PROPOSED PROJECT

Construction/Installation of Petroleum Storage (I.E. STYRENE MONOMER, METHYL ETHYL KETONE PEROXIDE, DIMETHYL PARA TOLUIDINE, AMINE A-1, PMDETA, PMCHA, PMEA, BDMA, DMAPA, CATALYST K-15 AND AMINE-33) by Name & Style by M/s Matrix Chemical Industries Private Limited Located at Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697, 698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore.

PROPONENT

M/s Matrix Chemical Industries Private Limited

Mr. Nasim Uz Zafar Burney

CONSULTANT

Environmental Services Pakistan Private Limited

Contact Person: Mr. Imran Malik (General Manager)

Contact No: +92 312-0839999

Email ID: info@espak.com.pk

Website: www.espak.com.pk

EXECUTIVE SUMMARY

INTRODUCTION

This executive summary presents an overview of the main findings of the Environmental Impact Assessment Report for the construction/Installation of Petroleum Storage (I.E. STYRENE MONOMER, METHYL ETHYL KETONE PEROXIDE, DIMETHYL PARA TOLUIDINE, AMINE A-1, PMDETA, PMCHA, PMEA, BDMA, DMAPA, CATALYST K-15 AND AMINE-33) Name & Style by M/s Matrix Chemical Industries Private Limited. The primary objective behind the construction of the Petroleum Storage unit is likely to meet the increasing market demand for storage and distribution facilities for petroleum products. This objective stems from the opportunity to capitalize on the growing industrial activities, urbanization, and infrastructure development in the region, thereby expanding the owners' business operations strategically while ensuring compliance with regulatory standards for safe storage and handling.

For this instance, Environmental Impact Assessment of the project has been conducted in accord with the Punjab Environmental Protection Act, 1997 and IEE/EIA Regulations 2022. The process for conducting environmental assessment and the results of EIA is described in this document.

SALIENT FEATURES OF PROJECT:

1.	Project Title	Construction/Installation of Petroleum Storage (I.E. STYRENE MONOMER, METHYL ETHYL KETONE PEROXIDE, DIMETHYL PARA TOLUIDINE, AMINE A-1, PMDETA, PMCHA, PMEA, BDMA, DMAPA, CATALYST K-15 AND AMINE-33) by Name & Style M/s Matrix Chemical Industries Private Limited
2.	Project Location	Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697, 698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore
3.	Storage Capacity	Total Storage Capacity of Petroleum Product is 129,560.96 LTRS
3.	Proponent	Nasim Uz Zafar Burney
4.	Consultant	Environmental Services Pakistan
5.	Total Area of Project	Approx. 36026.88 SFT
9.	Present status of Land Use	Barren Plot
10.	Cost of Project	500 Million
15.	Status of Project	Pre-Construction Phase

PROJECT OBJECTIVES

The Construction/Installation of Petroleum Storage(I.E. STYRENE MONOMER, METHYL ETHYL KETONE PEROXIDE, DIMETHYL PARA TOLUIDINE, AMINE A-1, PMDETA, PMCHA, PMEA, BDMA, DMAPA, CATALYST K-15 AND AMINE-33) at Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697, 698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore is driven by various objectives, including meeting the growing market demand for storage and distribution facilities for petroleum products, expanding their business operations strategically,

improving logistics efficiency through dedicated storage infrastructure, ensuring compliance with regulatory requirements for safe handling and storage, enhancing competitiveness by offering superior storage solutions and reliable supply to customers, mitigating risks associated with storing hazardous materials, and fulfilling corporate social responsibility goals by contributing to the local economy.

Site Alternatives

No site alternatives were considered as the proposed land is inherited land by proponent and best possible place for commercial activities. This site is chosen because site is well located in regard to the following:

- Easy access
- No settlements in close vicinity
- No ecologically sensitive or declared protected area
- No historical, educational or religious site nearby
- No vegetation at the selected site

As no important religious, archaeological, historical or recreational site, or any other ecologically sensitive, declared protected area or poor population exists within close vicinity of the selected site. In view of these facts, it can be concluded that the Selected Site is best suited for the project and will not pose any adverse impact or threat on any component of the environment and will not disturb ecology.

Economic Alternative

The immediate economic benefits of the proposed project are a generation of employment opportunities and revenue. The direct and indirect jobs creation will occur in a broad range of industries such as construction services, repair and maintenance, electricity supply, hardware and building supplies retailing, motor vehicle and parts retailing, water supply, sewerage and drainage services, waste collection, treatment and disposal services, gas supply, rental and hiring services, garden supplies retailing, cleaning and janitorial, pest control, printing, etc.

Direct Job Creation: The project timeline is of three years, which means that the project will create multiple jobs.

Environmental Alternative

The proposed project site is located in an urban area. There may be potential environmental and human health impacts of the proposed project during the construction phase of the project. However, the proposed project will have an efficient solid waste management system, and features of the eco-friendly building, such as the use of energy-efficient items, have been planned.

Considering the environmental protection measures to be taken during the construction and operational phase of the project and the sustainable features of the proposed project, it can be implied

that the proposed project will enhance the environment of the project area during the operational phase of the project especially when looking at the alternatives to the project.

SCREENING

Section 12 of Punjab environmental protection act, 1997 amended (2017) states "No proponent of project shall commence construction or operation unless he has filed with the government agency designated by Federal Environmental Protection Agency or provincial agencies, as the case may be or, where the project is likely to cause and adverse environmental effects an environmental impact assessment (EIA), and has obtained from the government agency approval in respect thereof." PEPA act provided the guidelines for categorizing the projects.

The Proposed Project; i.e., The construction/Installation of a Petroleum Storage (I.E. STYRENE MONOMER, METHYL ETHYL KETONE PEROXIDE, DIMETHYL PARA TOLUIDINE, AMINE A-1, PMDETA, PMCHA, PMEA, BDMA, DMAPA, CATALYST K-15 AND AMINE-33) Name & Style by M/s Matrix Chemical Industries Private Limited falls under Schedule-II, Category A (5), "Oil & Gas Extraction Projects including Exploration, Production, Gathering Systems, Separation & Storage", i.e., the project requires an EIA study. Thus, and EIA report is being prepared and submitted accordingly for approval.

ENVIRONMENTAL CONSULTANT

An Environmental Impact Assessment (EIA) study report has been prepared to identify and predict the significant environmental impacts likely to arise from the commencement of the Proposed Project, along with environmental impact statement followed by delineation of appropriate Environmental Management Plan and Environmental Monitoring Plan to have a control over the adverse environmental impacts and to check the efficiency and effectiveness of the mitigation measures being implemented. For the purpose of this EIA, and to get Environmental Approval from Environmental Protection Agency (EPA) Punjab, management of M/s Matrix Chemical Industries Private Limited has decided to engage the services of Environmental Consultant, M/S Environmental Services of Pakistan (ESPAK).

SCOPING

'Scoping' stage defines key issues that should be included in the Environmental Assessment and determines the scope, depth and Terms of Reference for the EIA study. This is a very important step both in identifying the impacts and identifying scope of the EIA. Effective scoping enables:

- Defining the boundary of the EIA study
- Consulting with relevant stakeholders to identify full range of concerns
- Focusing on key issues that characterize the existing environment in the baseline studies
- Reviewing the types of alternatives to be considered

Several groups, particularly decision makers, the local population and the scientific community, have an interest in helping to deliberate the issues which should be considered, and scoping is designed to canvass their views.

Scoping is important for two reasons; first, that problems can be pinpointed early allowing mitigating design changes to be made before expensive detailed work is carried out, and second, to ensure that detailed prediction work is only carried out for important issues. Scoping is an ongoing exercise throughout the course of project. Methodologies for scoping may range from interviews to use of checklists, matrices and network diagrams for visualization of sources and receptors of impacts and identifying which of these impacts require attention in the study. These techniques collect and present knowledge and information in a straightforward way so that logical decisions can be made about which impacts are most significant.

PROJECT OUTLINE

The Proposed Project is entitled as "Construction/Installation of Petroleum Storage (I.E. STYRENE MONOMER, METHYL ETHYL KETONE PEROXIDE, DIMETHYL PARA TOLUIDINE, AMINE A-1, PMDETA, PMCHA, PMEA, BDMA, DMAPA, CATALYST K-15 AND AMINE-33) Located at Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697, 698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore''. The proposed project will cover about 36026.88 SFT of land which has already been purchased by the proponent. The primary objective behind the construction/Installation of the Petroleum Storage unit by the owners is likely to meet the increasing market demand for storage and distribution facilities for petroleum products. This objective stems from the opportunity to capitalize on the growing industrial activities, urbanization, and infrastructure development in the region, thereby expanding the owners' business operations strategically while ensuring compliance with regulatory standards for safe storage and handling.

MAJOR IMPACTS AND RECOMMENDED MITIGATION MEASURES:

Keeping in view, all the findings of the baseline study, and through general observation and desktop study, and understanding of the activities and processes involved in the project, environmental impacts have been anticipated. Following impact assessment methodology; i.e., defining the criteria for evaluation of the impacts, identification of mitigation measures (all possible options), evaluation of the residual impacts and identification of the monitoring requirements, adequate and effective mitigation measures have been proposed for all construction and operation related likely environmental impacts of the project. These mitigation measures have been proposed in order of attempts to eliminate or minimize the impact, provide some compensation or rehabilitate the environment by some means.

Weather describes an impact as having both spatial and temporal impacts, which can be described as the change in an environmental parameter over a specified period and within a defined area, resulting

from a particular activity compared with the situation which would have occurred had the activity not been initiated.

Key impacts related to the construction phase include:

- Construction Noise
- Solid Waste
- Soil Contamination
- Air Pollution
- Community and Workers' Safety
- Employment Conflicts

Mitigation measures recommended to be incorporated into the project include running the machines and vehicles on good quality in good working order ensuring regular maintenance, tuning and servicing, and providing them with emission control devices, such as mufflers and silencers, etc. Water suppression and covered transportation and odor of the construction materials and slow driving on unpaved roads will control dust emission. Solid waste of construction activities will be used for flooring, while the remaining solid waste will be managed as per TMA practices in the area. For community safety, irrelevant persons will not be allowed inside. Safety of the workers will be ensured by developing SOPs for all jobs, training the workers to follow SOPs, discouraging any careless attitude of workers and providing the workers with, and encouraging them to use PPEs.

Key impacts related to the operation phase include:

- Noise
- Air pollution
- Safety, Public Health & Nuisances

ENVIRONMENTAL MANAGEMENT & MONITORING PLANS:

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

Environmental impact of a project is worked out using various factors and parameters, so that an Environmental Management Plan can be evolved to take mitigation measures, wherever these might be considered necessary in order of appropriateness of elimination, reduction and compensation as the goals. The development of the EMP is to make some person responsible for implementing the mitigation measures as identified so that smooth implementation of the mitigation measures can be

assured. Monitoring plans have also been included to ensure the compliance of the EMP by contractors and other responsible authorities.

During construction, ambient air quality for dust level in particular, vehicle and equipment exhaust, noise level (tests), solid waste management and soil contamination, and community and workers' safety (visual) need to be monitored. Monitoring Plan has been included in Chapter-6. During operation, noise level, ambient air quality and exhaust of generator, solid waste management and community and workers' safety need to be monitored.

Table 1-1: Environmental Monitoring Plan

Sr. No.	Parameters	Monitoring Schedules	Phase	Monitoring Duration
1	Ambient Air Monitoring	Quarterly	Construction / Operation	As per requirement
2	Noise Level Monitoring	Quarterly	Construction / Operation	As per requirement
3	Water quality testing	Quarterly	Construction / Operation	As per requirement

CONCLUSION

The Initial Environmental Examination contains description of the project, description of the environmental baselines, potential environmental impacts and recommended mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study. While the objectives of this study have been to describe the project and its environmental impact, it also identifies adverse environmental factors associated with the project. Suitable mitigation measures as explained in the environmental study should reduce, if not eliminate, these impacts so that these are within acceptable limits. It is further concluded that all potential environmental concerns associated with the project have been adequately addressed, and no further study is required in this context. The objective of grounding of an environmental study is to identify how the environment is impacted and to suggest mitigating measures to reduce if not totally eliminate adverse effects of a project. It is accordingly recommended that Environmental Approval for the project should be issued by the Punjab Environmental Protection Agency, subject to payment of the requisite scrutiny fee by the proponents of the project.

Glossary

Environmental Management System (EMS):

A set of management process and procedure that allows an organization to analyses and reduce the environmental impacts of its activities. Environmental Monitoring Systematic, geo-referenced observations of the environment essential to detecting changes in ecosystems over time. Environmental Protection Plan (EPP) a practical tool that describes the actions required to minimize environmental effects before, during and after project implementation. The plan may include details about the implementation of the mitigation measures identified in the environmental assessment, such as who is responsible for implementation, where the measures are intended to be implemented, and within what timeframe.

Habitat:

Land and water used by wildlife. This may include biotic and Abiotic aspects such as vegetation, exposed bedrock, water, and topography.

Impact:

Any aspect of a project that may cause an effect; for example, land clearing during construction is an impact, while a possible effect is loss and fragmentation of wildlife habitat. Indirect Effect:

An effect in which the cause-effect relationship (e.g., between the project's impacts and the ultimate effect on a Valued Ecosystem Component) has intermediary effects. As an interaction with another effect is required to have a cumulative effect (hence, creating intermediary effects), cumulative effects may be considered as indirect. Industry Relations Corporation (IRC) The Corporation or organization that a First Nation has created to manage the First Nation’s relations, including Consultation with Alberta, Canada and Industry.

Mitigation:

The elimination, reduction or control of the adverse environmental effects of the project. Mitigation includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

Non-Renewable Resource:

Natural resources that are in fixed supply such as coal, oil and minerals.

Project:

The activity or group of activities proposed by the Proponent. The types of activities that could be subject to Alberta’s environmental assessment process are listed in the

Environmental Protection and Enhancement Act and in the Water Act. The Project includes all associated construction, operation, decommissioning and reclamation activities and all phases of development described by the Proponent. Project Area Project Footprint/Study Area The area includes all lands subject to direct disturbance from the project and associated infrastructure. Project Components The different physical entities and activities that together make up the Project.

Residual Effect:

An effect that remains after mitigation has been applied

Scoping:

An activity that focuses the assessment on relevant issues and concerns and establishes the boundaries of the environmental assessment. A consultative process for identifying and possibly reducing the number of items (e.g., issues, VECs) to be examined until only the most important items remain for detailed assessment. Scoping ensures that assessment effort will not be expended in the examination of trivial effects.

Significance:

A measure of the magnitude, duration, frequency, timing, probability of occurrence, ecological and social context, geographic extent, and degree of reversibility of an effect on a Valued Ecosystem Component

Emission:

One or more substances released to the water, air or soil in the natural environment.

Environment:

Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelations. This definition extends the view from a company focus to the global system.

List of Abbreviation

EMMP	Environment Management and Monitoring Plan
EPA	Environment Protection Agency
EPD	Environmental Protection Department
EIA	Environmental Impact Assessment
IEE	Initial Environment Examination
PEQS	Punjab Environmental Quality Standards
NGO	Non-Government Organizations
NOC	No Objection Certificate
HSE	Health, Safety and Environment
PEPA	Pakistan Environment Protection Act
PEPC	Pakistan Environmental Protection Council
PMD	Pakistan Meteorological Department
RO	Reverse Osmosis
TDS	Total Dissolve Solids
TOR	Terms of Reference
WAPDA	Water and Power Development Authority
WASA	Water and Sanitation Agency
USA	United States of America

Table of Contents

Chapter # 1. Introduction 18

1.1 General 18

1.2 THE PROPOSED PROJECT 18

1.3 PROJECT DESCRIPTION 19

1.4 OBJECTIVES OF PROJECT 20

1.4.1 Meeting Market Demand: 20
1.4.2 Expanding Business Operations: 21
1.4.3 Improving Logistics: 21
1.4.4 Ensuring Compliance 21
1.4.5 Enhancing Competitiveness 21
1.4.6 Risk Management 21
1.4.7 Meeting Corporate Social Responsibility (CSR) Goals: 21

1.5 PURPOSE OF THE STUDY 21

1.6 THE PROPONENT 22

1.7 DETAILS OF CONSULTANTS 22

1.8 LOCATION OF THE PROJECT 22

1.9 IMPACT ASSESSMENT 23

Chapter # 2. SCREENING 25

2.1 SCREENING/TYPE AND CATEGORY OF PROJECT 25

Chapter # 3. SCOPING 26

3.1 TEMPORAL BOUNDARIES 26

3.1.1 Project Initiation 26
3.1.2 Pre-construction Phase 26
3.1.3 Construction Phase 26
3.1.4 Commissioning 26
3.1.5 Operational Launch 27
3.1.6 Ongoing Operations 27
3.1.7 Maintenance and Upgrades 27
3.1.8 Emergency Response Drills 27
3.1.9 Community Engagement 27
3.1.10 Regulatory Compliance Updates 27
3.1.11 Environmental Monitoring 27
3.1.12 Record Keeping and Reporting: 27

3.2 SPATIAL BOUNDARIES 27

3.2.1 Site Layout 28
3.2.2 Storage Area 28
3.2.3 Buffer Zones 29

3.2.4 Safety Features and Emergency Response Zones 29
3.2.5 Administrative and Support Structures 29
3.2.6 Green Spaces and Environmental Considerations 29
3.2.7 Future Expansion Areas 29
3.2.8 Perimeter Security 29
3.3 Significant Concerns Raised during Public Consultation 29
3.4 Significant Impacts Considered during EIA 30
Chapter # 4. CONSIDERATION OF ALTERNATIVES 31
4.1 SITE ALTERNATIVES 31
4.2 TECHNOLOGY ALTERNATIVES 31
4.3 ENVIRONMENTAL ALTERNATIVES 31
4.4 Green Building Design: 31
4.5 Containment and Spill Prevention: 32
4.6 Advanced Monitoring and Reporting: 32
4.7 Stormwater Management: 32
4.8 Hazardous Waste Management: 32
4.9 Community Engagement and Outreach: 32
4.10 ECONOMIC ALTERNATIVES 32
Chapter # 5. DESCRIPTION OF ENVIRONMENT 34
5.1 Physical Environment: 34
5.1.1 Topography 34
5.2 Land Use 34
5.3 Geology and Soils 34
5.4 Seismology 36
5.5 Climate 37
5.6 Water Resources 38
5.6.1 Surface Water 38
5.6.2 Ground Water 38
5.7 Ecological Environment 39
5.7.1 Flora 39
5.7.2 Fauna 39

5.8 Socioeconomic Environment: 39

5.8.1 General 40
5.8.2 Demographics 40
5.8.3 Public Transport 40
5.8.4 Railways 40

5.9 Industrial Importance 40

5.10 Environmental Parameters for Monitoring 41

5.10.1 Air Quality 41
5.10.2 Noise Level 41
5.10.3 Drinking / Ground Water Quality 41
Chapter # 6. IMPACT ASSESSMENT 42

6.1 METHODOLOGIES FOR IMPACT IDENTIFICATION 42

6.1.1 PROJECT IMPACT EVALUATION MATRIX 42

6.2 IMPACT ANALYSIS AND PREDICTION 47

6.3 CONSULTATIONS/ CASE STUDIES 47

6.4 MEETINGS 47

6.5 CHARACTERISTICS OF IMPACTS 47

6.5.1 Impact assessment criteria 48
6.5.2 Potential Positive Impacts 48
6.5.3 Economic benefits: 48
6.5.4 Potential Negative Impacts: 48

6.6 IMPACT SIGNIFICANCE 50

6.6.1 Ecological importance Natural Vegetation 50
6.6.2 Fauna 51
6.6.3 Social importance 51
6.6.4 Cultural Issues 52
6.6.5 Accident risks 52
6.6.6 Privacy Issues 53
6.6.7 Noise Problems 54
6.6.8 Mobilization issues 54
6.6.9 Health 55
6.6.10 Land Acquisition Resettlement 56
6.6.11 Changes in Land Use 57

6.7 Assessment of Impact 58

6.7.1 Dust Emissions: 58
6.7.2 Gaseous Emissions 58
6.7.3 Noise level 59
Chapter # 7. ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM 61

7.1 GENERAL 61

7.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN 61
7.3 MANAGEMENT APPROACH 61
7.4 Institutional Capacity 61
7.5 ENVIRONMENT MANAGEMENT PLAN 62
7.6 ENVIRONMENT MONITORING PLAN 82
7.6.1 Proposed Environmental Monitoring 82
7.7 HSE Management Plan 83
7.8 Traffic Management and Construction Material Transportation Plan 86
7.9 Emergency Preparedness, Response and Site Evacuation Plan 86
7.10 Training Program 87
7.11 ENVIRONMENT BUDGET 89
Chapter # 8. Stake holder and public consultation 90
8.1 Consultative Aspect 90
8.2 Identification of Main Stakeholders 91
8.3 Meetings with Stakeholders 92
8.4 Analysis of Stakeholder Consultation 92
8.4.1 Sample Size 92
8.4.2 Statistical Analysis 92
8.4.1 Result and Discussion 93
8.5 Pictures Stakeholder Consultation with Baseline Monitoring 94
8.6 Analysis of Stakeholder Consultation 98
8.7 Summary of Issues Raised by Stakeholders 100
Chapter # 9. CONCLUSION AND RECOMMENDATIONS 103
9.1 CONCLUSION 103
9.2 RECOMMENDATIONS 103

LIST OF TABLES

Table 1-1: Environmental Monitoring Plan 8
Table 1-1: List of Experts 22
Table 3-1: Consultation for Scoping 30

Table 5-1: Probabilistic Ground Acceleration (PGA) Values of Seismic Zones of Pakistan 36
Table 5-2: Details of temperature 38
Table 7-1: Environmental Management Plan (Construction Phase) 63
Table 7-2:Environmental Management Plan (Operational Phase)..... **Error! Bookmark not defined.**
Table 7-3: Environmental Monitoring 82
Table 7-4: Estimated Cost for the Implementation of Environmental Monitoring Plan 84
Table 7-5: Framework for Environmental Social Training Program 88

LIST OF FIGURES

Figure 1-1: Layout Plan 19
Figure 1-2: Proposed Location (31°50'10.76"N, 73°39'6.68"E) 23
Figure 5-1: Seismic Map of Pakistan 37

LIST OF ANNEXURES

CHAPTER # 1.

INTRODUCTION

1.1 General

In response to the dynamic landscape of industrial growth and evolving market demands, M/S Matric Chemical Industries Private Limited. proposes the establishment of a state-of-the-art i.e. Petroleum Storage Unit by M/s Matrix Chemical Industries Private Limited. Situated at Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697, 698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore, this project endeavors to address the burgeoning need for safe and efficient storage and distribution facilities for Petroleum Products (D.P.L) in the region. With a strategic focus on enhancing operational capabilities, meeting regulatory compliance, and contributing to sustainable business practices, this project embodies [M/s Matrix Chemical Industries Private Limited]'s commitment to excellence in the petroleum industry. Through meticulous planning, advanced infrastructure, and adherence to environmental and safety standards, the Petroleum Storage Unit aims to serve as a cornerstone for reliable and responsible petroleum product storage, facilitating economic growth while prioritizing the well-being of the community and the environment.

Ensuring the highest standards of safety and regulatory compliance, the unit will be equipped with cutting-edge infrastructure designed to meet the demands of an evolving energy landscape. The selected location not only adheres to stringent safety criteria but also strategically positions the facility for efficient distribution networks, contributing to the accessibility of our product to a broader market.

As we embark on this construction project, our commitment extends beyond mere infrastructure development. Environmental sustainability, community engagement, and adherence to the highest industry standards will be integral components of our approach. We recognize the importance of fostering positive relationships with the local community and are dedicated to implementing robust safety measures to safeguard both our workforce and the surrounding environment.

1.2 THE PROPOSED PROJECT

The Proposed Project is entitled as “Construction/Installation of Petroleum Storage Unit at Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697, 698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore’’

1.	Project Title	Construction/Installation of Petroleum Storage (I.E. STYRENE MONOMER, METHYL ETHYL KETONE PEROXIDE, DIMETHYL PARA TOLUIDINE, AMINE A-1, PMDETA, PMCHA, PMEA, BDMA, DMAPA, CATALYST K-15 AND AMINE-33) by Name & Style by M/s Matrix Chemical Industries Private Limited.
2.	Project Location	Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697, 698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore
3.	Nos of Storage Tanks and storage capacity	There is total eleven storage tanks for the different petroleum product with the total capacity of 129,560.96 LTRS.
3.	Proponent	Nasim Uz Zafar Burney
4.	Consultant	Environmental Services Pakistan
5.	Total Area of Project	Approx. 36026.88 SFT
9.	Present status of Land Use	Barren Plot
10.	Cost of Project	500 million
15.	Status of Project	Pre-Construction Phase

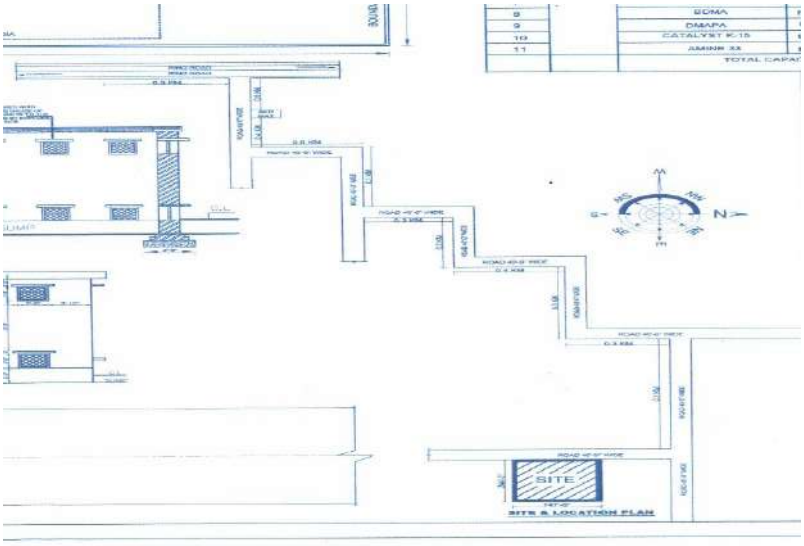


Figure 0-1: Site Location Plan

1.3 PROJECT DESCRIPTION

The proposed Petroleum Storage Unit by M/s Matrix Chemical Industries Private Limited with the Capacity of 95248 LTRS for the N-Methylaniline & 21594 LTRS storage capacity for the Petroleum Dyes & Fuel Additives Located at Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697,

698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore

This facility will serve as a central hub for the storage, handling, and distribution of various petroleum products, catering to the increasing market demand in the region. The unit will feature advanced infrastructure and state-of-the-art equipment to ensure safe and efficient storage practices, adhering to stringent regulatory standards. Additionally, the project will incorporate measures for environmental sustainability and community safety, aiming to minimize environmental impact and mitigate potential risks associated with the handling of materials. Through strategic planning and meticulous execution, the Petroleum Storage project seeks to establish itself as a reliable and responsible partner in the petroleum industry, fostering economic growth while prioritizing safety, efficiency, and environmental stewardship.

The project will progress through distinct phases, including pre-construction activities, construction, commissioning, and ongoing operations. Each phase is meticulously planned to ensure the timely and successful completion of the Petroleum Storage.

1.4 OBJECTIVES OF PROJECT

The Construction/Installation of Petroleum Storage Unit Located at Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697, 698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore by the owners is driven by various objectives, including meeting the growing market demand for storage and distribution facilities for dangerous petroleum products, expanding their business operations strategically, improving logistics efficiency through dedicated storage infrastructure, ensuring compliance with regulatory requirements for safe handling and storage, enhancing competitiveness by offering superior storage solutions and reliable supply to customers, mitigating risks associated with storing hazardous materials, and fulfilling corporate social responsibility goals by contributing to the local economy and adhering to environmental and safety standards. Here are some common objectives behind such a project: To ensure the safety of personnel and the surrounding environment, the project will be equipped with fire hydrant points strategically located near the underground water tanks. Additionally, comprehensive emergency response protocols will be established to address any potential incidents, including spills, leaks, or other environmental emergencies.

1.4.1 Meeting Market Demand:

The owners may aim to fulfill the increasing demand for storage and distribution facilities for petroleum products in the region, driven by industrial growth, urbanization, and infrastructure development.

1.4.2 Expanding Business Operations:

Construction of the Petroleum Storage Unit could be part of the owners' strategic plan to expand their business operations in the petroleum sector, tapping into new markets or enhancing their existing supply chain network.

1.4.3 Improving Logistics:

By establishing a dedicated storage facility, the owners can streamline their logistics operations, ensuring efficient handling, storage, and distribution of petroleum products to customers, thereby enhancing overall operational efficiency.

1.4.4 Ensuring Compliance

The owners may seek to comply with regulatory requirements mandating safe and secure storage and handling of dangerous petroleum products, mitigating potential risks to public safety and the environment.

1.4.5 Enhancing Competitiveness

Investing in modern storage infrastructure can enhance the owners' competitiveness in the market by offering superior storage solutions, reliable supply, and value-added services to customers, thereby consolidating their market position.

1.4.6 Risk Management

Constructing a dedicated storage facility allows the owners to mitigate risks associated with storing petroleum products, such as minimizing the risk of accidents, spills, or environmental contamination through proper containment and safety measures.

1.4.7 Meeting Corporate Social Responsibility (CSR) Goals:

The project may align with the owners' CSR objectives by contributing to the local economy through job creation, infrastructure development, and adherence to environmental and safety standards.

These objectives collectively reflect the multifaceted goals of constructing an Petroleum Storage Unit, encompassing economic, environmental, safety, and community-focused considerations. The successful achievement of these objectives contributes to the overall success and sustainability of the project.

1.5 PURPOSE OF THE STUDY

The EIA Study has been conducted to identify the possible positive and negative environmental impacts of the proposed project as presently envisaged and propose mitigation measures to be

implemented during Preconstruction, Construction and operational phases of the project in order to eliminate or minimize the identified adverse impacts on the environment to an acceptable level and prepare environmental management and monitoring Plans and submit the EIA study report for obtaining Environmental Approval from Punjab EPA.

1.6 THE PROPONENT

M/s Matrix Chemical Industries Private Limited

Contact Person: Nasim Uz Zafar Burney

Designation: CEO

1.7 DETAILS OF CONSULTANTS

For the preparation of the EIA Report of this Proposed Project, the proponent has hired the services of the environmental consultants; **M/s Environmental Services Pakistan (ESPAK).** Team comprising of environmental scientists, environmental engineers, and sociologists has worked on this report. The following table lists the names of those experts:

Table 0-1: List of Experts

Sr. No.	Team Member	Position Held	Qualifications
a)	Shagufta Tahir	Environmentalist	M.Phil. Environmental Sciences
b)	Ali Ramzan	Environmentalist	B.S Environmental Sciences
c)	Asma Akram	Environmentalist	M.S Environmental Science
d)	Aruba Imran	Reporting Officer	BS Environmental Science
e)	Irsa Aslam	Reporting Officer	BS Environmental Science
f)	Shahzad Ahmad Khan	Business Development Manager	MBA Marketing

1.8 LOCATION OF THE PROJECT

The proposed project will be located at

The required land is 36026.88 SFT that is available for the proposed project.

Figure 0-2: Proposed Location (31°38'09.6"N 74°26'00.3"E)

1.9 IMPACT ASSESSMENT

The environmental and socio-economic features and other project information collected, is used to assess the potential impacts of the activities. The issues studied include potential project impacts on:

1. Geomorphology
2. Meteorology
3. Groundwater
4. Soil quality
5. Ambient air quality & noise level
6. The ecology of the area, including flora and fauna
7. Local communities

Wherever possible and applicable, the discussion covers the following aspects:

- The potential change(s) in environmental parameters likely to be affected by project related activities
- The identification of potential impacts
- The evaluation of the likelihood and significance of potential impacts
- The defining of mitigation measures to reduce impacts to as low as practicable
- The prediction of any residual impacts, including all long-term and short-term, direct and indirect, and beneficial and adverse impacts

- The drafting of monitoring arrangements of residual impacts
- The management of qualitative and quantitative impacts to avoid adverse environmental effects
- Providing environmental management plan to bring down all these impacts

CHAPTER # 2.

SCREENING

2.1 SCREENING/TYPE AND CATEGORY OF PROJECT

Section 12 of Punjab environmental protection act, 1997 amended (2017) states "No proponent of project shall commence construction or operation unless he has filed with the government agency designated by Federal Environmental Protection Agency or provincial agencies, as the case may be or, where the project is likely to cause and adverse environmental effects an environmental impact assessment (EIA), and has obtained from the government agency approval in respect thereof." PEPA act provided the guidelines for categorizing the projects.

The Proposed Project; i.e., The construction/Installation of a Petroleum Storage Unit falls under Schedule-II, Category A (5), "Oil & Gas Extraction Projects including Exploration, Production Gathering Systems, Separation & Storage i.e., the project requires an EIA study. Thus, and EIA report is being prepared and submitted accordingly for approval.

CHAPTER # 3.

SCOPING

The scoping exercise helps identify key environmental issues that should be highlighted and further investigated in the EIA. Effective scoping enables:

- Defining the Spatial and Temporal Boundaries of the EIA study.
- Consulting with relevant stakeholders to identify a full range of concerns.
- Focusing on key issues that characterize the existing environment in the baseline studies.
- Reviewing the types of alternatives to be considered.
- Making logical decisions that impact is more significant and needs to be focused in EIA.

3.1 TEMPORAL BOUNDARIES

The temporal boundaries of the Petroleum Storage Unit Project Located at Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697, 698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore, refer to the timeline and phases associated with the construction, commissioning, and ongoing operational activities. Establishing clear temporal boundaries is crucial for project management, resource allocation, and meeting key milestones. Here's an overview of the temporal boundaries:

3.1.1 Project Initiation

The project initiation phase marks the beginning of the temporal boundaries. This involves the formal launch of the project, including the identification of objectives, feasibility studies, and securing necessary approvals.

3.1.2 Pre-construction Phase

This phase encompasses activities such as detailed engineering, design development, regulatory approvals, and land acquisition. It sets the foundation for the construction phase.

3.1.3 Construction Phase

The construction phase is a significant temporal boundary, involving the actual building of the Petroleum Storage infrastructure. This includes the installation of storage tanks, safety systems, and associated facilities.

3.1.4 Commissioning

The commissioning phase is a critical temporal boundary, marking the transition from construction to

operational readiness. During this phase, systems are tested, and the plant is brought online for trial operations.

3.1.5 Operational Launch

The operational launch is a key temporal boundary where the Petroleum Storage Unit officially begins its day-to-day activities, including the storage and distribution of petroleum products.

3.1.6 Ongoing Operations

The ongoing operations form the continuous temporal boundaries of the project. This involves the daily, weekly, and monthly activities related to receiving, storing, and distributing of Petroleum, as well as maintaining safety standards and regulatory compliance.

3.1.7 Maintenance and Upgrades

Temporal boundaries extend to scheduled maintenance activities and potential upgrades to enhance efficiency, safety, or accommodate changes in demand or technology.

3.1.8 Emergency Response Drills

Regular temporal boundaries are established for emergency response drills to ensure that personnel are well-prepared for potential incidents.

3.1.9 Community Engagement

Temporal boundaries are set for ongoing community engagement, including regular communication, addressing concerns, and providing information about safety practices.

3.1.10 Regulatory Compliance Updates

Temporal boundaries include periodic reviews and updates to ensure continued compliance with evolving regulatory requirements.

3.1.11 Environmental Monitoring

The temporal boundaries cover ongoing environmental monitoring programs to track and mitigate potential impacts.

3.1.12 Record Keeping and Reporting:

Temporal boundaries are established for maintaining detailed records of operational activities, safety inspections, and maintenance activities, with periodic reporting as required.

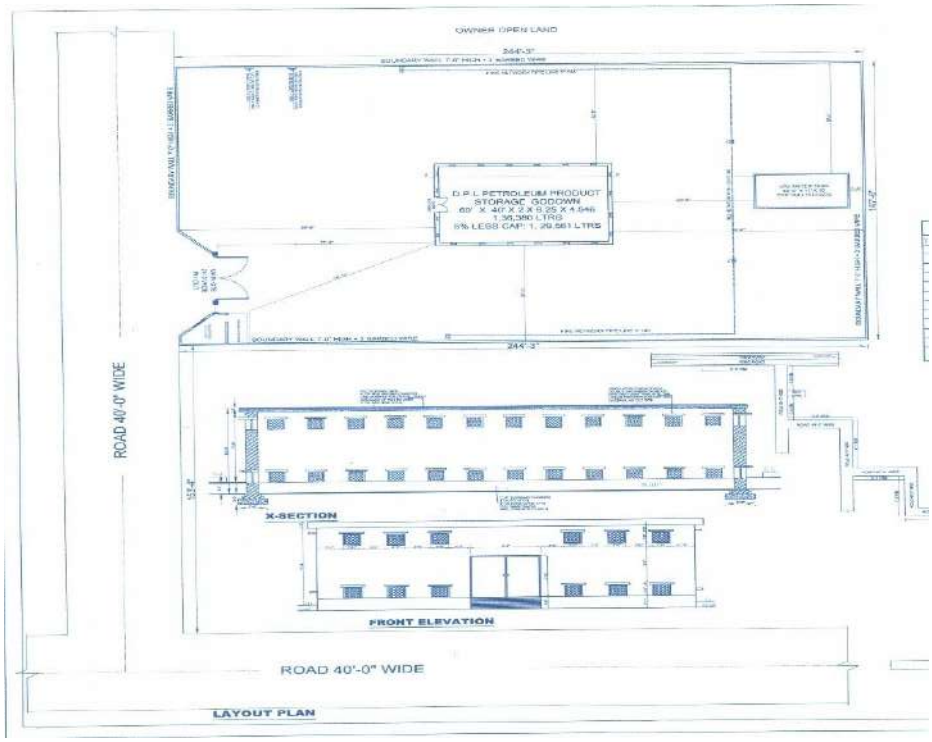
3.2 SPATIAL BOUNDARIES

Defining the spatial boundaries of the Petroleum Storage Unit is essential for effective planning,

regulatory compliance, and safety considerations. The spatial boundaries encompass various aspects, including the physical layout of the facility, buffer zones, and considerations for potential expansion. Here's an overview of the spatial boundaries:

3.2.1 Site Layout

The project's spatial boundaries begin with the designated site at Khewat no 645, 656, 657, 658, Khatooni no. 680 TO 685, 697, 698, 699, Khasra no. 1254, at Mouza Mari Tehsil Shalimar District, Lahore This encompasses the specific area where the Petroleum storage Unit and associated infrastructure will be constructed.



3.2.2 Storage Area

The spatial boundaries extend to the designated area for petroleum products storage area. Access and Transportation Routes

The spatial boundaries extend to access points and transportation routes within the project site. This includes entrances and exits for transport vehicles delivering petroleum.

3.2.3 Buffer Zones

Establishing buffer zones around critical areas is crucial for safety. The spatial boundaries may include buffer zones around the storage tanks and filling stations to mitigate potential risks and ensure compliance with safety regulations.

3.2.4 Safety Features and Emergency Response Zones

The spatial boundaries encompass designated safety features, such as emergency response zones and evacuation routes. These areas are strategically planned to facilitate a prompt and effective response in the event of an emergency.

3.2.5 Administrative and Support Structures

The spatial boundaries extend to administrative buildings, control rooms, and support structures within the project site. These facilities house essential personnel and equipment for the day-to-day operations and management of the Unit.

3.2.6 Green Spaces and Environmental Considerations

The project spatially considers green spaces and environmental features within and around the facility. This may include landscaping to enhance aesthetics, provide screening, and address environmental concerns.

3.2.7 Future Expansion Areas

The spatial boundaries also take into account potential areas for future expansion. This forward-looking approach allows for scalability and flexibility in response to increased demand or technological advancements.

3.2.8 Perimeter Security

Establishing perimeter security is part of the spatial boundaries, ensuring controlled access to the facility. This may include fencing, gates, and security measures to safeguard the premises.

Defining and adhering to these spatial boundaries is crucial for the safe and effective functioning of the Petroleum Storage Unit. It ensures compliance with regulations, minimizes risks, and contributes to the overall success and sustainability of the project.

3.3 Significant Concerns Raised during Public Consultation

A number of consultation meetings, key information interviews and focused group discussion sessions were conducted with different stakeholders in order to identify wide range of concerns and potential impacts associated with the project's activities as illustrated in Table 1.1. These impacts and concerns

were addressed in the EIA Study.

Table 0-1: Consultation for Scoping

Name	Designation	Organization	Concerns Highlighted/Feedback
Muhammad Irfan	Chief Chemist	ESPAK	It is a common observation that industries lack adequate ventilation and use of sun-light in their buildings Normally, our local contractors bypass Safe Practices during construction phase particularly for work at height and in confined space. Proper PPEs are not used for Noise and dust.
Mr. Ejaz Ahmed Suddle	Executive Director/ Environmentalist	Suddle and Shah Associates	Wastewater treatment plant may be installed at final discharge to comply with PEQS for treatment of liquid waste.
Mr. Abid Alamgir	Civil Consultant	Tahir Engineering Pvt. Limited	Seismic data should be carefully incorporated in design. The history of all the earthquake incidents should be shared with the designer.
Mr. Saeed Akhtar Khattak	Director-Electrical	Power-Link Pvt. Limited	Energy efficient equipment should be selected for Project.

3.4 Significant Impacts Considered during EIA

During consultation, there were no found general public because the project is in dedicated industrial estate. However, all the respondents favored the project keeping in view its benefits. They showed their satisfaction over management that they are capable of operating proposed project in compliance with all relevant rules and regulations as they are operating existing plants. However, they showed concerns over the activities during construction phase where Contractor is involved.

Chapter # 4.

CONSIDERATION OF ALTERNATIVES

The consideration of alternatives is a crucial step in evaluating the potential environmental effects of a proposed project. The purpose of assessing alternatives is to identify and compare different options to achieve the project's objectives, taking into account environmental, social, and economic considerations.

4.1 SITE ALTERNATIVES

No site alternatives were considered as the Unit will be established on proponent's owned land. This site is chosen because site is well located in regard to the following:

- Easy road access
- Proponent owned land
- No settlements in close vicinity
- No ecologically sensitive or declared protected area
- No historical, educational or religious site nearby
- No vegetation at the selected site

As no important religious, archaeological, historical or recreational site, or any other ecologically sensitive, declared protected area exists within close vicinity of the selected site. In view of these facts, it can be concluded that the Selected Site is best suited for the project and will not pose any adverse impact or threat on any component of the environment and will not disturb ecology.

4.2 TECHNOLOGY ALTERNATIVES

Since no technology will be used in this project and this project is a DPL Petroleum Product storage unit which will only be used to store petroleum products, technology alternatives have not been considered in this project. However, automatic storage and handling can be promoted to avoid storage risk.

4.3 ENVIRONMENTAL ALTERNATIVES

When considering environmental alternatives for the petroleum Storage project, several approaches can be explored to minimize the project's impact on the environment and promote sustainability. Here are some environmental alternatives to consider:

4.4 Green Building Design:

Implementing green building principles in the design and construction of the storage facility can

enhance energy efficiency, reduce resource consumption, and minimize waste generation. This can include using sustainable materials, incorporating renewable energy sources like solar power, and optimizing the building's orientation for natural lighting and ventilation.

4.5 Containment and Spill Prevention:

Implementing robust containment measures and spill prevention systems can significantly reduce the risk of environmental contamination in the event of leaks or spills. This may involve installing secondary containment systems, leak detection technologies, and automated shut-off systems to minimize the spread of hazardous materials.

4.6 Advanced Monitoring and Reporting:

Utilizing advanced monitoring technologies and real-time reporting systems can enhance environmental compliance and response capabilities. Implementing air quality monitoring stations, groundwater monitoring wells, and remote sensing technologies can provide early detection of environmental risks and facilitate timely mitigation efforts.

4.7 Stormwater Management:

Implementing effective stormwater management practices can prevent pollution of nearby water bodies and reduce the risk of runoff contamination. This can include installing retention ponds, vegetative buffers, and permeable pavement to capture and treat stormwater runoff before it enters natural waterways.

4.8 Hazardous Waste Management:

Implementing proper hazardous waste management practices can ensure the safe handling, storage, and disposal of waste materials generated during the operation of the storage facility. This may involve establishing waste segregation protocols, implementing recycling and reuse programs, and contracting with licensed waste disposal facilities to manage hazardous waste streams.

4.9 Community Engagement and Outreach:

Engaging with the local community and stakeholders throughout the project lifecycle can foster transparency, trust, and collaboration. Implementing community outreach programs, conducting public information sessions, and soliciting feedback from community members can help address concerns, build support, and enhance the project's social license to operate.

4.10 ECONOMIC ALTERNATIVES

Economic alternatives were considered taking into consideration the capital and operation costs for the proposed unit. Land cost, infrastructure cost and machinery cost were taken into account as the

deciding economic factor. Accordingly, land is selected is near to enough wide road that is Ring Road. So that the infrastructure and management costs get minimized due to already developed roads.

Also state of the art machinery will be employed considering it as one-time investment and thus minimizing the maintenance cost during the operational phase. Additionally, it will contribute towards uninterrupted production during operational phase.

CHAPTER # 5.

DESCRIPTION OF ENVIRONMENT

This section provides the description of baseline conditions of the Project as well as the area of influence. The existing environmental conditions of the proposed area of influence will also be a benchmark to be used for a comparison of before and after installation and operation of Petroleum Storage Unit. This baseline will also provide the datum for assessing the impacts and suggesting the mitigation measures, which will be implemented effectively at various phases of the Project activities.

5.1 Physical Environment:

5.1.1 Topography

The geography of Lahore comprises the various features relating to the land and climate of Lahore, Pakistan. Lying between 31°15′—31°45′ N and 74°01′—74°39′ E, Lahore is bounded on the north and west by the Sheikhupura District, on the east by Wagah, and on the south by Kasur District. The Ravi River flows on the northern side of Lahore. Lahore city covers a total land area of 1014 km² and is still growing.

The topography of the site is almost flat and slopes upward gently from north to south i.e. moving upwards when reaching the canal and vice versa.

Lahore is the capital of Pakistan's largest province, Punjab; with a population exceeding 10 million, it is a megacity and ranked as the country's second largest metropolis (after Karachi). Collectively, it is also the fifth largest city in South Asia and the 26th largest city in the world in terms of population. As a major urban center of Pakistan, it was graded in 2008 as a city with high sufficiency to become a Gamma world city.

5.2 Land Use

The land use of the Project Area is mainly industrial as it is industrial estate. Also, it is surrounded by industrial area.

5.3 Geology and Soils

The agro-ecological zones of the country are presented in Exhibit-5.1. The project site falls under Zone-IV (b); the zone generally comprises sandy loam, and clayey loam.

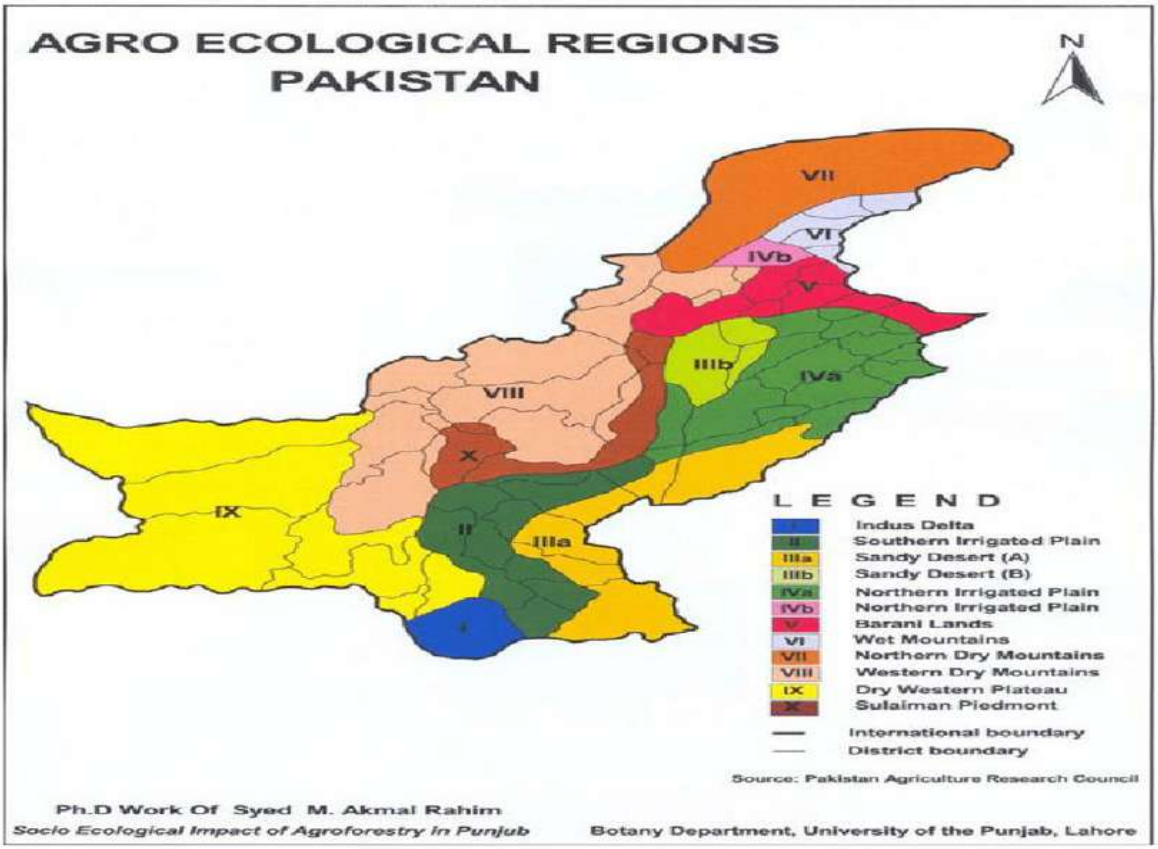


Fig 3.1: Agro-Ecological Map of Pakistan

Lahore plains are most probably underlain by the Potwar stratigraphy, but it would be deeply eroded. The geotechnical properties and mineralogical composition of the soil, das established during various studies / boring of tube wells for water supply by WASA/LDA confirm that the Lahore soil is composed of silty clay. The major mineral composition for Lahore soil is Quartz, Muscovite and Clinochlore, which shows that the alluvial deposit received sediments from metamorphic origin.

In general, subsurface stratigraphy at the site consists of three basic lithological units as given below:

- Lean Clay/Silty Clay
- Sandy Silt/Silt
- Silty fine Sand/fine Sand

These soils are the alluvial deposits of the recent geologic times. The subsurface stratigraphy is as discussed below:

- The first soil unit of brown silty clay/lean clay forms the topsoil cover at the site at all the locations and generally continues to a depth of 1 .0 m-3.5m below top of ground. This stratum contains trace fine sand and trace to little concretions at places. It is present in a soft to a stiff state of

consistency and has low to medium plasticity.

- The second soil unit of brownish grey sandy silt/silt underlies the upper silty clay/ lean clay stratum. This layer has a thickness of 1.0 to 3.0m and is present in a firm state.

- The third soil unit of brownish grey non-plastic fine silty sand underlies the silt/silty sand stratum. It is present in a loose to medium-dense state.

The lithological distribution of soils consists of slightly cohesive, generally firm to stiff silty clay lean clay from 1.0 to 3.5m depth, followed by firm to stiff sandy silt/silt of 1.0 to 3.0m thickness in turn followed by medium dense silty fine sand. Groundwater is present at a depth of 4.5 to 5.0m below top of ground.

The subsurface generally appears suitable for supporting light to medium loads through spread foundations placed at 1.0 to 2.0m depth. Besides, some isolated weak spots are also expected, which will require special measures to be adopted

5.4 Seismology

Earthquake is generated by tectonic process in the upper part of the earth called lithosphere, which is divided into several rigid parts called “Plates”. Due to the movements of these plates, stress build up takes place and result in the deformation of the crustal mass.

On the basis of Peak Ground Acceleration (PGA) values obtained through Pakistan Seismic Hazard Assessment (PSHA), Pakistan is divided into 5 seismic zones in line with the Uniform Building Code (UBC) 1997.

The boundaries of these zones are defined on the basis as shown in Table 5.1.

Table 0-1: Probabilistic Ground Acceleration (PGA) Values of Seismic Zones of Pakistan

Horizontal Zone	PGA (g)
1	0.05-0.08
2A	0.08-0.16
2B	0.16-0.24
3	0.24-0.32
4	>0.32

As per Building Code of Pakistan (BCP) 2007 (Seismic Provisions), the proposed Project falls entirely in the zone 2A, which is the regions of moderate seismic risk (Figure). Hence all the applicable provisions related to Soil and Foundations, Structural Design Requirements and with the

Structural Concrete of BCP should be considered in the design of the structures.

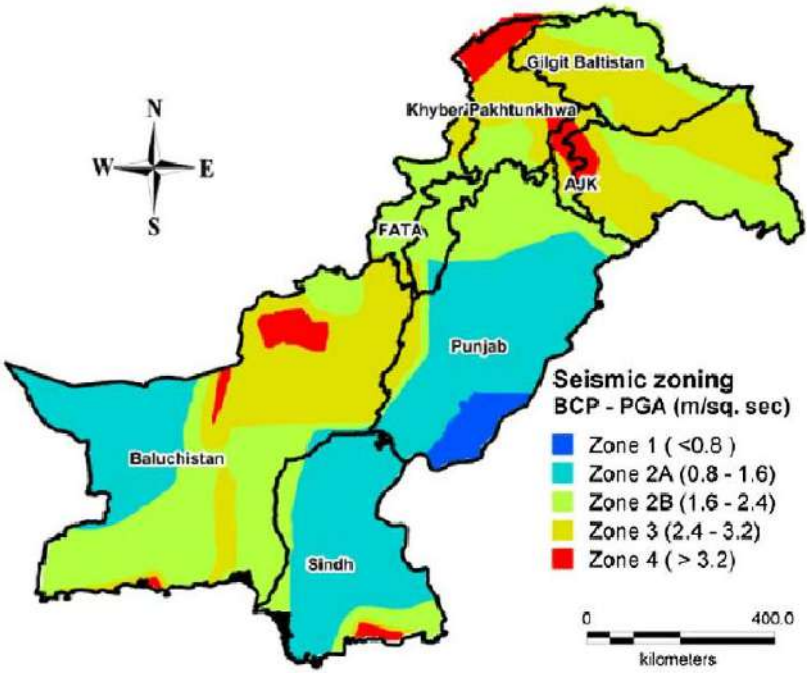
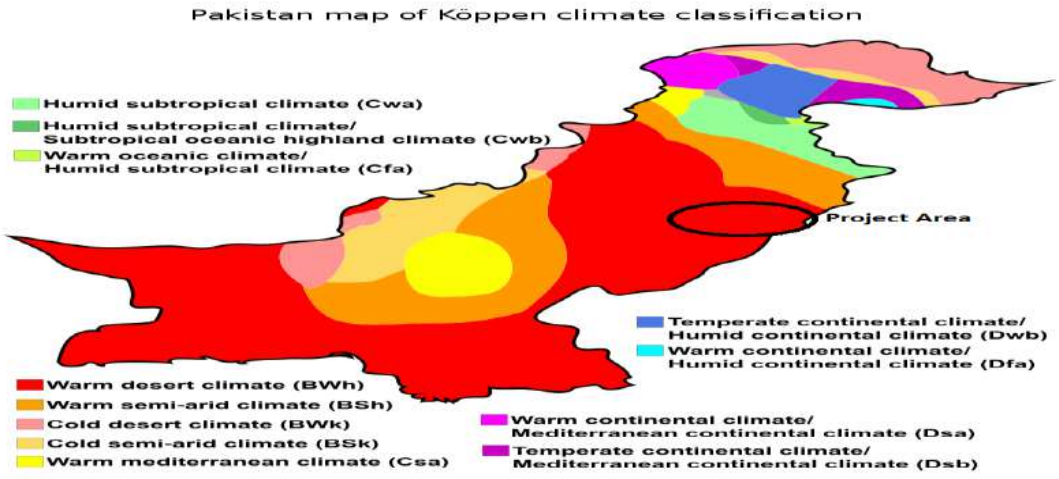


Figure 0-1: Seismic Map of Pakistan

5.5 Climate

The temporal division of the country is exhibited below:



.

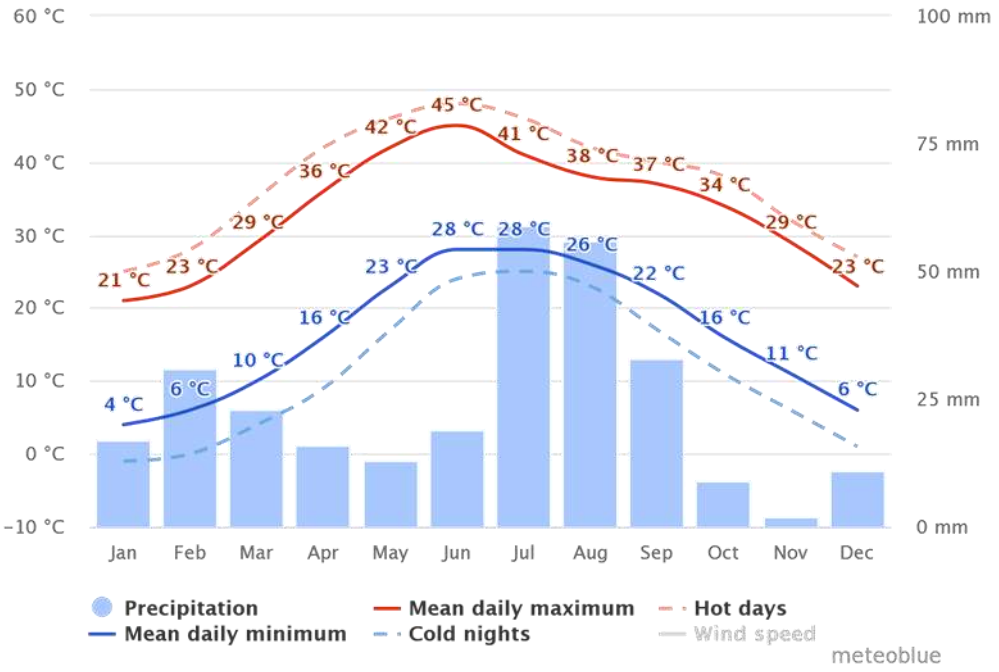


Table 0-2: Details of temperature

5.6 Water Resources

5.6.1 Surface Water

No rivers exist in the vicinity; however, storm water drains cross the route for disposal into the Ravi River. Water from River Ravi, flowing on the northwestern side of the city of Lahore, is being used for other purposes other than drinking purposes. River Ravi receives almost all the municipal/ industrial wastes from the city of Lahore. The potential value as a recreational water body and breeding place for fish is threatened by the municipal and industrial pollution.

5.6.2 Ground Water

Ground water quality is fresh (defined as acceptable in terms of its salinity). Raw water abstracted from the deep tube wells is believed to be essentially bacteria free. The water quality in the upper 50 meters zone of subsoil is generally brackish.

For city's drinking purposes water is abstracted from groundwater aquifer by means of tube wells located throughout the city. The quality of water is generally adequate for direct consumption. About 83% of city population is consuming groundwater for drinking purposes.

Groundwater is available at a depth ranging between 15 to 23m below the natural surface level. Deep groundwater from a depth of about 210m in the vicinity of the Project Area is being extracted for meeting the domestic and commercial water demands in nearby areas.

Adequate quantity of good quality groundwater is available below a depth of 50m. Water

consumption varies significantly and its variation as of industrial units. Usual water consumption pattern for industrial units and data collected from the prospective industrialist will form basis for total water demand.

According to Master Plan-2030 for the city of Lahore, the mean average decline in ground water is about 2.03 feet per year. It is noted that ground water is at a greater depth in the central part of the city where abstraction is more than the re-charge and close to surface waters i.e. Ravi River and Canal, the situation is in the reverse order.

5.7 Ecological Environment

This section describes the biodiversity existing ecosystem and existing ecological conditions in the Project AOI. This section also enlists the fruit and non-fruit trees (forest trees), wildlife species and identifies those that need protection.

5.7.1 Flora

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

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

5.7.2 Fauna

Common birds found in the area are crows and sparrows. Domestic animals are seen grazing in the agricultural land as well as on the project site. Chirping birds are having their nests at the well grown trees that are providing a natural habitat for the birds. Some squirrels, parrot, rats, weaver, sparrows are also found in the area.

Different species of reptile and amphibians such as lizards and frogs are also found. Various bird species known to occur in the area include myna, bulbul, crow and sparrow.

5.8 Socioeconomic Environment:

5.8.1 General

This section deals with the social conditions of the Project Area. During the desk/ office study, available reports/ documents were comprehensively studied. During the field survey interviews with the residents, shopkeepers, students, pedestrians, drivers, and school employees were held and observations were taken after giving due consideration to the desk/ office study results.

5.8.2 Demographics

The total population of Lahore District was 6,318,745 as enumerated in March 1998 with an intercensal percentage increase of 78.3 since March 1981 when it was 3,544,942 souls. The average annual growth rate of population in the district during intercensal period 1981-1998 was 3.5 percent. The total area of the district is 1772 square kilometers, which gives population density of 3,566 persons per square kilometer as against 2000 persons observed in 1981 indicating a fast growth rate of the district. The population of the district is predominantly Muslims i.e. 93.9 percent. The next higher percentage is of Christians with 5.8 points followed by Ahmadis 0.2 percent. While other minorities like Hindu etc.

5.8.3 Public Transport

Lahore is one of the most accessible cities of Pakistan. In addition to the historic Grand Trunk Road (G.T. Road), a Motorway (M-2) was completed in 1997 from Lahore to Islamabad. The government has built underpasses to ease congestion and prevent traffic jams, and according to official figures, Lahore has the highest number of underpasses in Pakistan.

5.8.4 Railways

The Pakistan Railways headquarters is located in Lahore. Pakistan Railways provides an important mode of transportation for commuters and connects distant parts of the country with Lahore for business, sight-seeing, pilgrimage, and education. The Lahore Central Railway Station, built during the British colonial era, is located in the heart of the city.

5.9 Industrial Importance

After Karachi, Lahore is the biggest industrial area in Pakistan. There has been a steady expansion of industries in and around Lahore since independence. There are many large industrial units in the district. These units manufacture cotton, woolen and silk cloths, carpets and rugs, textile products, lather and rubber foot wears, wearing apparel, pharmaceutical goods, soap, iron and steel products, heating, plumbing and lighting equipment, hardware, miscellaneous fabricated products, agriculture machinery, engines and turbines, textile machinery, printing machinery, metal working machinery, pumps and compressors, household machinery, water generators, motor generators, transformers,

electric fans, communication equipment, cycles and rickshaws. There are also a good number of printing and publishing units and body building workshops. Besides, there are units of canning and preservation of food, edible oils, beverages, metal and wood furniture, rubber products, chemicals, glass products, repair of railway equipment, toys, stationary etc.

The proposed site is situated at Gulberg III, Lahore. The project area is surrounded by commercial buildings.

5.10 Environmental Parameters for Monitoring

The environmental monitoring of parameters like ambient air quality, noise level and groundwater help us to analyze the prevailing environment conditions in and around the study area, and to protect it from any adverse activities due to the proposed Project implementation.

5.10.1 Air Quality

The environmental monitoring is conducted by EPA certified laboratory ESPAK and detailed results of ambient air quality monitoring have been also attached as Annexure D.

5.10.2 Noise Level

The environmental monitoring is conducted by EPA certified laboratory ESPAK and detailed results of ambient air quality monitoring have been also attached as Annexure D.

5.10.3 Drinking / Ground Water Quality

The environmental monitoring is conducted by EPA certified laboratory ESPAK and detailed results of ambient air quality monitoring have been also attached as Annexure D.

CHAPTER # 6.

IMPACT ASSESSMENT

This section discusses the potential environmental impact of proposed project, methodologies

for impact identifications and characteristics of impacts including nature, magnitude, extent and location, timing, duration, reversibility, risk. The assessment carried out in this section is based on potential impacts on overall environmental receptors within the project area.

6.1 METHODOLOGIES FOR IMPACT IDENTIFICATION

The methodology adopted for impact evaluation includes the Project Impact Evaluation Matrix.

During construction phase, adverse environmental & social impacts are depending on the resources and receptors involved along with other parameters such as; geographical scope (magnitude and extent), temporal scope (duration) and reversibility. It is anticipated that this project will have maximum positive impacts as it is environmentally friendly project to reduce pollution load.

6.1.1 PROJECT IMPACT EVALUATION MATRIX

The impact Evaluation matrix was developed by placing project activities on x-axis and different environmental parameters likely to be affected by the proposed project actions grouped into categories i.e., Physical, Biological and Socio-Economic Environment. For the impact assessment, project impact assessment matrix is used by dividing the project action into different phases (Construction phase and operation phase). A project impact evaluation matrix is attached in next section of this chapter.

The evaluation of impacts has been carried out on the basis of developing matrix, in which impacts have been rated on the basis of their significance. For rating impacts significance following criterion has been developed;

NA – Not Available

O – Insignificant (No or minimal impact)

LA – Low Adverse (Short term, reversible or less damage to environment)

MA- Medium Adverse (Long term reversible damage to environment)

HA – High Adverse (severe irreversible adverse damage to the environment)

LB – Low Beneficial (Short term benefits or less beneficial to the environment)

MB – Medium Beneficial (Long term benefits to environment)

HB – High Beneficial (Continuous benefits to environment)

CONSTRUCTION PHASE																
	Physical Environment							Biological Environment		Socio Economic Environment						
Environmental Component / Project Activities	**Topography & Drainage**	**Soil Quality**	**Landscape**	**Surface water quality**	**Ground water quality**	**Air quality**	**Noise**	**Flora**	**Fauna**	**Agricultural Land**	**Health & Safety**	**Disruption of Public Utilities**	**Employment**	**Population Disturbance**	**Social Disorder**	**Cultural Values**	**Traffic Management**
Placement of construction machinery on site	LA	LA	MA	LA	O	O	O	MA	LA	MA	LA	O	O	MA	LA	LA	HA
Parking of heavy vehicles	LA	O	LA	O	LA	O	O	LA	O	LA	LA	O	O	MA	MA	MA	HA
Transportation of raw construction material	LA	MA	MA	LA	O	HA	HA	MA	HA	LA	HA	O	MB	HA	HA	LA	HA
Temporary storage of raw material	LA	LA	LA	MA	LA	MA	O	LA	O	LA	LA	O	LB	LA	O	O	HA
Loading and unloading of raw material	LA	LA	MA	MA	O	HA	MA	LA	LA	LA	MA	LA	MB	HA	LA	O	MA
Labor camping on site	O	O	LA	LA	O	O	LA	LA	O	LA	LA	HA	O	HA	MA	MA	O
Storage of oil and fuel	LA	MA	LA	LA	O	LA	O	LA	LA	LA	MA	O	LB	O	O	O	O
Extraction of ground water	O	O	O	O	MA	O	O	MA	O	MA	LA	HA	O	O	LA	O	O

Construction material mixing/ preparation	LA	MA	LA	LA	LA	LA	HA	O	O	O	HA	HA	HB	MA	LA	MA	O
Building roofing	O	O	O	O	LA	MA	MA	O	O	O	HA	LA	HB	MA	LA	LA	O
Operation of generators	O	O	O	O	O	HA	HA	O	O	O	HA	LA	HB	LA	LA	O	O
Excavation	HA	MA	MA	LA	LA	HA	HA	MA	LA	O	HA	O	HB	LA	O	O	O
Water tank/ pond on site for temporary storage	O	O	O	LA	LA	O	O	O	B	O	LA	LA	B	LA	O	O	O

OPERATION PHASE																
	Physical Environment							Biological Environment		Socio Economic Environment						
Environmental Component / Project Activities	**Topography & Drainage**	**Soil Quality**	**Landscape**	**Surface water quality**	**Ground water quality**	**Air quality**	**Noise**	**Flora**	**Fauna**	**Agricultural Land**	**Health & Safety**	**Disruption of Public Utilities**	**Employment**	**Population Disturbance**	**Social Disorder**	**Cultural Values**	**Traffic Management**
Transportation of Raw material/ products	MA	MA	MA	MA	O	MA	HA	LA	MA	O	HA	LA	B	MA	LA	O	HA
Filling process	O	O	O	HA	MA	MA	MA	O	O	O	HA	HA	HB	O	O	LA	O
Operation of Generators	O	O	O	O	LA	HA	MA	O	O	O	HA	LA	HB	O	O	O	O
Water Consumption	LA	O	LA	HA	HA	O	O	LA	LA	LA	LA	HA	B	LA	O	O	O
Wastewater generation	HA	MA	MA	MA	MA	LA	O	MA	MA	MA	HA	LA	B	LA	LA	O	O
Storage of Raw Materials/ dyes	O	O	O	O	O	O	O	O	O	O	LA	O	B	O	O	O	O
Social activities	O	O	LB	B	B	B	B	B	B	HB	HB	B	HB	HB	HB	HB	O

Public Welfare	O	O	B	B	B	B	B	B	B	HB	HB	HB	HB	HB	HB	HB	LB
Economic Activities	LB	O	B	B	B	B	B	B	B	B	HB	B	B	B	B	B	LB
Employment	O	O	O	O	O	O	O	O	O	O	B	B	HB	B	B	B	LB
Infrastructure Improvement	LB	MB	HB	B	B	B	B	HB	LB	HB	HB	B	HB	B	B	B	B

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:

6.3 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.

6.4 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 Environmental Impact Assessment 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.

6.5 CHARACTERISTICS OF IMPACTS

6.5.1 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.

6.5.2 Potential Positive Impacts

The project is envisaged to have followed major positive impacts;

- **Employment opportunities:**

Construction/Installation of proposed unit by M/s Matrix Chemical Industries Private Limited will help in generating new jobs for the local population. The requirement of Managers, Engineers, Workers, technicians, skilled and unskilled labor etc. will generate employment opportunities. It is estimated about 200 persons will be employed during operational phase and about 18-20 persons will work during construction phase. Hence, there is large number of employment opportunities especially for the locals of the district.

- **Increase in Business:**

With the influx of laborers for the proposed project, there will be more opportunities for small scale business such as small food cafes etc.

- **Improved Infrastructure:**

Construction/Installation of M/s Matrix Chemical Industries Private Limited will improve the infrastructure of the area as proponent has incorporated aesthetic values and regeneration of site in its planning stage.

6.5.3 Economic benefits:

Construction/Installation of M/s Matrix Chemical Industries Private Limited is a major's working entity in the country; it is a great investment for the economy of our country. In the long run it will positively impact not only the local population but also the economy of Pakistan.

6.5.4 Potential Negative Impacts:

Types of Negative Impacts Minor Impacts

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

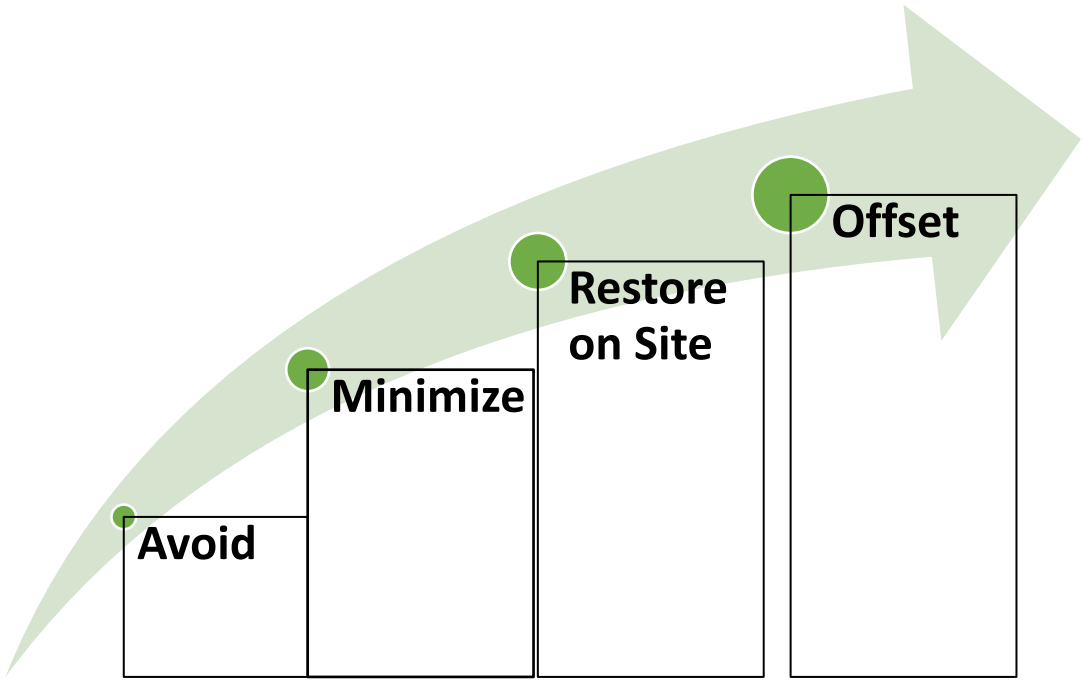
required.

Moderate Impacts These impacts need specific and additional mitigation measures.

Major Impacts

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

Mitigation assessment criteria: The Mitigation Hierarchy establishes a structure to guide development and application of measures to mitigate impacts on environmental values and associated components. The term "mitigation" applies to four steps, or levels, in the mitigation hierarchy:



General principles

- Maintaining the integrity and natural functions and processes of ecosystems, and the resilience of ecosystems, is prerequisite to sustainable use of natural resources, and essential to maintaining ecosystem goods and services over time.
- The mitigation hierarchy is applied in order of priority as follows: a. Avoid b. Minimize c. Restore On-Site d. Offset (Off-Site or On-Site)
- Generally, the "higher" the priority of the environmental value and associated component, the more protective the mitigation measures.
- For an action or measure to be considered "mitigation", a party must accept responsibility for implementation of appropriate mitigation measures, and there must be certainty that the mitigation measures will be carried out.

- Implementing mitigation measures can help resolve issues that may delay or prevent a proposed project or activity.

General considerations

- Which environmental values and associated components will be impacted by the proposed project or activity? (This will be determined from the output of the environmental impact assessment, i.e., the Environmental Impact Assessment and Mitigation Plan)
- Have the criteria been used to determine relative priorities among environmental values and associated components?
- Have mitigation measures for impacts on environmental values and associated components, at all scales, been considered?
- What is the current condition of each environmental value and associated component actually present within the footprint and area of influence of the proposed project or activity?
- Can impacts on one or more environmental values or associated components be more fully mitigated than impacts on other environmental values and associated components?
- Are there multiple environmental values and associated components with conflicting management needs and potential conflicts that need to be considered?
- Is sound guidance available and being used, e.g., are best management practices (BMPs) and guidelines available for affected environmental values and associated components?
- Is there opportunity to collaborate with other proponents that may have interest in overlapping mitigation measures?

6.6 IMPACT SIGNIFICANCE

6.6.1 Ecological importance Natural Vegetation

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

Assessment of Impact: A significant impact will be interpreted if unnecessary or excessive removal and burning of plants for fuel wood is observed. In case of subject project, no tree cutting will be required for the construction of the subject project.

Nature of impact: Direct

Duration: long term **Timing:** construction phase

Reversibility: irreversible

Likelihood: moderate

Consequences: Mild, as no rare plant species are not present in the project area.

Impact significance: significant

Mitigation Measures: The following mitigation measures will reduce any impact on vegetation: o Do not park vehicles on green belts/ grass o Unnecessary damage to vegetation will strictly be avoided. o Proponent will plant trees and other species after construction phase

Residual Impact: Given the current state of the vegetation, and proper implementation of the proposed mitigation measures, slightly significant residual impact on the natural vegetation of the area is anticipated.

6.6.2 Fauna

The fauna including wildlife 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 plant species are not present in the areas.

Impact significance: not significant

Residual Impact: Given the current state of the fauna there is no significant residual impact on the wild life of the area.

6.6.3 Social importance

Following parameters were adapted for the assessment of the well-being of the poor people near the project site that are used to assess the social, economic, and cultural impacts of the project.

Inconvenience due to construction Vehicles: During the construction period a minor impact may be the movement of vehicles from the main road to the proposed plant boundary; it may affect the traffic on other roads and may cause minor annoyances to the residents and other industrialists of the area. The transportation of heavy materials and equipment is likely to damage the existing roads if they were used for the transportation of heavy machinery.

Mitigation measures: 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.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: reversible

Likelihood: low

Consequences: low, as it links the main Ring Road and vehicles will rarely use the sub roads.

Impact significance: slightly significant

6.6.4 Cultural Issues

Induction of outside workers in the Contractor's labor may cause cultural issues with the local community as the local community is very sensitive about their cultural values. Also, theft problems to the local community may arise by the labor force and vice versa.

Mitigation Measures: Good relations with the local communities will be promoted by encouraging contractor to provide opportunities for skilled and unskilled employment to the locals, as well as on-the-job training in construction for young people. Project manager will restrict his staff to mix with the locals to avoid any social problem. Contractor will keep the copies of Computerized National Identity Cards (CNIC) of his workers and will warn them not to involve in any theft activities. And if anyone would involve, he will have to pay heavy penalty. Similarly, at the time of employment contractor has to take care that the workers should be of good repute. The contractor camp will be properly fenced and main gate will be locked at night with a security guard to check the theft issues. Contractor will also be the responsible for the sensitivity towards the local customs and traditions.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: reversible

Likelihood: low

Consequences: low, if project proponent implements mitigation measure, its impact will be low

Impact significance: slightly significant

6.6.5 Accident risks

Unmonitored construction activities may create an accident risk for the local residents particularly children and labor force.

Mitigation measures: Contractor must have first aid kits along with the medical officer in the field if a minor injury takes place, but for an unfortunate accident service of nearby hospitals will be availed. Routine medical check-ups of all the field staff including unskilled labor need to be conducted by a qualified doctor. Training of the workers should be arranged regarding safety procedures, environmental awareness, equipping all construction workers with PPEs, safety boots, safety helmets, ear plugs, gloves and protective masks. Monitoring must be carried out to check for the sustainable use of PPEs.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: not applicable

Likelihood: moderate

Consequences: moderate, as complete trainings and mitigation measure have been planned.

Impact significance: significant

6.6.6 Privacy Issues

Disturbance may happen to the privacy of women residing in the work area when workers will work at height.

Mitigation Measures: Contractor must take care for the privacy of residents, especially women near the working area.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: reversible

Likelihood: low **Consequences:** low, as contractor will take care of the matte

Impact significance: slightly significant

Sharing of resources: During the construction and operational phase of the project, workers will share the common resources like potable water, fuel, wood. It may create conflicts between work force and local population.

Mitigation measures: The contractor will be required to maintain a close friendly relationship with the local communities to ensure that there may not be any conflict related to common

resources utilization. He must get permission of the local population before using their common sources of water and other resources.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: reversible

Likelihood: low

Consequences: low, it the terms & conditions will be followed and mitigation measures have been employed

Impact significance: significant

6.6.7 Noise Problems

Residents of the area and neighbours may face the problems of noise during the construction and operations phase

Mitigation measures: Large noise generating activities should be carried out in fixed hours. The timing will be known to all the people in 500 m radius of the site.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: reversible

Likelihood: Moderate

Consequences: Moderate, project contractor will follow the safety guidelines & NEQS

Impact significance: significant

6.6.8 Mobilization issues

During the construction phase, the general mobility of the local residents and their livestock in and around the study area is likely to be hindered.

Mitigation measures: It will be the responsibility of project contractor and drivers to follow the speed limits in the area.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: reversible

Likelihood: low

Consequences: low, as it links the main Ring Road and vehicles will rarely use the sub roads **Impact significance:** slightly significant

6.6.9 Health

People from the project area regularly travel to other cities, and thus cannot be considered isolated from the rest of the country. They are regularly exposed to illnesses common to urban populations, and have similar levels of immunity. The project is therefore very unlikely to lead to an epidemic of any sort among local communities.

Mitigation measures: Regular medical check-ups of all the workers need to be conducted to ensure the health of workers and local population.

Nature of impact: Indirect

Duration: Long term

Timing: construction / operation phase

Reversibility: reversible

Likelihood: moderate

Consequences: low to moderate, it may cause disturbance or spread of disease in the area if mitigation measure will not follow

Impact significance: significant

Safety: Project activities could become a hazard as it is located in populated area local people, especially children, are likely to gather around to watch the activity. The other safety issue is that of traffic, especially along access roads close to settlements.

To reduce the hazards, the following mitigation measures will be implemented:

- Local people will be informed in advance when work is about to start in an area.
- This may result in people keeping young children away from work areas.
- Safe driving practices will be adopted, particularly while passing through settlements.

Nature of impact: Direct

Duration: long term

Timing: construction / operation phase

Reversibility: irreversible

Likelihood: moderate to high

Consequences: moderate if all safety measure will be taken care

Impact significance: Significant

Environmental standards **Topography:** The project will not change the topography of the area as proponent committed to sustainable development of the proposed project. The infrastructure of the area will be maintained after the construction activities.

Residual Impact: The residual impact of project activities on the topography of the area is expected to be insignificant. The residual effects are summarized below:

Nature of impact: direct

Timing: construction Phase

Duration: during construction activities

Likelihood: Nil

Consequences: no change

Impact significance: Not significant

Mitigation measures: The project design should include measures to maintain the project landscape that matched the pre project natural green features achievable through extensive plantation. Project activities must be executed in a way it will not harm naturally available resources.

6.6.10 Land Acquisition Resettlement

One of the major impacts includes acquisition of land from the land owners and the resulting displacement of their families and disturbances in the livelihood of the affected persons (AP) in the project area. But present project land is ownership of M/S Matric Chemical Industries Private Limited and do not involve any type of land acquisition and resettlement activity.

Residual Impact: The residual impact of project activities for the land acquisition & resettlement of the area is expected to be insignificant. The residual effects are summarized below:

Nature of impact: direct

Timing: Planning stage

Duration: not applicable

Likelihood: Nil

Consequences: no change

Impact significance: Not significant

Mitigation measures: If any resettlement involve, proponent must consult the affected persons and incorporate their interests and demands.

6.6.11 Changes in Land Use

The current land use of the area is mainly industrial. Project is expected to increase land use value particularly near the main road creating easy economic and employment opportunities for locals.

Residual Impact: The residual impact of project activities on land use of the area is expected to be insignificant. The residual effects are summarized below:

Nature of impact: direct

Timing: construction phase

Duration: not applicable

Likelihood: Nil as it is not involving any constructional activity that may cause change in land use

Consequences: no change

Impact significance: Not significant

Mitigation measures: The impact of change in land use must incorporate in planning stage so that it may not cause any hindrance during the constructional phase.

Solid waste/ sludge management: Proper solid waste management system is necessary for the prompt, timely and efficient disposal of solid waste & sludge for the reduction of its impacts. Impacts due to solid waste & sludge are expected to be temporary and minor in nature.

Nature of impact: Direct

Duration: Short term

Timing: operation/ construction

Reversibility: Not applicable

Likelihood: Low (unlikely) as mitigation measures will ensure that Solid waste management will be efficient

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:

- Planning of solid waste disposal sites with reasonable distance from the human settlements
- A minimum distance of 1 km should be maintained between the solid waste disposal site and nearest human settlement
- Devise plan & develop guidelines for the safe handling, storage & disposal o Sludge must not be placed at the site after cleaning of wastewater treatment tank
- PPEs are strongly recommended for workers for the handling of sludge

Residual Impact: After implementing the mitigation measures listed above, the residual impact of the solid waste/ sludge is expected to be insignificant.

Air Quality Potential Impact: Air emissions from project-related activities are likely to include:

- Dust raised on dirt tracks by project-related vehicles.
- Combustion products (nitrogen oxides, sulfur dioxide, particulate matter, carbon monoxide, and volatile organic compounds) from vehicles used for project-related activities

6.7 Assessment of Impact

6.7.1 Dust Emissions:

Dust emissions caused by vehicular traffic on dirt track are an important concern, primarily when such traffic passes near community settlements. Dust emissions cause the amount of particulate matter in the air to increase, and thus become a health concern. Dust clouds also reduce road visibility, creating a traffic hazard.

6.7.2 Gaseous Emissions

Emissions produced by vehicles and equipment will be similar to those produced by generators in terms of the resulting pollutants (SO_2, NO_X, PM, etc.). However, the extent to which they are produced will be kept considerably lower, since much smaller engines are used in vehicles and construction machinery.

Nature of impact: Direct

Duration: long term

Timing: operation/ construction

Reversibility: irreversible

Likelihood: moderate as mitigation measures will ensure that air pollution remains within acceptable limits.

Consequences: moderate, as pollutant levels in the ambient air will be well within acceptable limits.

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

Mitigation Measures

- None of the potential effects discussed above are expected to exceed acceptable limits.
- The mitigation measures given below will further reduce their impact, and ensure that they remain within acceptable limits.
- All equipment and vehicles used during the 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
- Imposing speed limits and encouraging more efficient journey management will reduce the dust emissions produced by vehicular traffic.
- Water will be sprinkled where necessary to contain dust emissions.
- Management will make sure process is environmentally friendly

Residual Impact: After implementing the mitigation measures listed above, the residual impact of the proposed activities on ambient air quality is expected to be low.

6.7.3 Noise level

Noise may be a major concern during the construction/ operation phase. It can be generated from the machinery used for construction and operations. Generators are another source of noise pollution.

Nature of impact: Direct

Duration: long term

Timing: operation/ construction

Reversibility: Not applicable

Likelihood: moderate

Consequences: slightly significant, if above mentioned mitigation measure will be strictly followed

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

Mitigation measures:

- Keep the traffic load aligned and minimum during working hours of project
- Machinery and vehicles must be well tuned and maintained o Impose the limits on

unnecessary use of horns

- Safety signs must be displayed and public & drivers must be well aware of them o Do not work in night time

Residual Impact: After implementing the mitigation measures listed above, the residual impact of the noise level will be slightly significant.

Conclusion Management of M/s Matrix Chemical Industries Private Limited has to achieve the following goals.

- Identification of regulatory requirements that apply to the project activities in the context of environmental protection.
- Identification of the environmental features of the project area and the likely impact of the project on the environment,
- Recommendation of appropriate mitigation measures that management will incorporate into the project implementation to minimize all adverse environmental impacts.

Baseline environmental and socioeconomic information collection from a variety of sources, including field surveys.

The impacts of project in area will be insignificant, provided the generic mitigation measures proposed in this report are implemented. After assessing the project activities and investigating the project area, it is concluded that, if the activities are undertaken in this report, and the recommended mitigation and environmental management measures are adopted, the project will not result in any long-term or significant impacts on the local community or the environment.

Chapter # 7. ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

7.1 GENERAL

The Environmental Management Plan (EMP) of the project provides a road map on how to address identified significant environmental and social impacts to keep it environment friendly during construction and operational phases. This Chapter also presents the Monitoring Plan to check compliance of the EMP and to take timely corrective actions in case any deviation from significant criteria, requirement or goal is found.

7.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The primary objectives of the EMP are to:

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

7.3 MANAGEMENT APPROACH

The organizational roles and responsibilities of the Proponent and Contractor are summarized below:

Proponent: The project proponent will undertake overall responsibility for compliance with the EMP. Concerned Departments will carry out verification checks to ensure that the contractors are effectively accomplishing their environmental and social responsibilities.

Contractors: The contractors will carry out the majority of environmental and social mitigation measures in their field activities as part of the project. The contractors are subject to certain liabilities under the laws of the country and under different clauses of their contract with the proponent. The responsibilities outlined in EMP should be included in the scope of work during agreement with the Contractor.

7.4 Institutional Capacity

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

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

7.5 ENVIRONMENT MANAGEMENT PLAN

Table 7.1, 7.2 provides the EMP for Construction and Operation Phases of the proposed project.

Table 7-1: Environmental Management Plan (Construction Phase)

#	Environmental Parameter/ Element	POTENTIAL IMPACTS	MITIGATION MEASURE/ENHANCEMENT MEASURES	RESPONSIBILITIES

1.	Gaseous/ Dust emissions		1. Control speed of construction vehicles 2. To minimize dust generation water should be sprinkled on the construction site and on drive ways as frequently as possible. 3. Regular maintenance of equipment. 4. People who are working and exposed to severe dust and exhaust fumes should be provided with PPEs. 5. The use of low sulphur fuels in construction equipment and ensuring proper vehicle and equipment maintenance. 6. Construction vehicles and machinery shall be equipped with standard pollution control devices to minimize emissions. 7. Civil debris, if generated during construction phase, shall be disposed in low-lying areas for land filling.	HSE/Environment Manager

			8. Construction materials i.e., sand, clay should be transported to the project site in covered trucks. 9. All project vehicles should be checked regularly to ensure that engines are in sound working condition and are not emitting smoke. 10. Construction materials i.e., sand, clay and like shall be transported to the project site during night time and will be stored away from the road or foot path. They will be kept under cover to avoid any fugitive dust. 11. The site proposed for the M/s Matrix Pvt. Ltd. is located away from human settlements. All equipment, generators, and vehicles used during the project construction will be properly tuned and maintained in good working condition in order to minimize exhaust emissions.	

2.	Noise		1. Ensure Noise level compliance according to Rules and Regulation 2. Ensure all construction machinery are maintained and serviced in accordance with the contractor's specifications 3. Ensure exhaust mufflers and engine enclosures are in place and in good working order for all construction equipment and industrial trucks. 4. Ensure Noise generation activities to be relegated during daytime. 5. Ensure that vehicles undergo routine maintenance 6. Notifying the neighbour in case there would be some noisy events. Ear plugs will be provided & implemented in case of heavy noise.	HSE/Environment Manager

3.	Health & safety		1. Workers/people will be informed in advance when work is about to start at the project site. 2. Machinery will never be left unattended. 3. Safe driving practices will be adopted, particularly while passing through human settlements. Basic health facilities will be provided to workers.	HSE/Environment Manager

4.	Soil and water pollution		1. Prevention of accidental oil or chemical spillage, solid matters, contaminants, debris and other pollutants and wastes from entering into surface and ground water. 2. Awareness on environmental protection. 3. Avoid deposition of stockpiling materials near or on-stream banks or another watercourse perimeter. 4. No grey water runoff or uncontrolled discharges from the site/working areas (including wash down areas) without treatment shall be permitted. Water containing pollutants such as cement, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site. 5. Spills during construction or operations shall be absorbed with absorbent blankets, socks, or absorbent	HSE/Environment Manager

			material and disposed of in accordance with applicable laws and regulations. Contractor must dispose solid wastes away from the site to an approved disposal site. 6. Potential pollutants (If any) of any kind and in any form shall be kept Stored and used in such a manner that any escape can be contained and the water table not endangered. 7. Equipment Storage or wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted. 8. During construction, standard engineering practices such as silt fencing, erosion control material, and construction tracking pads should be implemented to control runoff, erosion, and sedimentation that could affect	

			watersheds. 9. Proper handling and storage procedures for hazardous wastes e.g., fuel oil should be stored in areas with hard standing and containment to handle spills. Minimize waste production by utilizing best available techniques for site preparation.	

Table 7 2: Environmental Management Plan (Operational Phase)

#	Environmental Parameter/ Element	Potential Impacts	Regular operations	Responsibilities

1.	Gaseous/ Dust emissions		1. Air emissions from generators will be controlled by regular maintenance. 2. Management of M/s Matrix Pvt. Ltd. will ensure that PPEs i.e., masks will be provided to workers during the working hours. 3. Vehicles to be used for the transportation of raw materials at the project site should be properly tuned. 4. Generator shall cater for emergency situation only. Their exhaust will be emitted through an adequately fabricated stack. It will also be ensured that the generators will only function during emergency condition for limited period. 5. Monitoring should be conducted on Monthly basis as per EPA PEQS Rules. 6. For avoid dust pollution following measures will be taken care of: a. Proponent will Ensure proper ventilation throughout the facility to dilute and remove airborne particulates. Good airflow helps prevent the accumulation of dust in work areas. b. Will be Implemented dust collection systems, such as baghouses or cyclone separators, to capture and collect airborne dust. These systems can be integrated into various points along the production line where dust is generated. Machinery and process will be enclosed as much as possible	HSE/Environment Manager

			to contain dust emissions. This can be achieved through the use of barriers, enclosures, or hoods around equipment.	

2.	Noise	1. machines can generate noise, particularly if they operate at high speeds. Noise can be generated by auxiliary systems such as generators, and heating, ventilation, and air conditioning (HVAC)	**Engineering Controls:** 1. Invest in noise-reducing technologies and machinery. 2. Use vibration isolators and soundproof enclosures for noisy equipment. **Administrative Controls:** 1. Schedule noisy operations during specific times to minimize disruption. 2. Implement job rotation to reduce individual exposure to high noise levels. 3. Personal Protective Equipment (PPE): 4. Provide employees with hearing protection, such as earplugs or earmuffs, where necessary. **Regular Maintenance:** 1. Conduct regular maintenance on machinery to ensure proper functioning and reduce noise emissions. **Noise Barriers:** 1. Install physical barriers or sound-absorbing materials to contain or absorb noise. **Employee Training:** 1. Provide training on the importance of using hearing protection and following noise control measures.	HSE/Environment Manager

			2. All activities will be under PEQS level of noise during operation phase. 3. PPEs i.e., ear muffs should be provided to workers in case of high noise. Ensure all production machinery are maintained and serviced in accordance with its specifications.	

3.	Health & safety	1. Workers may be exposed to chemicals/ dust can pose health risks. 2. Dust generated operation processes can lead to respiratory issues for workers. 3. Moving parts of machinery and equipment can pose a risk of injuries. 4. Electrical equipment used can pose a risk of electric shock. 5. Wet surfaces, spills, and uneven flooring can contribute to slips, trips,	• Implement proper ventilation systems, provide personal protective equipment (PPE), and conduct regular training on chemical handling and safety protocols. • Use dust control measures, such as local exhaust ventilation, dust collectors, and personal protective equipment (e.g., masks). Ensure regular cleaning and maintenance of machinery. • Install safety guards on machines, conduct regular equipment maintenance, and provide training on safe operating procedures. • Implement fire prevention measures, provide firefighting equipment, and conduct regular fire drills. Store materials in accordance with safety guidelines. • Ensure proper installation and maintenance of electrical systems, provide training on electrical safety, and use appropriate protective equipment. • Maintain clean and dry work areas, install non-slip flooring, and use signage to alert workers to potential hazards. • Install safety guards on machinery, conduct regular inspections, and provide training on machine safety. • The EMP guidelines will be followed strictly (committed by the management of M/s Matrix Pvt. Ltd. • Training of workers will be conducted regarding health and safety.	HSE/Environment Manager

		and falls. Lack of proper machine guarding can lead to accidental contact with moving parts.	• PPEs will be provided and implemented. • First aid measures will be provided to workers. • Shift Rotation, proper ventilation will be provided to workers. • Safety signs, safety boards, exit arrows etc. will be placed on site. • An Assembling point will be kept to gather in case of emergency situation such as fire hazards. • Floors will be kept clean without slippery to avoid any hazard. • Firefighting system will be installed to avoid any health hazards. • Electrical wires, D.Bs will be kept covered to avoid electrical hazards. Machinery will never be left in running condition.	

4.	Water pollution	• Discharge of untreated or improperly treated wastewater can introduce pollutants into water bodies, impacting water quality. • Improper disposal of cleaning-related wastewater can contribute to water pollution. • Runoff may carry contaminants from stored materials into stormwater systems and nearby water bodies. • Uncontrolled releases can lead to the contamination of soil and water, especially if spills reach stormwater drains or nearby	• Install wastewater treatment systems to treat effluents before discharge. • Implement sedimentation basins, filtration, and chemical treatment to remove contaminants • Develop and implement spill response plans to address accidental releases promptly. • Provide spill containment measures, such as spill berms and absorbent materials. • Store chemicals (Petroleum Products) and raw materials in designated areas with proper containment measures. • Implement spill prevention measures, such as secondary containment for storage tanks. • Implement spill prevention measures, such as secondary containment for storage tanks. • Conduct regular inspections to identify and address potential sources of water pollution. • Maintain equipment and infrastructure to prevent leaks, spills, and discharges. Provide trainings to employees on proper handling, storage, and disposal practices to minimize the risk of water pollution	HSE/Environment Manager

		water bodies.		

5.	Soil Pollution	• Inadequate waste management practices can result in the deposition of pollutants in the soil, affecting its quality. • Runoff may carry contaminants from stored materials into the soil, potentially leading to soil pollution. • Spills that reach the soil can introduce pollutants and potentially harmful substances, impacting soil health. Poor storage practices can result in soil contamination, especially if chemicals penetrate the ground.	• Develop and implement spill response plans to address accidental releases promptly. • Provide spill containment measures, such as spill berms and absorbent materials. • Store chemicals and raw materials in designated areas with proper containment measures. • Implement spill prevention measures, such as secondary containment for storage tanks. • Implement proper waste management practices for solid waste, including recycling and safe disposal. • Separate and properly dispose of hazardous waste in accordance with regulations. • Implement erosion control measures, such as cover crops, mulching, and sediment fences, to prevent soil erosion. • Conduct regular inspections to identify and address potential sources of soil pollution. Maintain equipment and infrastructure to prevent leaks, spills, and discharges.	HSE/Environment Manager

7.6 ENVIRONMENT MONITORING PLAN

Environmental monitoring is a vital component of the Environmental Management Plan.

The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation and planning corrective actions. Main objectives are:

- To provide a mechanism to determine whether the Construction contractors are carrying out the project in conformity with the EMP.
- To document the actual project impacts on physical, biological, and socioeconomic receptors, quantitatively where possible, in order to evaluate adequacy of EMP and determine the need for any improvement.

Proponent provides periodic Environmental and HSE trainings to their permanent and Contract Employees. A comprehensive annual training calendar will be developed for the employees whose trainings are organized based on Training Need Analyses. Environment, Health and Safety (EHS) are considered to have a high weightage in their performance evaluation process.

7.6.1 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 7-2: Environmental Monitoring

Sr. No.	Parameters	Monitoring Schedules	Phase	Monitoring Duration
1	Ambient Air Monitoring	Quarterly	Construction / Operation	As per requirement
2	Noise Level Monitoring	Quarterly	Construction / Operation	As per requirement
3	Water quality testing	Quarterly	Construction / Operation	As per requirement

7.7 HSE Management Plan

- Health Safety and Environment (HSE) induction/orientation will be provided to all workforce at the project site.
- Assembly point will be established for the gathering of workforce regarding daily HSE Toolbox Talk at the project site.
- HSE Toolbox Meeting will be held by HSE Manager on a weekly basis.
- Special education sessions will be conducted properly at the site.
- The daily walkthrough will be conducted at the project site.
- All the Mandatory PPE's (Safety Helmet, Safety Jacket, Safety Shoes, Coverall, Full body Harness, Safety Goggles, Earplug, Earmuff, Dust mask/Special Safety Gloves, etc.).
- Proper and safe scaffolding will be provided at the site for safe work at height.
- All the heavy machinery will be inspected properly at the site.
- All Cranes and lifting gears will be inspected/checked on a regular basis.
- Inspection Tagging system will be maintained at the project site.
- Safety signage will be provided at the project site.
- Fire posts will be established at the project site at easy approach location.
- Waste will be maintained properly.
- HSE Signboard will be installed at the project site for an emergency response.
- Rest area smoking zones will be established at the site.
- Regular First Aid Center, along with all required medicines 24/7, will be available at the project site.
- Paramedic (dispensers) will be deployed at the first-aid post for day-night shift
- Fully equipped Ambulance will be made available at the site for 24/7
- In-house training will be conducted on the project site.

HSE policy, roles and responsibilities of HSE Manager and staff will be developed. It will also provide information about HSE objectives, Personal Protective Equipment (PPE's) to be used at the site, first aid training and communication and documentation regarding HSE.

- First Aid Boxes: First aid boxes will be provided at all active construction sites to cope up the emergency situations. Usually, a typical first aid box mainly contains antibiotics, basic medicines, cotton, bandages, sunny plasts, healing balms, pyodine, spirit, pain killer, etc.
- Dispensaries: Medical facilities will be established on-site. A dedicated room will be established as a dispensary and first aid services at the campsite.
- PPEs: Site Engineer and HSE Manager will be responsible for providing PPEs to all workers.
- Safety Signs: Relevant safety signboards will be displayed on the worksites and labour camps to make aware / train workers about safety rules. Mainly safety signs include signs of speed limits, electric spark, etc.
- TBTs: Tool Box Talks (TBTs) will be delivered on a regular basis and when a new team of workers start a new activity like shuttering, steel fixing, steel cutting, steel bending, scaffolding, concrete pouring, mechanical works, electrical works, etc. at sites to promote safety culture.
- Water Sprinkling: Dust pollution will be controlled with water sprinkling and minimizes the risk of adverse impacts of dust on workers and surrounding areas. Water sprinkling will be carried out regularly to minimize dust pollution and avoiding creating slush.
- Barricading: Barricade tape at all the active work sites will be put. Hard barricading (scaffolding pipes) will be used to cover exposed areas where excavation is more than 10 feet.
- Training: Safety training will be delivered by the HSE Manager to achieve its objectives. Trainings will be conducted for capacity building of employees / workers /labor/ sub- contractors to make them well effective to respond in any kind of emergency situation.

The breakup cost for the safety of workers is described in **Table 7.2.**

Table 7-3: Estimated Cost for the Implementation of Environmental Monitoring Plan

Sr No	Item	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Personal Protective Equipment (A)				
1.	Dust Masks	18,200	10	182,000
2.	Safety Shoes	350	2000	700,000
3.	Gloves	8400	200	1,680,000

4.	First Aid Box	2	3,000	6,000
5.	Ear Plugs	700	50	35,000
6.	Safety Helmets	350	1000	350,000
7.	Safety Jackets (Hi Vis)	700	500	350,000
Others (B)				
8.	Provision of Dust Bins	30	500	15,000
9.	Warning Tape	50	500	25,000
10.	Safety Cones	20	1000	20,000
11.	Safety Sign Boards	40	1500	60,000
12.	Raincoat	100	1000	100,000
Total (A + B)				**3,523,000**

- Time Required for Construction Period = 3.0 years
- Number of Labor Required during peak Construction = 80
- Personal Protective Equipment PPEs
- Dust Mask: Dust Mask to be used in a week by each laborer
- Safety Shoes:1 Safety shoe for 1 year for each laborer
- Gloves 2 pair of gloves for each laborer for each month
- First Aid Box 1 first aid box for every 50 laborers
- Ear Plug 1 set of the earplug to be used for 6 months for each laborer
- Safety Helmet 1 safety helmet for each laborer for 12 months
- Safety Jackets 2 safety Jackets (Hi-Vis) for each laborer for 12 months
- Dust Bin: Rough estimate
- Water Sprinkling the whole construction period

- Rain Cost: 1 Raincoat for each laborer

7.8 Traffic Management and Construction Material Transportation Plan

- All the construction material will be transported to the project site via Ring Road.
- 20 km per hour speed limited will be being maintained at the project site.
- All the light vehicles cars, jeep etc. will be parked in a designated area.
- All traffic signals will be followed properly.
- Experienced and license holders (drivers/operators) will be hired for transportation.
- All the heavy machinery will be checked properly and inspected on a regular basis.
- Speed limit signboards will be installed at the project site.
- All the (headlights, backlights, Indicator, etc.) will be checked and maintained regularly.
- All the warning light, reverse back alarms will be maintained properly.
- All the routes within the project site will be marked and designated properly.

7.9 Emergency Preparedness, Response and Site Evacuation Plan

- The management will always be ready for response in any kind of emergency at the project site.
- Special assembly points will be established at the project site (offices site).
- The emergency siren will be installed at assembly points.
- Contact numbers of emergency response team will be circulated at the project site.
- Close coordination will be carried out with 1122 in the case of any serious injury/accident.
- Close coordination will be carried out with all law enforcement agencies (police) in case of an aggressive mob of people in the shape of any kind of protest.
- Emergency response drill will be carried out once in a month for provision of awareness to the workforce at the project site.
- First Aid Boxes will be available at the project site around the clock.
- Experienced and qualified paramedic staff will be available at First Aid Post at the site under the command of HSE Manager.
- Fully equipped Ambulance will be available at the project site along with all mandatory items (Oxygen cylinder, Statures First Aid Box)
- All the new entrants will be oriented by the HSE Manager regarding the required awareness towards the hazardous and risky situation and control.
- The entire workforce will be provided with the all-mandatory PPEs for the risk-free environment.
- Special in-house training (TBT) will be conducted by the HSE Manager regarding the awareness towards any emergency condition and control.

- Proper water sprinkling will be carried out at service road along within the project site for dust control to avoid any hazardous and risky situation which can be a cause of transport emergency.

7.10 Training Program

Training programs are a necessary agenda that has to be implemented to implement Environmental Management Monitoring Plan effectively. The Environment, Health Safety Officer, will impart training to the staff. The key objective of the training program is to ensure that the requirement of EMP is clearly understood and followed throughout the project. The training shall cover the following areas:

- Environmental sensitivity of the project area.
- EMP communication and documentation requirement.
- Vegetation and community issues and their mitigation measures.
- Safe construction practices
- Use of personal protective equipment's (PPEs)
- Environmentally sound construction practices
- Vehicular safety
- Site restoration requirement
- Solid Waste Disposal

M/s Matrix Chemical Industries Private Limited will be primarily responsible for providing training to all project personnel. A lump sum fee of Rs. 1,000,000/- should be kept for the training management plan. Framework for the environmental and social training program is being provided.

Table 7-4: Framework for Environmental Social Training Program

Type of Training	Training Description	Period	Duration	Training By	Trainee
Occupational Health and Safety for staff	Training should be provided to aware staff to conform to safety codes	Before Commencement of Project Activities	Full day	External Sources	EHS Manager
Environment Social Laws, Regulations, procedure and guidelines of the government	The training should detail the laws and regulation concerning the environment, labor laws and compliance to government regulation.	Before Commencement of Project Activities	Full day	External Sources	EHS Staff, Site Supervisors, Site Engineers.
Occupational Health Safety for workers	Health, Safety and Hygiene. Proper usage of Personal Protective Equipment (PPE's), Precautions to be taken for working in confined areas.	Before Construction Activities	Full Day	EHS Manager	Workers
Solid Waste Management	Waste Segregation, identification of hazardous waste, Use of PPEs and waste handling	Before Commencement of Project Activities	Full Day	External Sources	Relevant workers and staff
Vehicular safety	Safe operation and maintenance of all vehicles, insurance in accordance with the applicable local and federal laws	Before Commencement of Project Activities	Full Day	EHS Manager	Relevant workers and staff
Vegetation and community issues and their mitigation measures	To analyze the community problems and how to cater to serious issues relevant to vegetation and agricultural land of the community	Before Commencement of Project Activities	Full Day	EHS Manager	Relevant workers and staff
Safe construction practices	To upgrade local craftsmen's skill in quality construction and develop skillful working human resources in hazard-resistant construction	Before Commencement of Project Activities	Full Day	EHS Manager	Relevant workers and staff
Health Safety and Environmental Auditing	Health Safety and Environmental Audits, Reporting Requirements	Before Commencement of Project Activities	Full Day	External Sources	Relevant Department
Implementation of environmental management and monitoring plan	Explanation of Environment Management and Monitoring Program	Quarterly. As soon as the project activities start	Full Day	External Sources	EHS Staff

7.11 ENVIRONMENT BUDGET

The management propose annual budgetary allocation of 1 million PKR for the Environment related activities.

CHAPTER # 8. STAKE HOLDER AND PUBLIC CONSULTATION

The consultation process with various stakeholders of ESPAK 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. However, our team tries to take consultation with the workers of surroundings and environmental practitioners. Public consultation has been done during the planning and design phases of the Project with neighbored industries of the Project area; concerns and suggestions thereafter have been taken into account and included where appropriate. The consultative process to date has been effective in addressing the concerns over the Project Operational impacts.

Objectives of Consultation

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

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

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

8.1 Consultative Aspect

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

- Dissemination of Project information through discussions, education and liaison.
- Eliciting the comments and feedback on the project.

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

8.2 Identification of Main Stakeholders

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

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

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

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

- **Meetings with Stakeholders**

A series of consultation was carried out with stakeholders and general public in nearby areas.

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

a. Brief Description of the Project
b. Current economic condition in the area

c. Suggestions for improvement in the current industrial system and all activities related to industry

d. Perceptions about the project

e. Perceived impacts of the project

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

8.3 Meetings with Stakeholders

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

a. Brief Description of the Project

b. Current economic condition in the area

c. Suggestions for improvement in the current industrial system and all activities related to industry

d. Perceptions about the project

e. Perceived impacts of the project

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

8.4 Analysis of Stakeholder Consultation

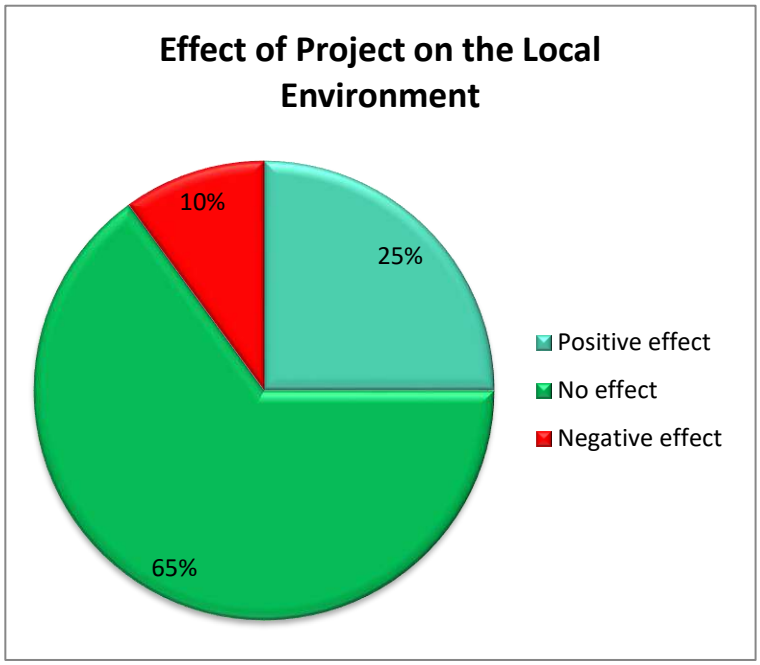
8.4.1 Sample Size

Sample size was selected by the Team of consultants for conducting the socioeconomic survey.

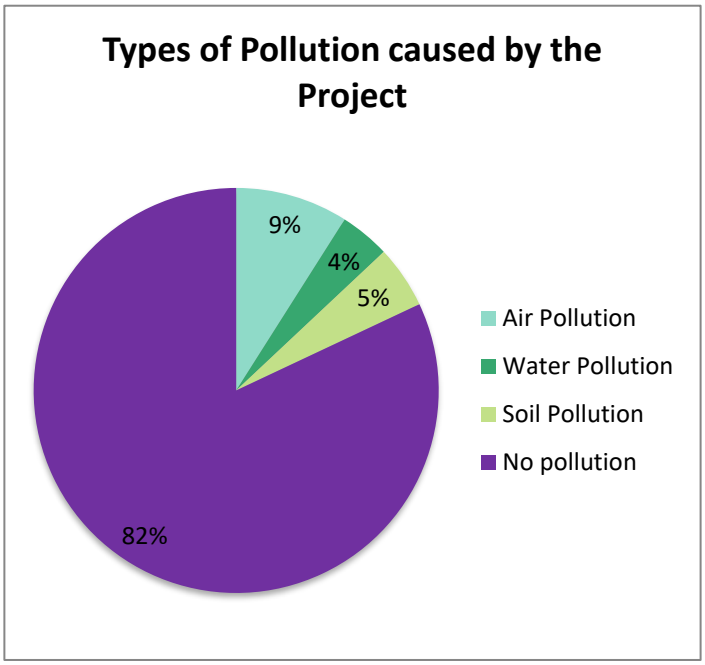
8.4.2 Statistical Analysis

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

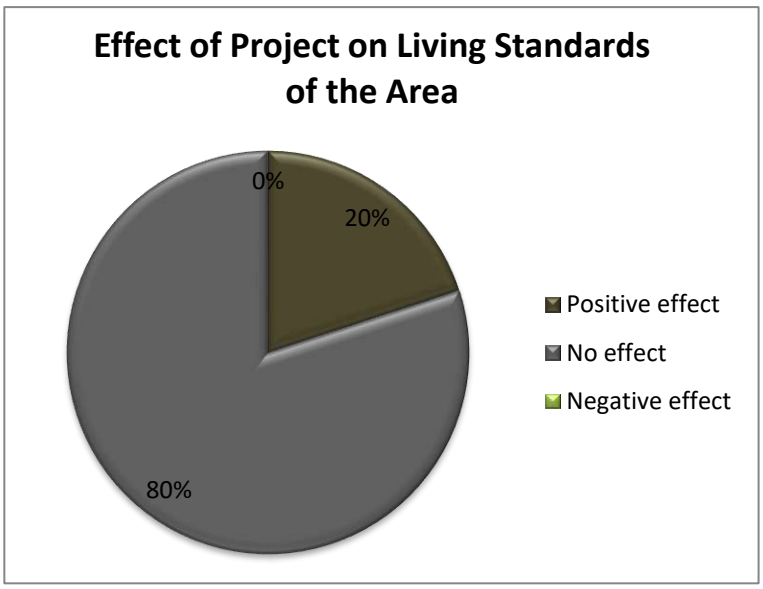
8.4.1 Result and Discussion



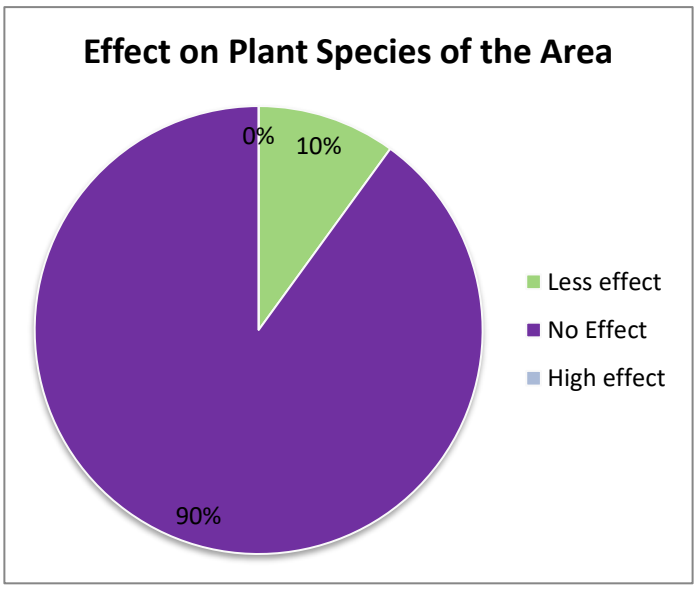
Effect of project on local environment



What type of pollution caused by project



Effect of project on the living standard of area



Effect on plant species of area

According to graphical representation, 100 percent respondents were male while the numbers of females were 0 because no female is available on that site.

8.5 Pictures Stakeholder Consultation with Baseline Monitoring

As per survey, 80% people were satisfied with the project and they gave positive remarks regarding the proposed unit and project as they got job over there, their living standard raise over working there. While 5% respondents were having no opinion regarding the project and 15% respondents were not satisfied with the construction due to their concern regarding the aesthetic degradation and no preference to local people for jobs. Majority were in favor that no effect will produce by this project. Pictures Stakeholder Consultation with Baseline Monitoring

.

Sr. No.	Representative	Apprehensions Raised	Suggestions
1.	Environmental Inspector (Muhammad Nasir)	• The proposed Project is a good initiative taken by Proponent; as it will provide job opportunities to the local residents. • Dust emissions due to the construction activities such as deep excavations, transportation of construction materials and use of construction machinery. • Health and safety issues may arise for local community and workers due to construction activities. • If tree cutting is involved then it should be avoided as much as possible.	• Proponent shall use latest technology to remove fine particles, like dust and smoke, from a flowing gas to combat air pollution. • Ensure continuous sprinkling of water on daily basis in the Project area to reduce emission of dust particles. • Health and Safety Management Plan should be prepared and implemented to avoid health and safety issues occurring during construction period of the Project. • Solid waste produced should be properly managed and disposed of in identified designated areas. • Construction material should be removed as early as possible on the construction sites. • Proper barricading shall be provided

			along excavation sites to avoid accidents and casualties. • Community Development Programs shall be initiated by PROPONENT to uplift social living standard of the local residents.
2.	Environmental Practitioner (Dr. Muhammad Sajid)	• The proposed Project is a good initiative taken by proponent as it will provide job opportunities to the local residents. • No Wildlife Sanctuary and game reserve falls in the study area. Therefore; there is no threat to wildlife species.	• Ensure continuous sprinkling of water on daily basis in the Project area to reduce emission of dust particles.
3.	Environmental Practitioner (Muhammad Naveed)	• The proposed Project is a good initiative taken by proponent; as it will provide job opportunities to the local residents. • No fisheries are present in the area	• PROPONENT shall ensure construction of Wastewater Treatment Plant for treating effluents.
4.	Environmental Practitioner (Muhammad Arfan)	• The proposed Project is a good initiative taken by PROPONENT; as it will provide job opportunities to the local residents. • No reserve forest is present in and around the	• Provision in Client budget for tree plantation and its maintenance cost for three (03) years, for the trees that will be planted in and around the study area,

		study area.	as a compensation for the trees that will be bowdlerized and as an absorbent for air pollutants due to the implementation of the proposed Project. • Sheesham and Eucalyptus shall be suggested in the tree plantation plan for plantation with three (03) rows. • Ensure continuous sprinkling of water on daily basis in the Project area to reduce emission of dust particles.

8.6 Analysis of Stakeholder Consultation

- **Sample Size**

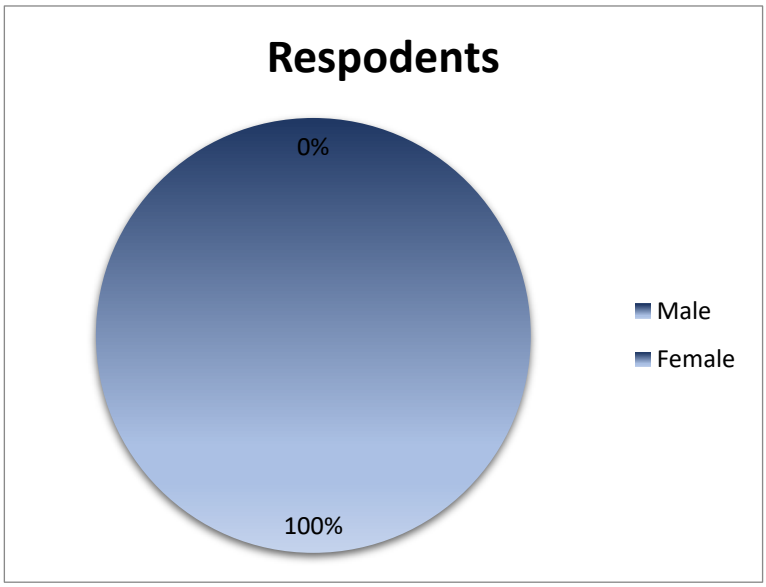
Sample size was selected by the Team of consultants for conducting the socioeconomic survey.

- **Statistical Analysis**

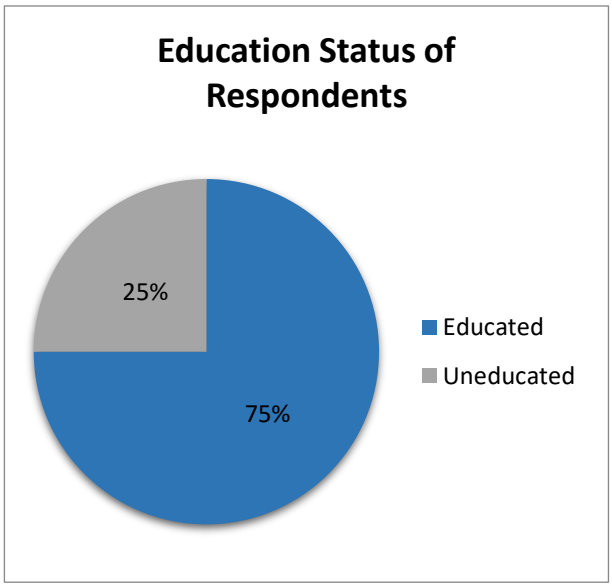
Statistical analysis of the data collected during the visit of study site villages through questionnaires.

These questionnaires (Stakeholder Survey Form with CNIC) are attached as ANNEXURE-J.

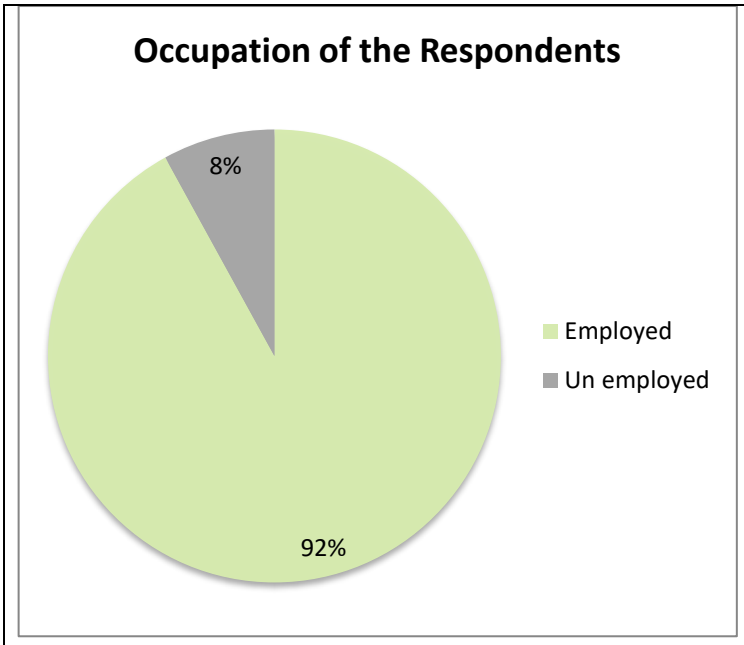
- **Result and Discussion**



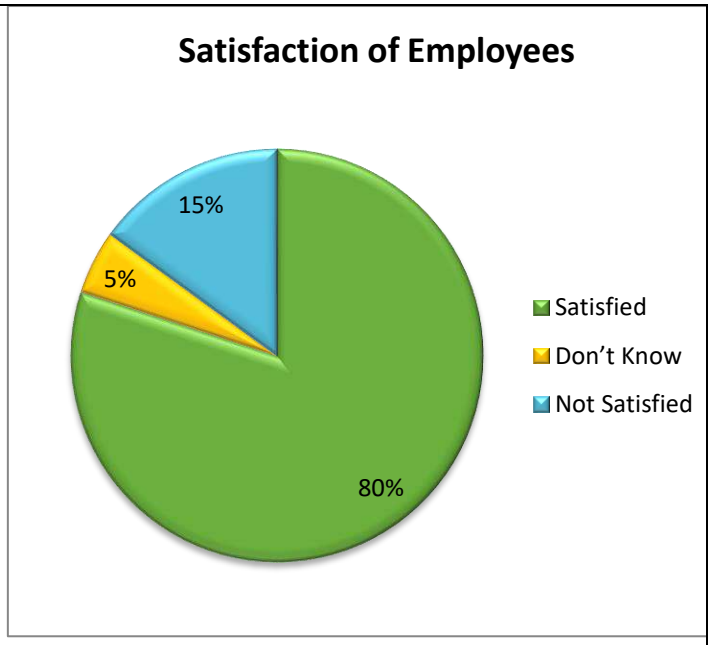
Gender Ratio of Respondents



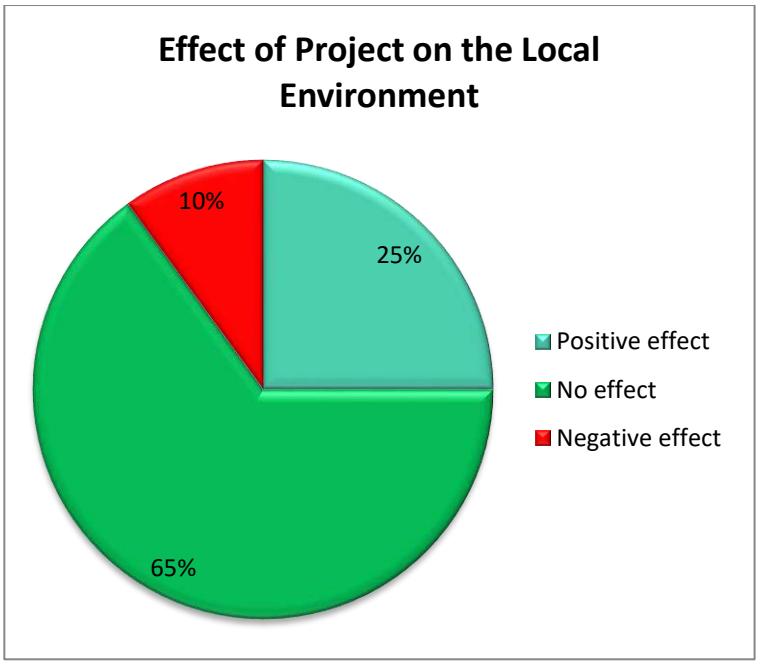
Education status of respondents



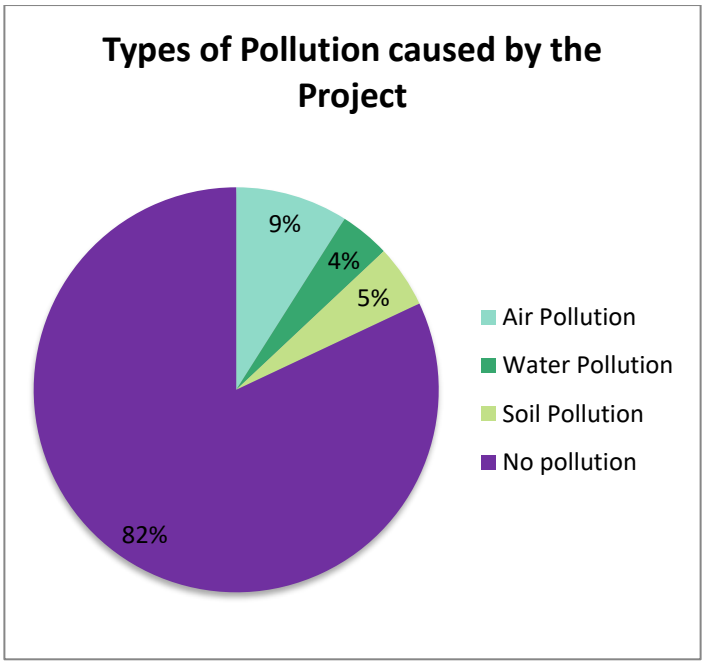
Occupation of respondents



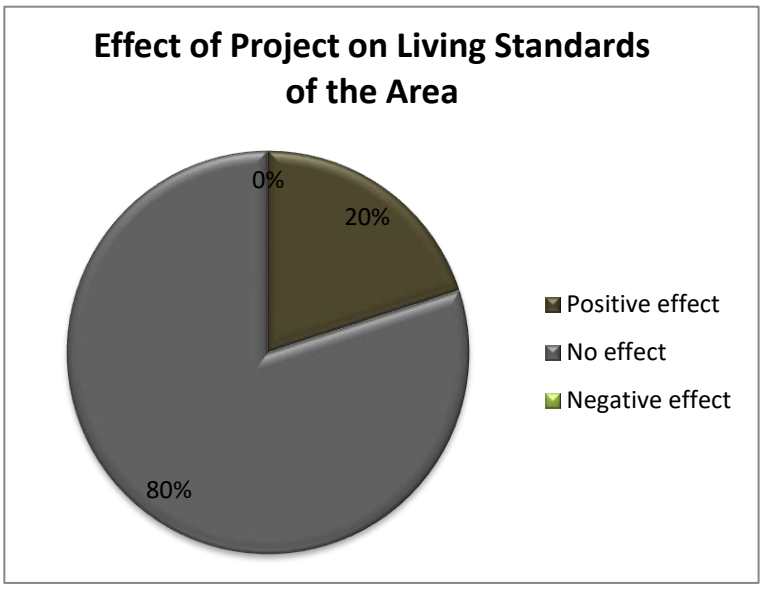
Satisfaction of respondents

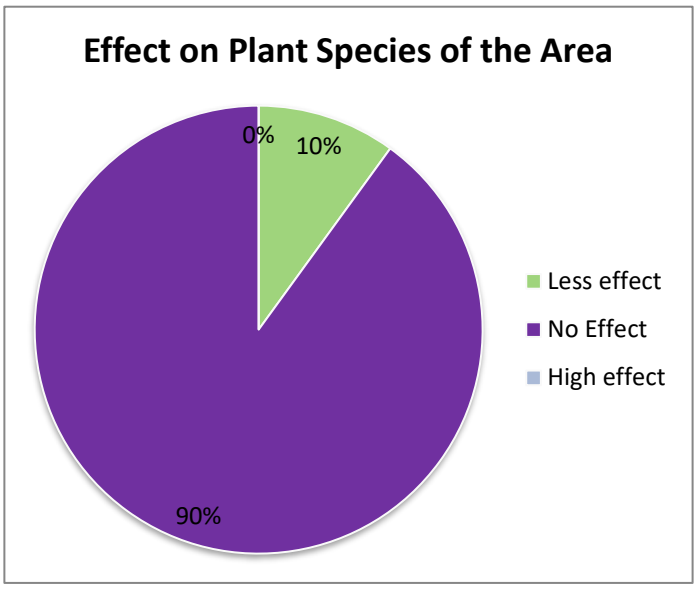


Effect of project on local environment



What type of pollution caused by project





Effect of project on the living standard of area **Effect on plant species of area**

According to graphical representation, 100 percent respondents were male while the numbers of females were 0 because no female is available on that site. 75 % respondents were educated while 25% were uneducated. So, according to the survey overall education status of the area is good.

As per survey, 80% people were satisfied with the project and they gave positive remarks regarding the proposed unit and project as they got job over there, their living standard raise over working there. While 5% respondents were having no opinion regarding the project and 15% 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 produce by this project.

8.7 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 6.1: 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. Max. Persons according to the requirement will be employed by the industry.
Training Opportunities	People are keen to consult with subject industry if the Project offers training and upgrading opportunities to enhance their trade or professional skills.	Development of the Training Strategy, including commitment of allocation of budget investment for training infrastructure, delivery and design. Installation of training facilities in for worker of the company and students will also be accommodate. The internship program will offer to the students to develop professional skills.
Health & safety	Health and safety issues may be arising due to constructional activity.	All possible safety measures will be taken during operation and construction phase. Proponent has designated teams for HSE concern a.k.a. Emergency Response Teams (ERTs) and emergency equipment like fire extinguishers, spill kits, water hydrant system, effective use of PPEs and first aid are already well managed.
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 to buy from the local market. 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 nearby residents. Environmental degradation during construction.	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 community.	Implementation of consultation in relation to water use, recycle and development of the Participatory Environmental Monitoring Program.

Chapter # 9. CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSION

The report presents Environmental impact Assessment (EIA) of the proposed project "Construction/Installation of Petroleum storage unit by M/s Matrix Chemical Industries Private Limited". Its main objective is to providing a reliable and efficient storage of petroleum products and meet the needs of the region.

EIA of Proposed Project is performed according to guidelines of EPA. It includes description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study.

The performed EIA showed all anticipated impacts (both positive and negative), associated with the project. Appropriate mitigation measures as explained in the environmental study shall reduce, if not eliminate, these impacts so that these are within acceptable limits.

Moreover, no deterioration, depletion or exploitation of resources is expected to be caused by this project. Based on overall assessment of the environmental impact of the project, it is concluded that the project is not likely to cause any significant adverse impact on the social, physical and biological environment of the area, provided that suitable mitigation measures as identified in this study are implemented. It is accordingly recommended that Environmental Approval for the project may be issued by the Punjab Environmental Protection Agency.

The potential impacts during construction phase includes soil erosion and degradation, soil and water contamination, ambient air quality deterioration caused by the exhaust emission and kicked up dust, noise pollution, damage to local infrastructure, safety hazards, very less loss to the wildlife and natural vegetation and public health concerns for the nearby communities.

The significant environmental management issues during operation phase include Safety hazard, Public Health and Nuisance, air and dust pollution, sewage disposal, solid waste and noise pollutions, vehicular traffic and water consumption.

9.2 RECOMMENDATIONS

The study and survey results are finally evaluated to recommend the following:

- Implementation of EMP must be given top priority.
- Implement measures to minimize air emissions during construction and operational phases.
- Regularly monitor air quality and install air pollution control devices.
    - Consider using low-emission equipment and vehicles.

- Implement noise reduction measures during construction and operation.
- Use noise barriers and consider scheduling noisy activities during non-sensitive hours.
- Conduct periodic noise monitoring and address any exceedances promptly.
- incorporate green building practices such as energy-efficient design, sustainable materials, and eco-friendly infrastructure.
- Invest in energy-efficient machinery and processes to minimize energy consumption.
- Implement water-saving technologies and practices to minimize water consumption during manufacturing processes.
- Develop a comprehensive waste management plan that focuses on reducing waste generation, promoting recycling, and properly disposing of non-recyclable waste.
- Integrate noise reduction technologies and practices to create a healthier and more comfortable working environment for employees.
- Use soundproofing measures and provide hearing protection where necessary.
- Establish an Environmental Management System (EMS) to monitor, evaluate, and continually improve environmental performance. This system can help in identifying areas for optimization and ensuring compliance with environmental regulations.
- Consider the impact of the project on local biodiversity. Implement measures such as green spaces, landscaping, and habitat conservation to enhance the ecological value of the project site.
- Engage with local communities to understand and address their concerns. Establish communication channels to provide information about the project's environmental initiatives and foster positive relationships.
- Consider the establishment of green spaces or habitat restoration initiatives.
- Develop a traffic management plan to minimize congestion and air pollution during construction.
- Consider using alternative transportation methods for workers to reduce traffic impacts.
- Develop and regularly update an emergency response plan for potential incidents.
- Conduct emergency response drills involving plant personnel and local emergency services.
- Ensure compliance with all relevant environmental regulations and obtain necessary permits.

ANNEXURE-A

LAYOUT & DRAWING

ANNEXURE-B

GOOGLE MAP

ANNEXURE-C

LAND OWNERSHIP DOCUMENTS

ANNEXURE-D

LAB REPORTS

ANNEXURE-E

UNDERTAKING & AFFIDAVIT

ANNEXURE-F

AUTHORIZATION LETTER

ANNEXURE-G

OTHER RELEVANT NOCS