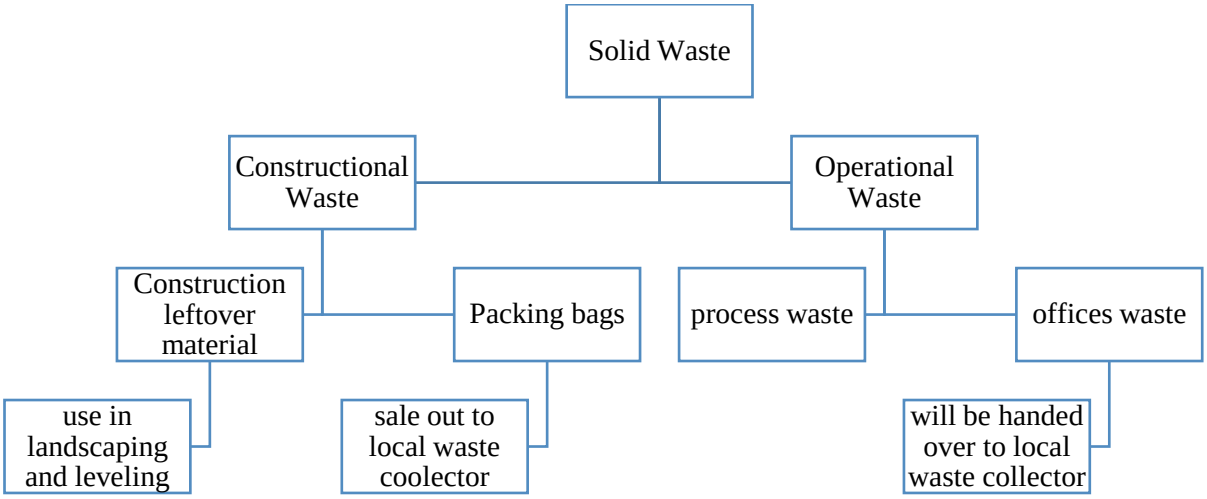

Figure 2-10: Solid Waste Detail

2.8.6 HEALTH AND SAFETY

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

Table 7: Details of PPEs

Protection	Occupational Hazards	PPEs
Head Protection	Falling objects, inadequate height clearance, and overhead power cords	Helmets with or without electrical protection
Hand protection	Hazardous material, cuts or lacerations, vibrations, extreme temperatures	Synthetic or Rubber gloves, leather, insulating material etc.
Eye and face protection	Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation	Glasses, shield protective, etc.
Hearing protection	Noise, ultra sound	Hearing protectors like ear plugs, ear muffs
Respiratory protection	Dust, fogs, fumes, gases, smokes, vapors, oxygen deficiency	Facemasks or air supply
Body protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	Aprons, insulating clothing etc. of appropriate materials

2.8.6.1 SAFETY SIGNS/SAFETY BOARDS:

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

2.8.7 PLANTATION

Area for plantation will be reserved. Proper plantation will be done to control the suffocation and for the esthetic purpose. Plantation plan is annexed in **Annexure – H**.

2.8.8 FIRE PROTECTION SYSTEM:

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

2.9 RESTORATION AND REHABILITATION PLANS:

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

2.9.1 DETAILS OF RESTORATION AND REHABILITATION AT THE END OF THE PROJECT LIFE:

There will be no matter of rehabilitation as the proposed site is already owned by the project proponent. At the end of the life of the project, it will be duly dismantled with special precautions to avoid/ minimize pollution and at the same time taking all safety precautions to protect human life and property around the building.

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

2.10 GOVERNMENT APPROVALS:

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

CHAPTER # 3

3 ANALYSIS OF ALTERNATIVES

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

3.1 THE NO PROJECT ALTERNATIVE

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

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

3.2 LOCATION ALTERNATIVES:

To fulfill the commercial aspects of the project under reference of this EIA Report, it is to be sited at a place where commercial processing activity is either already going on or there are bright prospects of the same. Concurrently, it must also meet the legal requirements of the Punjab Environmental Protection Act.

3.2.1 REJECTED SITES

Before the consideration of selected project site, project proponent had considered another site. Site-A in Lahore, but later it was rejected due to high cost of land and less benefits of project site.

Another site, Site-B at Raiwind was considered for the construction of the subject project by the management but it was also rejected due to some reasons.

3.2.2 REASON FOR REJECTION

This site was rejected due to the following reasons:

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

3.3 MODIFIED CONSTRUCTION TECHNOLOGY ALTERNATIVES

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

3.4 TECHNOLOGY ALTERNATIVES

Final design of Plant and Machinery will base on latest available technology to produce high quality paint. These machines have pollution remove technologies built in. Therefore, it the best option to use that technology.

CHAPTER # 4

4 STAKEHOLDERS AND PUBLIC CONSULTATION

The consultation process with various stakeholders of Pak Green Enviro-Engineering (Pvt.) Ltd. has been carried out to involve community and other stakeholders at earlier stages. Information dissemination during public consultation is fundamental to successful conclusion of the Project. This chapter describes the objectives and details of the consultative process adopted; its outcome and the conclusions drawn thereafter.

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

4.1 OBJECTIVES OF CONSULTATION

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

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

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

4.2 CONSULTATIVE ASPECT

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

- Dissemination of Project information through discussions, education and liaison.
- Eliciting the comments and feedback on the proposed Project.
- Documentation of information narrated by the stakeholders.

- Documentation of mitigation measures proposed by the stakeholders.
- Incorporation of public concerns and their addressal in the EIA/EMMP.

4.3 IDENTIFICATION OF MAIN STAKEHOLDERS

There are two types of stakeholders related to the project i.e. primary and secondary stakeholders. Primary stakeholders are those which are directly affected by the Project activities and secondary stakeholders are those which are affected indirectly.

The proposed Project does not have direct impacts on any individual; therefore, no primary stakeholders are identified. Secondary stakeholders are institutional stakeholders, which includes Project Proponent, local Government representatives, and Government officials of the relevant departments, NGO, general public, local residents, shop keepers, vendors, hospital owners/staff, teachers, pedestrians, and businessmen/traders of the city. The categories of the stakeholders who provided useful feedback, included:

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

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

4.4 MEETINGS WITH STAKEHOLDERS

A series of consultation was carried out with stakeholders and general public in Sundar Industrial Estate and nearby areas. Further list of official stakeholders and local people consulted is attached as **Annexure-I.**

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

i. Brief Description of the Project
ii. Current economic condition in the area
iii. Suggestions for improvement in the current industrial system and all activities related to industry
iv. Perceptions about the proposed Project
v. Perceived impacts of the proposed Project

The local poor people predominantly requested for unskilled and semi-skilled jobs during implementation of the Project. On the basis of the consultations so far, it appears that the Project will have no insurmountable environmental and social impact. The community generally supported the proposed Project. They have opinion that the Project will not only provide livelihood during construction stage, but also will help to eradicate the burning issue of regarding import of materials.

4.5 ANALYSIS OF STAKEHOLDER CONSULTATION

4.5.1 SAMPLE SIZE

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

4.5.2 STATISTICAL ANALYSIS

SPSS 19.0 has been used for the statistical analysis of the data collected during the visit of study site villages through questionnaires.

4.5.3 RESULT AND DISCUSSION

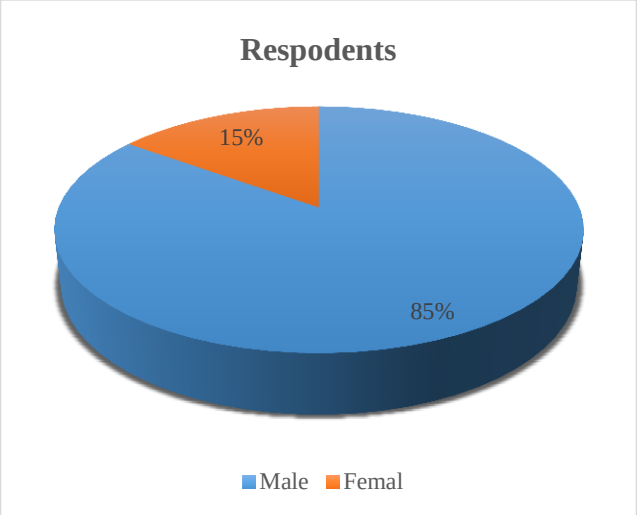

Figure 11: Gender Ratio of Respondents

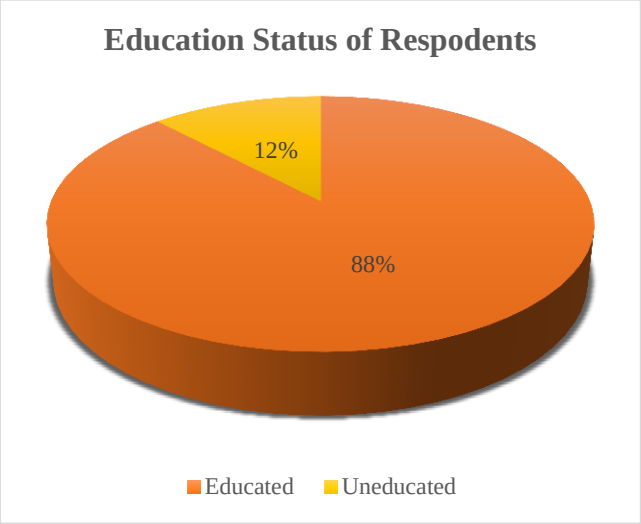

Figure 12: Education status of respondents

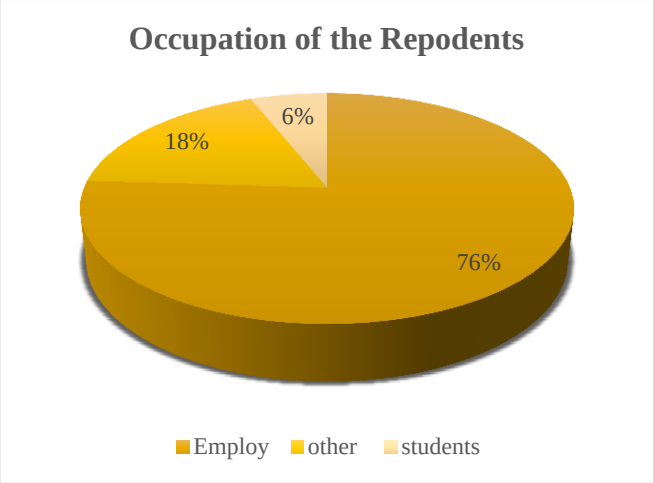

Figure 13: Occupation of respondents

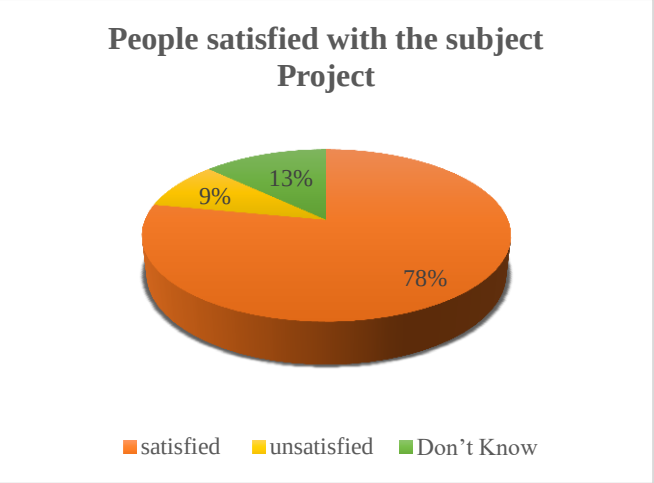

Figure 14: Satisfaction of respondents

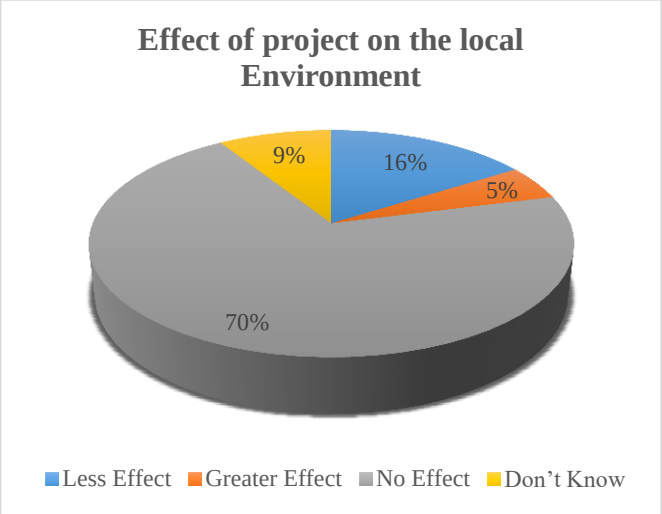

Figure 15: Effect of project on local environment

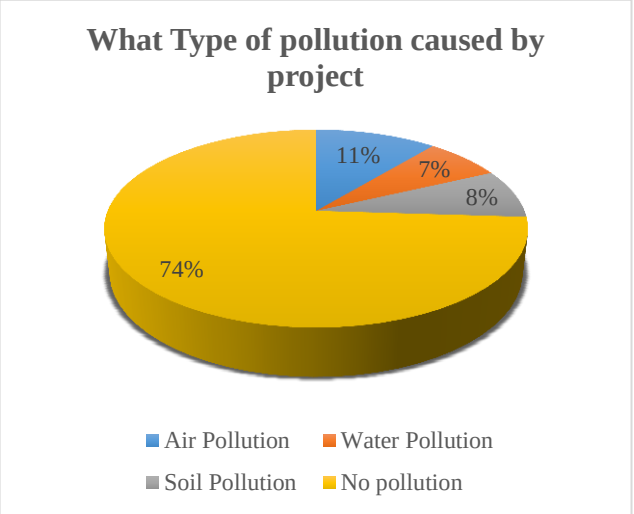

Figure 16: What type of pollution caused by project

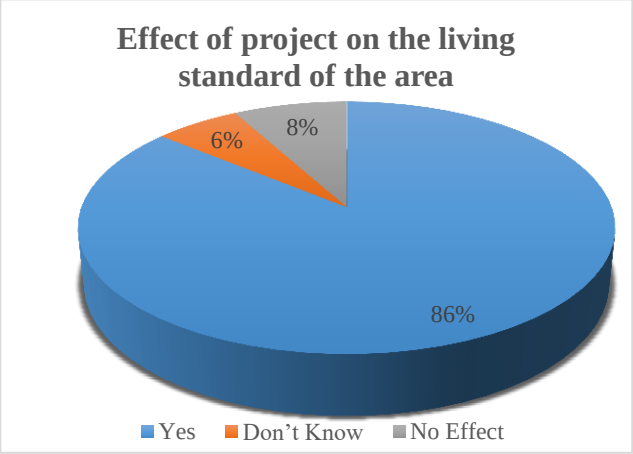

Figure 17: Effect of project on the living standard of area

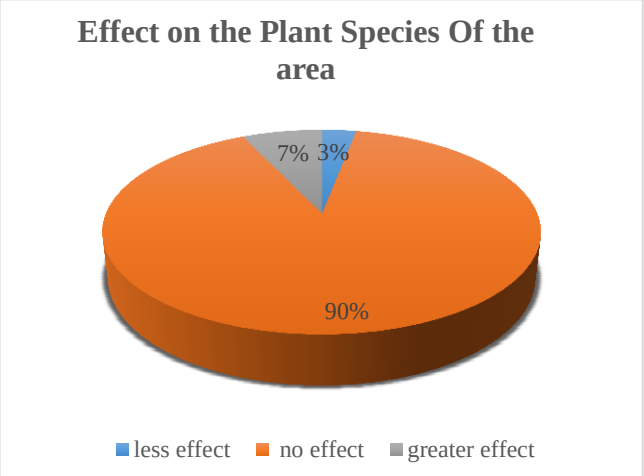

Figure 18: Effect on plant species of area

According to graphical representation, 85 respondents were male while 15 % respondents were female. The number of female respondents is less as compared to male respondents because according to the social binding female hesitates to respond or communicate comfortably. 88 % respondents were educated while 12% were uneducated. So, according to the survey overall education status of the area is good.

As per survey, 78% people were satisfied with the proposed project and they gave positive remarks regarding the existing unit and proposed project as they got job over there, their living standard raise over working there. While 13% respondents were have no opinion regarding the project and 9% respondents were not satisfied with the production unit due to their concern regarding the aesthetic degradation and no preference to local people for jobs. Majority were in favor that no effect will be caused by this project.

4.5.4 SUMMARY OF ISSUES RAISED BY STAKEHOLDERS

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

Table 8: Summary of issues and commitments by Proponent

Issue	Aspect/Concern raised by Stakeholders	Project Proponent Commitments
Employment Opportunities	Expectations of employment are very high. Job opportunities are less for herders as they generally have less skills and training.	Employment is the main priority of the industry. Mostly locally skill and unskilled labor will be prioritized and also there will be job in executive level. Around 50-60 person will be employed by the industry.
Training Opportunities	People are keen to consult with subject industry if the Project offers training and upgrading opportunities to enhance their trade or professional skills.	Development of the Training Strategy, including commitment of allocation of budget investment for training infrastructure, delivery and design. Installation of training facilities in for worker of the company .
Health & safety	Truck traffic is a main concern because the road used by the Project passes through a number of small communities and different industries and there will be a high volume of trucks transporting concentrate.	Extensive consultation on the road corridor and safety aspects, including on herder and animal crossings. Development of Transport Management Plan including traffic safety training. Traffic advisory signs will be installed along project site and all nearby specific areas.
Local economy and business development	Local service providers are keen to participate in providing services to provide raw material and expect to receive in order to adjust their businesses to meet specific needs.	Proponent has main focus that they will all the material regarding construction and plant operation to buy from the local market.

	Local businesses want to receive support in terms of finance and facilities to diversify their businesses. Local/regional companies and entrepreneurs have limited understanding about meeting the high volumes required by the Project and the quality standard, but are keen to know these requirements so they can become suppliers.	This will help the local and small business and to people who are keen interested to become suppliers.
Environmental Issues	Dust and noise impacts, particularly from the construction activities and in operation of mechanically unfit machines, are of concern to herders and other residents. Environmental degradation during road construction and use. Loss and change of vegetation due to soil degradation. Increased waste along project boundary and around economic zone.	Implementation of controls under the Environmental Management Plans, including on and off-site dust and noise monitoring. A Participatory Environmental Monitoring Program will be launched to spread awareness.
Water quantity and quality	Water quality and quantity, and impacts from the wastewater disposal are all key concerns for nearby herders.	Implementation of consultation in relation to water use and development of the Participatory Environmental Monitoring Program. Water treatment plant will be installed by the proponent that will help to safe disposal of the water.

CHAPTER # 5

5 DISCRIPTION OF ENVIRONMENTAL & SOCIAL BASELINE CONDTIONS

5.1 BASELINE CONDITIONS

Baseline conditions refer to the existing physical, environmental and socio-economic status of the Project area. The baseline information and indigenous knowledge is required for scoping potential environmental issues associated with the implementation of the Project. On the basis of baseline information, the Project interventions are assessed and mitigation measures are proposed. The baseline information also helps to indicate the specific issues to be monitored during construction and operational phase of the Project. The baseline data (physical, biological and socio-economic parameters) related to the Project area is described below. Information provided is based on primary and secondary data collected by site visits and desk studies respectively.

5.2 PHYSICAL ENVIRONMENT

5.2.1 TOPOGRAPHY & Geography

The proposed site is situated at Sundar Industrial Estate. Site area is generally flat and slopes towards south and south-west at an average gradient of 1:3000. The project area is surrounded by industrial units and within the radius of 10 Km, there is Jamal Pura, Wara Kumharan, Rosa, Riwiand City and small villages / towns etc.

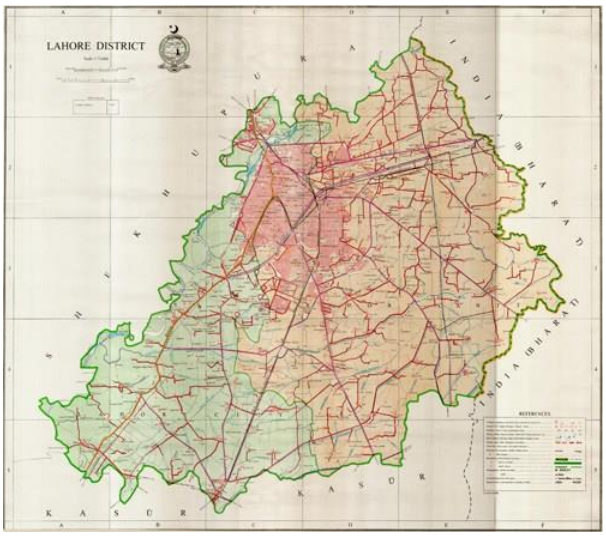

Figure 19: Map of Lahore District

5.2.2 SOIL

The selected project land is w.r.t fertility is poor fertile land. In the vicinity, the fertile agricultural land can be seen. The soil of surrounded area is loamy in nature. Site selected for the construction of sack paper bag manufacturing is dominated in sand (sandy loam).

5.2.3 Climate

5.2.3.1 TEMPERATURE & PRECIPITATION

Temperature & precipitation pattern can be estimated from the below figure simulated on the base of 30 year of hourly weather data collected from Pakistan Metrological Department (PMD). The simulated weather data have a spatial resolution of approximately 30 km and may not reproduce all local weather effects, such as thunderstorms, local winds, or tornadoes. Climatic changes are being significant factor to change the expected temperature & precipitation pattern in the proposed project area of Dist. Lahore.

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

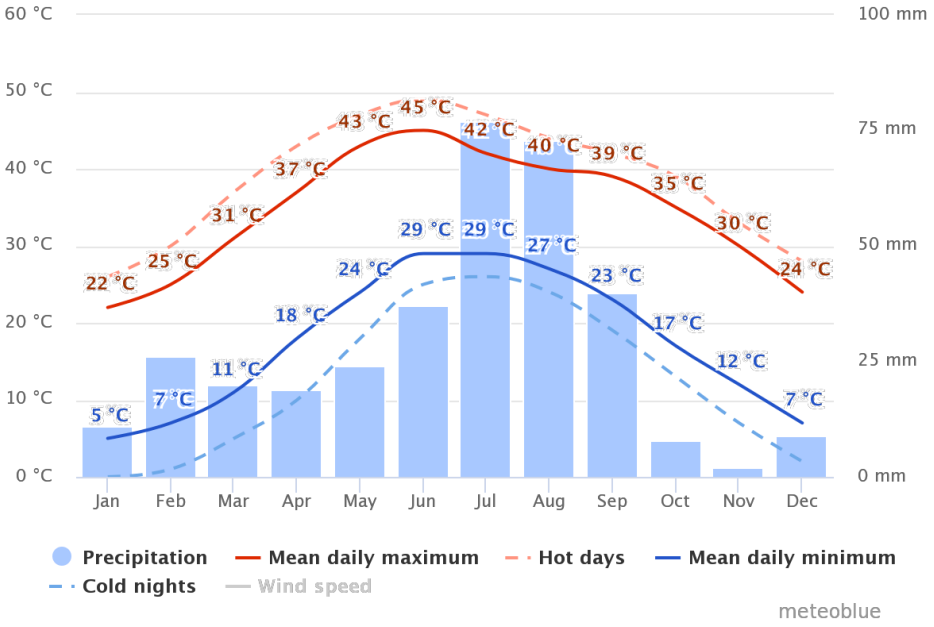

Figure 20: Average Temperature & Precipitation Data of Proposed Project Site

5.2.3.2 Wind Speed & Direction

Wind speed and its direction can be estimated from the figure given below. The data is simulated on base of 30 years' hourly weather condition data collected by Pakistan Metrological Department (PMD). Mostly, greater than 5 Km/h winds below in area of proposed project site and its direction toward East – North East side. Greater than 12 Km/h wind below mostly towards East – South East direction.

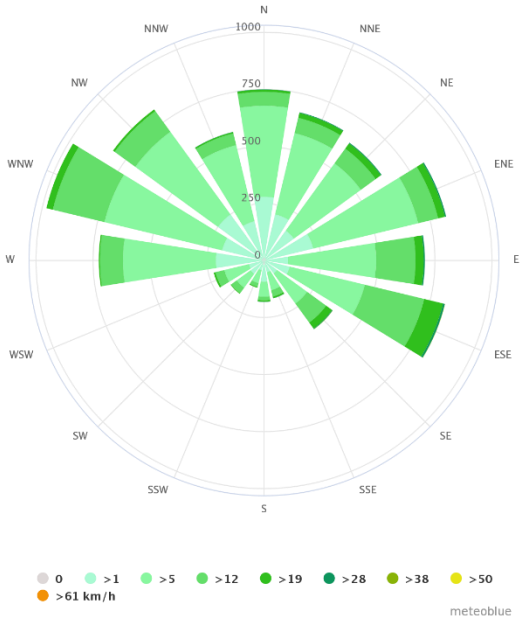

Figure 21: Wind Rose of Proposed Project Site

5.2.4 Hydrology

5.2.4.1 Surface Water

No clear water canal, stream or river is passing within 10 – 15 Km range of proposed project site. A wastewater receiving drain (Rohi Nalah) is passing near the industrial estate site at approx. 1000 m away. It receives wastewater from all nearby industries.

5.2.4.2 Underground Water

The underground water is clear, healthy and can be used as drinking purpose also. Pumps, tube wells and hand pumps are used to extract the water from ground. Water table is present at the depth of 70 feet but is not fit for drinking purpose due to contamination. Drinking water can be extracted from the depth of 600- 800 ft from ground. Water Quality test report are given in **Annexure – J**.

5.2.5 Ambient Air

The proposed project site is present in industrial estate and number of small industries within 10-Km radius. The major sources of air pollution in the area are surrounding industries and transportation or vehicular traffic.

To record the baseline ambient air quality of the project area, monitoring was conducted at advised locations to assess the concentration of priority pollutants (Carbon monoxide, Nitrogen dioxide, Sulphur dioxide and PM10) in the air. Ambient Air Quality test report is given in **Annexure – J**.

5.3 ECOLOGICAL ENVIRONMENT:

5.3.1 FISHERIES

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

5.3.2 FLORA

The proposed project site has very few herbs and shurbs, there will be no cutting of trees during the constructional activities of the project.

5.3.3 FAUNA:

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

Sr. No.	Name of Specie	Local Name
1.	*Bubalus bubalis*	Buffalos
2.	*Bos taurus*	Cows
3.	*Canis lupus*	Dog
4.	*Passer domesticus*	House Sparrow
5.	*Corvus*	Crow
6.	*Columbidae*	Pigeon
7.	*Thanasimus formicarius*	Beetle ant
8.	*Sympetrum flaveolum*	Dragon fly

5.4 SOCIOECONOMIC ENVIRONMENT:

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

5.4.1 DEMOGRAPHY

5.4.1.1 POPULATION

The results of the 2017 Census determined the population to be at 11,126,285 with an annual growth rate of 4.07% since 1998.Gender-wise, 52.35% of the population is male, while 47.64% is female and trans genders make only 0.01% of the population.

5.4.1.2 RELIGION

The city has a Muslim majority and Christian minority population. There is also a small but longstanding Zoroastrian community. Additionally, Lahore contains some of Sikhism's holiest sites, and is a major Sikh pilgrimage site. According to the 1998 census, 94% of Lahore's population is Muslim, up from 60% in 1941. Other religions include Christians (5.80% of the total population, though they form around 9.0% of the rural population) and small numbers of Bahá'ís, Hindus, Ahmediya, Parsis and Sikhs.

5.4.2 EDUCATION

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%. Lahore hosts some of Pakistan's oldest educational institutes:

- St. Francis High School, established in 1842
- King Edward Medical University, established in 1860
- Forman Christian College, established in 1864
- Government College University, Lahore, established in 1864
- Convent of Jesus and Mary, established in 1867
- University Law College, established in 1868
- National College of Arts, established in 1875
- University of the Punjab, established in 1882[123]
- University of Veterinary and Animal Sciences, established in 1882
- Central Model School, established in 1883
- Aitchison College, established in 1886
- Islamia College, established in 1892
- St. Anthony's High School, established in 1892
- Sacred Heart High School, established in 1906
- Queen Mary College, established in 1908
- Dayal Singh College, established 1910
- Kinnaird College for Women University, established in 1913
- University of Engineering and Technology, Lahore, established in 1921
- Lahore College for Women University, established in 1922
- Hailey College of Commerce, established in 1927
- De'Montmorency College of Dentistry, established in 1929
- Lady Willingdon Nursing School, established in 1933
- University College of Pharmacy, established in 1944
- Fatima Jinnah Medical University, established in 1948

5.4.3 CULTURE & FESTIVAL

The people of Lahore celebrate many festivals and events throughout the year, blending Mughal, Western, and other traditions. Eid ul-Fitr and Eid ul-Adha are celebrated. Many people decorate their houses and light candles to illuminate the streets and houses during public holidays; roads and businesses may be lit for days. The mausoleum of Ali Hujwiri, also known as Data Ganj Bakhsh or Data Sahib, is located in Lahore, and an annual *urs* is held every year as a big festival. Basant is a Punjabi festival marking the coming of spring.

Basant celebrations in Pakistan are centred in Lahore, and people from all over the country and from abroad come to the city for the annual festivities. Kite-flying competitions traditionally take place on city rooftops during Basant. Courts have banned the kite-flying because of casualties and power installation losses. The ban was lifted for two days in 2007, then immediately reimposed when 11 people were killed by celebratory gunfire, sharp kite-strings, electrocution, and falls related to the competition

5.4.4 RECREATIONAL RESOURCES AND DEVELOPMENT:

The project area has not any private recreational facilities.

5.4.5 QUALITY OF LIFE VALUES

As of 2008, the city's gross domestic product (GDP) by purchasing power parity (PPP) was estimated at $40 billion with a projected average growth rate of 5.6 percent. This is at par with Pakistan's economic hub, Karachi, with Lahore (having half the population) fostering an economy that is 51% of the size of Karachi's ($78 billion in 2008). The contribution of Lahore to the national economy is estimated to be 13.2%. Lahore is one of the Pakistan’s modern city.

5.4.6 ARCHAEOLOGICAL AND HISTORICAL TREASURES

Proposed Project is free from any type of historical and archaeological site/building.

CHAPTER # 6

6 POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

The following chapter describes the overall possible impacts of project on the physical, biological and socioeconomic environment because of operation phases and mitigation measures to minimize the significance of the possible impacts up to an acceptable level. The anticipated impacts related to location, design, construction and operation of the proposed project have been assessed and mitigation measures have been suggested in this report.

Impacts are assessed by analyzing their magnitude and sensitivity. The sensitivity and magnitude of the impact are described with reference to legal requirements, accepted scientific standards or accepted impact assessment practice, and/or social acceptability; where possible.

But where no known published 'standard' criteria exists for determining the magnitude of effects, established professional criteria and best practice techniques are used.

6.1 METHODOLOGY FOR IMPACT EVALUATION:

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

6.1.1 Leopold Matrix

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

1) On the horizontal axis, the actions which cause environmental impact, and
2) On the vertical axis, the existing environmental conditions which may be affected by those actions.

This provides a format for comprehensive review of the interactions between proposed actions and environmental factors.

The most important blocks marked are evaluated individually, and a number between 1 and 10 is placed in the upper left-hand corner to indicate the relative magnitude of the impact (1 represents the least magnitude, and 10 the greatest). Likewise, a number between 1 and 10 is placed in the lower right-hand corner to indicate the relative importance of the impact (again, 1 represents the least magnitude and 10 the greatest).

Table 9: Scale Table of Importance & Magnitude

Sr. No.	Type of Impact	Scale of Magnitude (0 – 10)	Scale of Importance (0 – 10)
1	No Impact	0	0
2	Low Impact	1 – 4	1 – 4
3	Medium Impact	5 – 6	5 – 6

4	High Impact	7 – 10	7 – 10

For the evaluation of this project, each action checked was evaluated in terms of magnitude of effect on environment characteristics and conditions [on the vertical axis]. From upper right to lower left across each block where significant interaction is expected slash \was placed diagonally. The most important blocks marked are evaluated individually, and a number between 0 to10 is placed in the upper left-hand corner to indicate the relative magnitude of the impact 1is the best magnitude, and 10 the greatest magnitude. In the same way, a number between 0 and 10 in the lower right-hand corner to indicate the relative importance of the impact again, 0 is the magnitude, and 10 the greatest.

The next step is to evaluate the numbers which have been in the slashed boxes. The high or low numbers on any one box indicates the degree of impact of the appropriate action on the given characteristic of the environment. The assignment of magnitude and importance numbers is based, to the extent possible, on factual data rather than on the evaluator's preference.

For the rating design regarding the probable impacts requires the evaluator to quantify his\her judgment. The rating scheme\scheme allows the reviewers to thoroughly follow the evaluator's line of reasoning, to aid in identifying points of agreement and disagreement. In fact, matrix is the abstract for the text of the environmental impact assessment.

Table 10: Leopold Matrix

Construction Phase															
Magnitude / Importance			**Actions**											**Total Score of Impact**	**Average Score of Impact**
			Transportation of raw material	Construction Activities	Operation of generators	Water consumption	Wastewater generation	Storage of raw materials	Social activities	Public welfare	Economic activities	Employment	Infrastructure improvement		
PHYSICAL	Soil	Soil Quality	2 / 1	3 / 2	0 / 0	1 / 1	5 / 2	4 / 4	1 / 1	0 / 1	1 / 1	1 / 3	4 / 6	22 / 22	2 / 2
		Erosion	2 / 1	6 / 6	0 / 0	0 / 0	2 / 2	1 / 1	2 / 1	0 / 0	1 / 1	1 / 1	3 / 4	18 / 17	1.6 / 1.5
		Geomorphology	0 / 0	5 / 5	0 / 0	4 / 2	5 / 3	2 / 1	0 / 0	0 / 0	1 / 1	2 / 1	4 / 6	23 / 19	2.09 / 1.7
	Water	Surface Water	0 / 0	0 / 0	0 / 0	6 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	6 / 0	0.5 / 0
		Subsurface Water	1 / 2	1 / 1	0 / 0	7 / 8	5 / 7	1 / 1	0 / 0	0 / 0	1 / 1	0 / 0	2 / 2	18 / 22	1.6 / 2
	Air	Air Quality	2 / 1	6 / 6	0 / 0	0 / 0	2 / 2	1 / 1	2 / 1	0 / 0	1 / 1	1 / 1	3 / 4	18 / 17	1.6 / 1.5
		Odors	1 / 1	1 / 1	3 / 3	0 / 0	5 / 7	4 / 6	1 / 1	0 / 1	0 / 1	1 / 1	1 / 1	17 / 23	1.5 / 2.0
		Noise	5 / 6	9 / 10	7 / 8	0 / 0	5 / 4	2 / 2	5 / 0	0 / 1	5 / 6	4 / 6	4 / 6	46 / 55	4.1 / 5

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

6.2 IMPACT ANALYSIS AND PREDICTION:

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

6.2.1 CONSULTATIONS/ CASE STUDIES:

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

6.2.2 MEETINGS:

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

To identity the different types of stakeholders and ascertain their perceptions about the project, an initial environmental examination was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed in the following.

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

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

6.3 CHARACTERISTICS OF IMPACTS:

6.3.1 IMPACT ASSESSMENT CRITERIA:

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

- Magnitude or degree of impact
- Time and duration of impact
- Likelihood of impact occurrence

- Sensitivity of impact
- Risk related to impact

Table 11: Impact Assessment criteria

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

6.4 ANALYSIS OF IMPACTS AND RECOMMENDED MITIGATIONS

6.4.1 ENVIRONMENTAL IMPACTS DUE TO PROJECT LOCATION:

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

Impact significance: Low to moderate
Nature of impact: Direct
Duration: Long-term
Timing: Construction & Operation phase
Reversibility: NA
Likelihood: Low
Consequences: Mild or may be positive

Mitigation Measures

- Project site will have good and efficient road infrastructure that already exists there at the project site
- Location can be considered as the positive impacts due to enhanced infrastructure.

- The project will also have positive socioeconomic impacts because of provision of jobs to the local residents of the area.
- No human settlement within the radius of the study area
- There would be no issue of congestion of traffic due to presence of good road network in the area.
- Provision of embankments, designed by considering the Geotechnical investigation studies. Due consideration should be given to aesthetic improvement during the design phase.

6.4.2 ENVIRONMENTAL IMPACTS DUE TO THE PROJECT DESIGN

The current project is present in sundar industrial estate. Area for parking, waste water treatment facility and solid waste management will be reserved within unit. Firefighting plan, health & safety plan, tree plantation plan, emergency response plan will be incorporated during the design phase of the project.
Following are the major Environmental impacts due to the development related to the design:

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

Impact significance: moderate to high
Nature of impact: direct
Duration: Long-term
Timing: Constructional phase & Operation phase
Reversibility: NA
Likelihood: moderate to high
Consequences: moderate to high

Mitigation measures and recommendations

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

- Industrial unit will incorporate all HSE measures regarding the design of project. Structure stability of the building should be ensured.
- Emergency exist points should be marked within the project building and in overall plan.
- Firefighting system should be designed for the emergency situations.
- Electricity system should be design safe and sound.
- Electricity wires should be covered by thick plastic/electricity resistant covers.

6.4.3 ENVIRONMENTAL IMPACTS DURING CONSTRUCTION PHASE:

6.4.3.1 IMPACTS ON PHYSICAL ENVIRONMENT

6.4.3.1.1 TOPOGRAPHY

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

Impact:

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

Impact significance: Low
Nature of impact: Direct
Duration: Short-term
Timing: Constructional phase
Reversibility: NA
Likelihood: moderate
Consequences: Very Low

Mitigation:

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

6.4.3.1.2 AIR QUALITY:

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

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

Impact significance: Low
Nature of impact: Direct
Duration: Short-term
Timing: Constructional phase
Reversibility: NA
Likelihood: moderate
Consequences: Very Low

Impact:

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

Mitigation:

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

6.4.3.1.3 NOISE

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

Impact

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

Impact significance: Low
Nature of impact: Direct
Duration: Short-term
Timing: Constructional phase
Reversibility: NA
Likelihood: moderate
Consequences: Low

Mitigation:

- Selection of up-to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices
- Confining excessively noisy work to normal working hours in the day, as far as possible

- Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and training them in their use
- Preferably, restricting construction vehicles movement during night time
- Vehicles and equipment used should be fitted, as applicable, with silencers and properly maintained
- Use of low noise machinery, or machinery with noise shielding and absorption
- Contractors should comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures

6.4.3.1.4 WATER RESOURCES

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

Impact:

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

These impacts are temporary and minor negative in nature

Impact significance: Low
Nature of impact: Direct
Duration: Short-term
Timing: Constructional phase
Reversibility: NA
Likelihood: moderate
Consequences: Low

Mitigation:

- Water required for construction is obtained in such a way that the water availability and supply to nearby communities remain unaffected
- Regular water quality monitoring according to determined sampling schedule
- Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond
- Continuous withdrawal and over pumping of groundwater should be avoided. Instead, intermittent pumping be carried out to conserve the groundwater resources
- Take precautions construct temporary or permanent devices to prevent water pollution due to increased siltation.

6.4.3.1.5 SOIL

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

Impact:

- Excavation of earth/cutting operations
- Land leveling activities
- If the excavated area is left unfilled for long, which may lead to rainfall induced soil erosion;
- The unspent materials and debris produced from consumed up materials, if left as such and allowed to mix with soil underneath, can degrade the quality of receiving soils and may render them unfit for plantation later on
- Leakages of oils, lubricants, chemicals, and other similar substances from their storage sites and from engines of the generators, machines, equipment and vehicles can spoil the receiving soils and may undermine ability of the spoiled soils to support growth of vegetation and plants
- Non-provision of septic tanks with the temporary worksite toilets, constructed for the labour and others, can contaminate the effluent receiving soils because of raw nature of the effluents
- Washing of the gadgets, machinery and equipment without proper drainage of the washout water can adversely affect the soil quality. This impact is, however, temporary.

Impact significance: Low to Moderate
Nature of impact: Direct
Duration: Short-term
Timing: Constructional phase
Reversibility: NA
Likelihood: moderate
Consequences: Low

Mitigation:

- Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for dumpsites, and covered
- As applicable and needed, plantation of grasses and shrubs will be done at appropriate place where required
- Unnecessary excavations should be avoided
- Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall and away from any potential source of fire
- Septic tanks of adequate capacities should be constructed for receiving and treating wastewater from all temporary worksite toilets and at the temporary container offices, if any. The toilet wastewater should not be discharged untreated onto the adjacent lands

- All machineries and materials should be stored at the designated areas and compounds
- All the unspent and left over materials should be completely removed offsite upon completion of construction
- Washout from washing of equipment and gadgets should be drained into either a septic tank or a sand-gravel bed for removal of the grit and contaminants

6.4.3.1.6 WASTEWATER

Impact:

- Wastewater generation due to construction activities

Mitigation:

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

6.4.3.1.7 Solid Waste

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

Impact

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

Impact significance: Low
Nature of impact: Direct
Duration: Short-term
Timing: Constructional phase
Reversibility: NA
Likelihood: moderate
Consequences: Moderate

Mitigation:

- An efficient and responsive solid waste management system should be devised for the entire duration of the construction phase. Such a system should provide for separate collection of different categories of constructional wastes. The wastes which will be reusable/recyclable (iron bars, aluminum) should be sold to waste vendors and those which cannot be sold out (brick pieces) may be used as a filling material for leveling the depressions, subject to technical feasibility
- Training of working force in the storage and handling of materials and chemicals that can potentially cause soil contamination
- Solid waste generated during construction and camp sites will be safely disposed in demarcated waste disposal sites or handed over to the contractor

6.4.3.1.8 Health and Safety

Health risks and work safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment and due to storage, handling and transport of hazardous construction material. Workers should be provided with safe and healthy working environment taking into account risks inherent to the particular sector and specific classes of hazards in project area. Mitigation measures will include:

Impact significance: Low to Moderate
Nature of impact: Direct
Duration: Short-term
Timing: Constructional phase
Reversibility: NA
Likelihood: moderate
Consequences: Moderate
Mitigation:

- Providing basic medical training to specified work staff and basic medical service and supplies to workers
- Layout plan for site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents
- Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for labourers
- Protection devices (ear muffs) should be provided to the workers doing job in the vicinity of high noise generating machines
- Provision of adequate sanitation, washing, cooking and dormitory facilities including light up to satisfaction
- Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc.
- Ensure strict use of wearing these protective clothing during work activities
- Instruct foremen to strictly enforce the keeping out of non-working persons, particularly children, off work sites

- Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic at construction sites, haulage and access roads.

6.4.3.2 IMPACT ON BIOLOGICAL ENVIRONMENT

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

6.4.3.3 IMPACT ON SOCIO-ECONOMIC ENVIRONMENT

6.4.3.3.1 ECONOMIC ACTIVITY

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

6.4.3.3.2 LIFESTYLE AND CULTURE

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

6.4.4 IMPACTS DURING OPERATIONAL PHASE:

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

6.4.4.1 IMPACTS ON PHYSICAL ENVIRONMENTS

6.4.4.1.1 SOLID WASTE/ SLUDGE MANAGEMENT:

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

Nature of impact: Direct
Duration: Short term
Timing: operation
Reversibility: Not applicable
Likelihood: Low (unlikely) if mitigation measures will ensure that Solid waste management in efficient way.
Consequences: Mild, as it will be removed from site within few hours
Impact significance: Low, based upon low likelihood and mild to moderate consequence.

Mitigation measures:

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

6.4.4.1.2 WASTEWATER

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

Nature of impact: Direct
Duration: Short term
Timing: operation
Reversibility: Not applicable
Likelihood: Low
Consequences: Mild
Impact significance: Low.

Mitigation measure

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

6.4.4.1.3 GASEOUS EMISSIONS:

Emissions will be produced by generators, boilers and vehicles and equipment will similar to those produced by generators in terms of the resulting pollutants (SO2, NOX, PM, etc.). However, the extent to which they can produce would keep considerably lower, since much smaller engines will use in vehicles and construction machinery.

Nature of impact: Direct
Duration: long term
Timing: operation
Reversibility: irreversible
Likelihood: moderate if mitigation measures will be ensured.
Consequences: moderate, if pollutant levels in the ambient air will be control within acceptable limits by adopting proper mitigations.
Impact significance: moderate, based upon low likelihood and mild to moderate consequence.

Mitigation Measures

None of the potential effects discussed above will be exceeded to acceptable limits.
The mitigation measures given below used to reduce their impact, and ensure that they remain within acceptable limits.

- All equipment and vehicles during the operation of project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions.
- Vehicle speed will be reduced on track passing through or close to shops
- Speed limits will be imposed and encourage more efficient journey management worked to reduce the dust emissions produce by vehicular traffic. Water sprinkling will be done where necessary.
- Management make sure process will be environment friendly
- Pollution abatement technologies regarding air pollution will be adopted.

6.4.4.1.4 ENERGY REQUIREMENT

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

Mitigation measures

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

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

6.4.4.1.5 NOISE LEVEL:

Noise is the major concern during the operation phase. It can be generated from the traffic on the road and from the machinery used for operations.
Nature of impact: Direct
Duration: long term
Timing: operation
Reversibility: Not applicable
Likelihood: low
Consequences: slightly significant
Impact significance: moderate, based upon low likelihood and mild to moderate consequence.

Mitigation measures:

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

6.4.4.2 IMPACT ON BIOLOGICAL ENVIRONMENT

6.4.4.2.1 NATURAL VEGETATION

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

Assessment of Impact:

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

Nature of impact: Direct
Duration: long term
Timing: construction phase
Reversibility: irreversible
Likelihood: moderate
Consequences: Mild, as no rare plant species were present in the areas.
Impact significance: significant

Mitigation Measures:

The following mitigation measures will reduce the impact on vegetation:

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

6.4.4.2.2 FAUNA

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

Nature of impact: Direct
Duration: short term
Timing: construction phase
Reversibility: not applicable
Likelihood: low
Consequences: Nil, as no rare animal species are present in the areas.
Impact significance: not significant

Mitigation:

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

6.5 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

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

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

6.6 PURPOSE OF MITIGATION MEASURES

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

The major impacts which may arise by the subject project are air, water and noise pollution. Other impacts are of minor importance. These impacts may arise during operational phase of the project because the constructional phase of the project includes the construction of boundary walls, roads and offices, so they will not cause any major harmful impacts on the environment and during the operational phase of the subject project, as different industries will be installed in the industrial estate, they may cause the issues of air, water and noise

pollution if proper precautionary measures to avoid this pollution will not be taken but it will be ensured that precautionary measures will be adopted prior to start the activity, during the activity and post activity to cause minimum impacts to the environment.

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

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

6.6.3 Where and how the problem should be addressed?

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

6.7 WHYS OF ACHIEVING MITIGATION MEASURES

6.7.1 Changing in planning and design:

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

6.7.2 Improved monitoring and management practices:

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

6.7.3 Compensation in money terms:

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

6.7.4 Replacement, relocation and rehabilitation:

Subject project site is the property of the proponent, there is no need of replacement or relocation of a single person or economic activity. Management will develop Restoration/ reclamation or tree plantation plan to restore the project area after the construction phase of the project.

CHAPTER # 7

7 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

The primary objectives of the EMMP are to:

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

7.1 INSTITUTIONAL CAPACITY

The overall responsibility for compliance with the environmental management plan rests with the project proponent. He will appoint a HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage all HSE conditions at the PEQS.

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

Following functionaries will be involved in the implementation of EMP:

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

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

7.2 TRAINING SCHEDULE

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

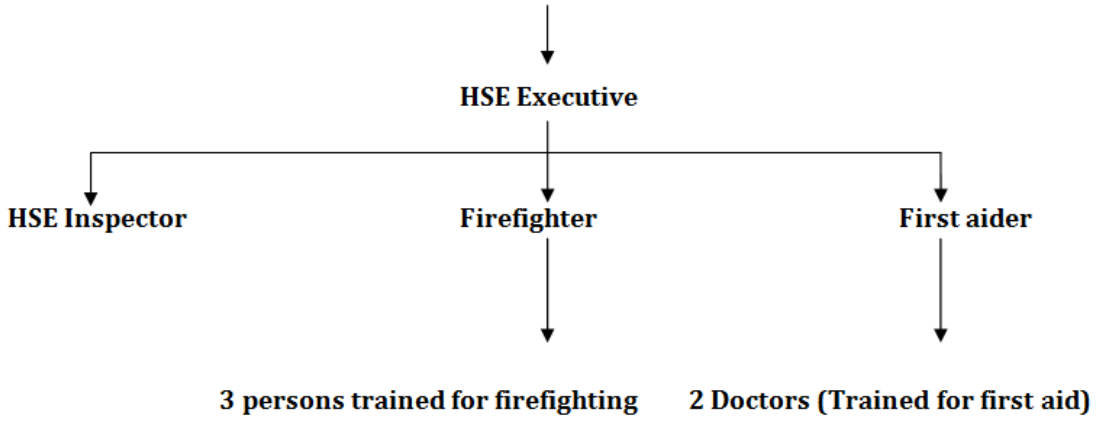

Figure 22: Institutional Capacity for the implementation of EMP

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

Table 12: Training Program

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

In order to raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. HSE/Project Manager should play a key role in this respect and arrange the training programs. HSE/Project Manager will provide training to staff and workers about the best environmental management practices at the construction site and affective implementation of the EMMP. The training modules will include air, noise and water pollution monitoring, social awareness, Environmental Laws, Punjab Environmental

Quality Standards (PEQS), Usage of personal protection equipment's, and health and safety related issues on the construction site.

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

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

7.2.1 TRAINING OF BUILDING CONTRACTOR

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

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

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

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

7.3 SUMMARY OF IMPACTS AND THEIR MITIGATION MEASURES

Table 13: Summary of Impacts and their Mitigation Measures

Impacts	Mitigation Measures
Project Location	
• Acquisition of land • Loss of environmentally sensitive areas • Changes in traffic pattern • Potential conflicts with stakeholders • Resettlement issues	✓ There is not any sensitive area near the project site. ✓ Many other industries are also working near the project site. ✓ The project proponent will achieve the PEQS at the boundary walls of the subject project to avoid the environmental impacts on the nearby industrial unit. ✓ There is no need to change the traffic pattern due the development of the subject project because few industries have been developed at the same road. ✓ It is recommended to settle the issues through scoping and specific group discussions. ✓ No resettlement issues. ✓ It is recommended for obtaining of approval from other relevant departments.
Project Design	
• Soil structure and soil bearing capacity • Road infrastructure design • Emergency exits • Firefighting system • Wastewater disposal system design • Electricity hazards	✓ Safe road infrastructure design should be provided at the project site. ✓ Emergency exit points should be marked at the project site. ✓ Firefighting equipment must be maintained at the site in good working condition to cope with any emergency situation. ✓ Efficient wastewater disposal system should be designed for proper treatment of wastewater. ✓ Electricity system should be designed safe and sound.
Construction and Operation phase	
Land & Soil	

• Land or Soil Erosion during the construction phase • Habitat destruction • Scarring of the landscape and aesthetic beauty. • Clearing of native plants will disturb the complexity of the ecosystem of the proposed area. • Leakage of oil from storage area may contaminate soil	✓ Sprinkling of water is recommended ✓ After construction phase, the project proponent will restore the land by plantation. ✓ All spoils will be disposed of as desired and the site will be restored back to its original conditions ✓ Aesthetics of the area will be maintained. ✓ Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall and away from any potential source of fire
Air pollution and Dust emission	
• The transportation of the project machineries and material also may cause dust. • Un-metaled roads may cause dust. • Dust raised on dirt tracks by project-related vehicles. • Dust from drilling of deep holes. • Combustion products from vehicles used for project-related activities	✓ Air emissions controlled devices must be installed to control the air pollution. ✓ Water the construction site periodically to minimize fugitive dust generation while laying foundation. ✓ Store all construction materials in a manner to minimize generation of dust and spillage on roads. ✓ During excavation works drop heights will be minimized to control the fall of materials reducing dust escape. ✓ Sprinkling of water must be done to control the dust or PM ✓ Vehicle emissions inspection should be done on regular basis ✓ Sprinkling should be done on the unpaved area to avoid dust pollution/ particulate matter. ✓ Vehicles/ trucks should be serviced regularly ✓ All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.

Noise	
• The major sources of the noise at proposed project site are project related machinery. • High noise level cause hearing loss, deafness, high blood pressure, headache, depression and mental disturbance. • Noise level will not exceed 75 dB(A) at the distance of 2 km radius, activity site is located at a safe distance from the nearest human settlement . • Noise from construction activities from site preparation, earth works, foundation and plant equipment installation	✓ Personal Protective Equipment PPEs including Ear muffs, Ear plugs and other noise abating equipment will be provided to the workers and other staff of the subject project. ✓ Proper maintenance and tuning of the vehicles should be done. ✓ Sound proof room should be built for generator (if any) to control the noise. ✓ A speed restriction of 40 km/h will be imposed on all construction vehicles.
Waste Water	
• Domestic waste water from the camp • Minor generation of waste water from construction activity. • Water Contamination due to improper storage of construction material, • Water contamination due to improper debris disposal, • Spread of diseases, underground water contamination.	✓ Domestic waste water will be drained out into industrial drain after treated in wastewater treatment plant. ✓ Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall.

Solid waste	
• Solid waste may generate from construction activity, domestic and packing material of project related machineries. • Solid waste may generate from operation of project.	✓ A solid waste management division should be formulated to deal with the proper disposal of solid waste, supervised by HSE Manager, SW Manager, and other related personnel. ✓ Solid waste generated from the construction activity as sand, stones residues etc. that should be utilized in restoration of the quarry area whereas solid waste from the domestic sources should be disposed of properly ✓ Proper solid waste management system is recommended for each individual industrial unit. ✓ Industrial ecology practices will be adopted wherever possible. ✓ 7 R's of sustainability is recommended ✓ Sludge will be removed and dispose of in scientific way. ✓ Solid waste related to the operation will also manage in scientific way.
Health and Safety	
• Health and safety issues will be arose during construction activity, handling of material, machinery and improper practices of work • Health and safety issue may arise during regular operations	✓ Use of PPEs should be implemented at workplace. ✓ First aid measures/medical facility should be provided to project related employees. ✓ Safe drinking water must be provided to workers, staff, and poor people of the area. ✓ Water consumption records should be maintained. ✓ Safety signs & boards should be placed at during construction activity. ✓ Construction site should be fenced properly to avoid any damage to nearby settlements. ✓ Smoking or any drugs should be prohibited during working hours or performing work. ✓ At the time of earthwork, fencing will be ensured for the area under the exploration.

7.4 EQUIPMENT MAINTENANCE DETAIL

The proponent of the subject project will maintain records for Health, Safety & Environment and will hire Environmental / unit manager to check and deal with the unit issues.
All mobile equipment is to be inspected and maintained according to the following Equipment Inspection Schedule as a minimum. Records of all inspections and maintenance are completed and maintained for review and approval.

Maintenance of equipment, release of lubrication fluids, etc., is performed only in approved areas. Spills and leaks from equipment are cleaned up promptly.

Table 14: Equipment Inspection Detail

Type of Equipment	Type of Inspection	Schedule
Cranes – Crawler, Truck, Hydraulic, etc.	Complete inspection and certification	Before put to work and annually
	Critical items, controls, overall functioning	Daily
	Safety device, hooks, cables, electrical	Monthly
	Complete inspection	Every 3 months
	Repair	When failure occurs
	Preventative maintenance	Manufacturer's recommendation
Heavy Equipment	Complete inspection	Before put to work
Dozers, Backhoes	Complete inspection	Every 3 months
Compactors, Trucks	Repair	When failure occurs
	Preventative maintenance	Manufacturer's recommendation
	Operator's checklist	Daily
Miscellaneous	Complete inspection	Before put to work
Compressors, Welding Machines, Generators	Complete inspection	Every 3 months
	Repair	When failure occurs
	Preventative maintenance	Manufacturer's recommendation

7.5 ENVIRONMENTAL BUDGET

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

Table 15: Allocation of Environmental Budget

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

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

7.6 ENVIRONMENTAL MANAGEMENT PLAN FOR JOTUN POWDER COATING (PVT.) LTD.

Table 16: Environmental Management Plan

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

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

			Air quality was conducted by EPA certified lab and results are attached with this report.		
Noise & Vibration					
4	Noise	The major sources of the noise at site are project related machinery. High noise level cause hearing loss, deafness, high blood pressure, headache, depression and mental disturbance. Noise level will not exceed 75 dB (A) at the distance of 2 km radius, project site is located at a safe distance from the nearest human settlements. Noise from construction activities from site preparation, earth works, foundation and plant equipment installation.	Personal Protective Equipment PPEs including Ear muffs, Ear plugs and other noise abating equipment will be provided to the workers and other staff of the subject project. Proper maintenance and tuning of the vehicles should be done. Sound proof room should be built for generator (if any) to control the noise. A speed restriction of 40 km/h will be imposed on all construction vehicles. Regular monitoring is recommended by EPA certified lab to check the compliance with PEQS. Noise level monitoring was conducted at different location and results are attached as Annexure-J with the report.	HSE department	Environmental Consultant
Soil Contamination					
5	Soil contamination	Contamination of soil due to oil and other chemicals leakage or spillage Soil contamination due to waste water generated from the project activities	SOPs will be developed for the storage of oil and other chemicals handling and transportations. Soil contamination must be controlled by adopting mitigation measures such as storage of oil, fuels etc. under paved area, by maintaining leakage record of construction vehicles, and by	HSE Department	Environmental Consultant

			regular inspection (admitted by proponent). Waste water treatment facilities should be installed during construction and operational phases of the project to treat the wastewater. Water from the treatment facility must not be injected into the sub soil. Tarpaulin sheets should be placed under generators and other leaching substances Treated water will be used for plantation. Proper storage of oil, fuel etc. is recommended under paved area.		
Health and safety					
6	Health and safety	Health & safety issues of workers and nearby community	Trainings of the workers is recommended for health & safety, first aid and firefighting. Proponent must provide First aid facilities to workers in case of any injury or accident. Safe drinking water must be provided to workers, staff, and poor people of the area. Water consumption records should be maintained. Provision of Proper PPEs must be ensured at workplace. Assembly point and exit points must be available at workplace. Electric wires, D.Bs must be kept covered & closed to avoid any electric hazards. Smoking or any drugs should be prohibited	HSE Department	Environmental Consultant

			during working hours or performing work. Safety signs & boards will be placed at the time of construction activity. Security guards will be appointed at the construction site. At the time of construction and earthwork, fencing will be ensured for the area under the exploration. Further proper housekeeping and safety arrangements must be ensured at the subject project.		
Waste Water					
7	Waste water	Minor generation of waste water from construction activity. Water Contamination due to improper storage of construction material, Water contamination due to improper debris disposal, Waste water pollution, Spread of diseases, underground water contamination	Waste water generated from the constructional activity will be used as sprinkling on the dusty tracks or for restoration of the land. Waste water monitoring is recommended on regular basis. Waste water treatment facility is recommended for each individual industry to treat waste water. After the treatment in wastewater treatment facility, water will be disposed of in the wastewater collection system present at the project site.	HSE department	Environmental Consultant
Solid waste generation					
8	Solid Waste	Land & soil contamination,	A solid waste management division will be	HSE Department	Environmental

	Generation	aesthetic degradation, foul smell etc. Solid waste generation from the construction activity, domestic and project process sources	formulated to deal with the proper disposal of solid waste, supervised by HSE Manager, SW Manager, and other related personnel. Constructional waste must be utilized for road filling or maintenance purposes. Recycling of material should also be implemented up to possible extent. Existing Project related solid waste should be handed over to contractors. Sludge from the wastewater treatment plant must be replaced on regular basis. It is recommended to ensure Proper housekeeping. It is recommended to adopt proper waste management system. Industrial ecology practice will be adopted wherever applicable and possible. 7 R's of sustainability is recommended.		Consultant/ EPA PUNJAB
Odor					
9	Odor	There will be no source of odor from the both construction and operation of the project	Nil	NA	
Energy requirement					
10	Energy requirement	Resource depletion	Do not waste the energy/electricity when there is no need of it.	HSE Department	Environmental Consultant

			Use energy efficient machinery and equipment Use energy saving products Conduct and maintain records for energy audits Do not leave the machinery in running form when there is no working being done Machinery must never be left unattended It is recommended to save and conserve the energy and adopt energy efficient technologies during the construction phase		
Socio economic impacts					
11	Resettlement	Resettlement issues	The proposed area under the investigation is devoid-off any human settlement and it is the property of the government.	NA	NA
12	Language	Change in cultural language	Maximum employment of Local people is recommended to preserve the local cultural language. It will help in communication with the local people to resolve any emerging issue near the project area	Proponent	NA
13	Education	Change in social behavior and economic gains	School and colleges exist in the area. The project proponent will initiate an educational awareness program with the coordinator of the local people.	Proponent	NGO survey
14	Health	Social performance of the individuals in the area	The project proponent will assist the local impacted community for the improvement of health services Health clinic must be established for the project	Proponent	Proponent

			workers.		
15	Culture and norms of the area	Change in culture by the influx of nomadic people	Maximum local employment should be ensured to preserve the culture of the area	Proponent	NGO survey/Environmental Consultant
16	Sewage and waste disposal	Diseases caused by improper sanitation	Subject project will uplift the economic status of the nearest human settlements. Awareness program will be initiated regarding the disposal of waste.	Proponent/ local NGO	NGO survey/ Environmental Consultant

7.7 PROPOSED ENVIRONMENTAL MONITORING

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

Table 17: Environmental Monitoring

Sr. No.	Parameters	Monitoring Schedules	Monitoring Duration
1	Ambient Air Monitoring (NOx, COx, SOx, PM_{10})	Quarterly	24 Hours
2	Noise Level	Quarterly	24 hours
3	Water quality	Quarterly	Some parameters on site, Others in lab

CHAPTER # 8

8 CONCLUSION & RECOMMENDATIONS

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

8.1 CONCLUSION

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

8.2 RECOMMENDATIONS

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

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

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

REFERENCES:

- https://www.epa.gov/sites/production/files/2015-10/documents/njmc-wpp-2.pdf
- Schedule I of Punjab Environmental Protection Act 1997 (Amended 2012)
- *section 12 of Punjab Environmental Protection Act 1997 (Amended 2012)*
- Pakistan Environmental protection act 1997
- Punjab Environmental Protection Act 1997 (Amended 2012)
- Guideline for the Environmental Assessment
- Regulations of Environmental Assessment, Regulations 2000
- National Conservation Strategy- Pakistan
- Guideline for the public consultation
- National Resettlement Policy and Ordinance
- National Environmental Quality Standards (Self-monitoring and reporting by the industry)
- Labor laws
- Canal And Drainage Act, 1873
- National Environmental Policy 2005.
- The Land Acquisition act, 1894
- The Punjab local Governmental ordinance, 2001.
- Meteorological data from meteorological department and website
- Pakistan Biosafety rules 2005
- Pakistan Environmental agency (review of IEE/EIA) regulation 2000.
- Punjab Portal (http://www.punjab.gov.pk/attock)
- Attock Chamber of Commerce Industries (http://www.acci.org.pk/Attock.html)
- Sectorial Guideline for environmental reports, industrial states
- Pakistan Environmental Protection ordinance (PEPO), 1983
- OSHAS 1800 for health and safety

GLOSSARY

Words	Dictionary
mitigation	The action of lessening in severity or intensity
legislation	law enacted by a legislative body
compliance	Acting according to certain accepted standards
flora	All the plant life in a particular region or period
fauna	All the animal life in a particular region or period
demarcated	Separate clearly, as if by boundaries
Screening	The display of a motion picture
substitutions	An event in which one thing is substituted for another
regulations	An authoritative rule
stakeholders	A person or organization with an interest or concern in something
vulnerable	Susceptible to attack