

PROPOSED PROJECT

**CONSTRUCTION OF PETROLEUM PRODUCTS STORAGE
TANKS IN THE EXISTING PREMISES OF FMC UNITED PRIVATE
LIMITED, MEHDIPUR ROAD OFF MULTAN ROAD, 18 KM,
DISTRICT LAHORE**

PROPONENT

FMC UNITED PRIVATE LIMITED

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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 Schedule

of Activities 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	Punjab 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

EXECUTIVE SUMMARY

INTRODUCTION

This executive summary presents an overview of the main findings of the Environmental Impact Assessment Report for the construction of petroleum products storage tanks in the existing premises of FMC United Private Limited, Mehdiपुर Road off Multan Road, 18 km, District Lahore. The primary objective behind the construction of the Petroleum Products Storage Tanks is likely to meet the increasing market demand for storage and distribution facilities for dangerous 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 of Petroleum Product (Solvesso A 100) Storage Tanks within the Existing Premises of FMC United Private Limited.
2.	Project Location	Mehdiपुर Road, 18 km off Multan Road, District Lahore”
3.	Nos of Storage Tanks and storage capacity	04 Tanks, Total capacity of the proposed project is 3,7500 liters
4.	Proponent	Mr. Haseebullah Zahur
5.	Consultant	Environmental Services Pakistan Private Limited
6.	Area of Project	Approx. 2 Kanal
7.	Present Status of Land Use	Vacant Land within the premises
8.	Cost of Project	400 million
9.	Status of Project	Pre-Construction Phase

PROJECT OBJECTIVES

The objective of the proposed project is to establish a safe, reliable, and environmentally compliant storage facility for petroleum-based chemicals within the existing premises of FMC (Pvt.) Limited, located at Mehdiपुर Road off Multan Road, District Lahore. The project aims to construct four aboveground storage tanks with a total capacity of 375,000 liters for Solvesso A-100 (C9 chemical), which will be used for self-consumption in the factory's production processes. By developing an on-site storage facility, the proponent intends to ensure uninterrupted supply of raw material, reduce dependency on external

storage and transportation, and enhance overall operational efficiency. The project is further designed to optimize the utilization of the available 2 kanal land without requiring any additional land acquisition, thereby avoiding displacement or resettlement issues. A key objective is also to meet all environmental regulatory requirements under PEPA 1997 and NEQS, while safeguarding occupational health and safety through the adoption of hazard prevention measures, fire protection systems, and an emergency response plan. Ultimately, the project reflects FMC's commitment to sustainable industrial growth, environmental responsibility, and worker well-being.

Site Alternatives

In the case of the proposed storage facility, several site alternatives were considered and evaluated before finalizing the present location.

The first option was to establish the storage tanks at a new, independent location outside the existing factory premises. Although this could provide a dedicated area for storage, it would involve additional land acquisition, higher costs of construction and infrastructure development, and potential displacement or land-use conflicts. Moreover, transporting the stored chemical between the new site and the existing factory would increase traffic, fuel consumption, and associated emissions, thereby generating additional environmental and safety risks.

The second option was to utilize off-site commercial storage services. While this could reduce the burden of direct construction, it would increase reliance on external logistics and transportation. Frequent handling of Solvesso A-100 during transfer operations would raise the risk of spills, leaks, and emissions. Furthermore, the increased movement of heavy tankers on public roads could affect traffic safety and cause inconvenience to local communities.

The selected option is to construct the four aboveground storage tanks within the existing premises of FMC Pvt. Ltd. at Mehdipur Road, District Lahore. This alternative was chosen because it optimizes the use of available industrial land, eliminates the need for land acquisition, minimizes transportation requirements, and ensures strict control of safety and environmental management within the factory boundary. The location is already zoned for industrial activities, reducing the likelihood of adverse impacts on residential populations or sensitive receptors. Therefore, the chosen site is considered the most environmentally, socially, and economically viable alternative.

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

From an economic perspective, the option of continuing to rely on external storage facilities was considered but found to be costly in the long run due to recurring rental charges, transportation expenses, and supply chain risks. Constructing smaller tanks was also reviewed, but this would have increased refilling frequency and operational inefficiencies. The chosen option—developing four aboveground tanks with a total capacity of 375,000 liters within the existing FMC Pvt. Ltd. premises—ensures long-term cost savings, minimizes dependency on external facilities, and strengthens production reliability, making it the most economically viable solution.

Environmental Alternative

From an environmental perspective, the option of transporting Solvesso A-100 from off-site storage facilities was considered but found to increase the risks of spills, leaks, and emissions during handling and transportation. Establishing the tanks outside the existing premises would also require land development and potentially affect new environmental receptors. The selected alternative—constructing the tanks within the existing industrial premises of FMC Pvt. Ltd.—minimizes environmental disturbance, avoids additional land conversion, reduces transportation-related emissions, and ensures better control over environmental management, making it the most environmentally sustainable option.

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 of a Petroleum Products Storage Tanks, falls under Schedule-II, Category A (Energy), Clause 5 “Oil and gas extraction projects including exploration, production, gathering systems, separation and storage, i.e., the project requires an EIA study. Thus, an EIA report is being prepared and submitted accordingly for approval.

ENVIRONMENTAL CONSULTANT

An Initial Environmental Examination (IEE) 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 FMC United Private Limited. has decided to engage the services of Environmental Consultant, M/S Environmental Services of Pakistan Private Limited (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 IEE study. This is a very important step both in identifying the impacts and identifying scope of the IEE. Effective scoping enables:

- Defining the boundary of the IEE 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 involves the construction of four aboveground storage tanks with a total capacity of 375,000 liters for storing Solvesso A-100 (C9 chemical) within the existing premises of FMC United (Pvt.) Limited, located at Mehdiपुर Road off Multan Road, District Lahore. The storage tanks will serve the factory's self-consumption needs, ensuring a continuous and reliable supply of raw material for production processes. The project site covers approximately 2 kanal of industrial land already owned by FMC, thereby eliminating any requirement for land acquisition or resettlement. The facility will be equipped with proper safety systems, spill prevention measures, and fire protection infrastructure to ensure compliance with environmental and occupational health standards. The development of this storage facility reflects FMC's commitment to operational efficiency, environmental responsibility, and workplace safety.

MAJOR IMPACTS AND RECOMMENDED MITIGATION MEASURES:

The proposed construction and operation of storage tanks for Solvesso A-100 may result in certain environmental and social impacts, which have been carefully assessed in this EIA.

- **Air Quality:** Dust and emissions from construction machinery and vehicle movement may temporarily affect ambient air quality. During operation, volatile organic compounds (VOCs) may be released from solvent handling. *Mitigation:* Water sprinkling on unpaved areas, well-maintained machinery, installation of vapor-tight connections, and provision of appropriate venting systems.
- **Noise:** Construction equipment and transportation may generate noise, causing disturbance to nearby communities. *Mitigation:* Limit noisy activities to daytime hours, maintain equipment regularly, and provide workers with hearing protection.
- **Soil and Water Quality:** Accidental spills or leakages of Solvesso A-100 during storage or transfer could contaminate soil or groundwater. *Mitigation:* Provide impermeable flooring and bund walls around tanks, install leak detection systems, and ensure spill kits and emergency response protocols are in place.
- **Health and Safety:** Workers may face risks of exposure to chemical vapors, accidents, or fire hazards. *Mitigation:* Enforce strict use of PPEs, conduct safety training, install fire-fighting systems, and prepare an emergency response and evacuation plan.
- **Traffic and Transportation:** Movement of heavy vehicles during construction and chemical supply may disrupt local traffic. *Mitigation:* Implement a traffic management plan, regulate vehicle speed, and schedule deliveries to avoid peak hours.

- **Socioeconomic Environment:** The project is not expected to cause land acquisition or displacement; instead, it may generate employment opportunities during construction and operation. *Mitigation:* Prioritize local hiring and maintain good communication with nearby communities to avoid conflicts.

Overall, with the adoption of the proposed mitigation measures, the project's potential adverse impacts will be minimized and managed effectively, while enhancing its positive contributions to local employment and industrial development.

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 suggested 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. Appropriate 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 preparation 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.

CHAPTER # 1. INTRODUCTION

The industrial sector in Pakistan has witnessed significant growth over the past few decades, leading to an increased demand for reliable storage and handling facilities for petroleum products and allied chemicals. Safe and efficient storage of such materials is crucial not only for maintaining uninterrupted industrial operations but also for minimizing environmental risks associated with accidental releases, leakages, and fire hazards.

In this context, FMC United Private Limited, an established industrial entity located along Mehdiपुर Road, off Multan Road at 18 km, District Lahore, has proposed the construction of dedicated storage tanks within its existing premises. The storage tanks will be used exclusively for self-consumption within the factory, thereby ensuring continuous supply of raw material for production processes without dependence on external storage arrangements.

The proposed project involves the installation of four storage tanks designed for storing Solvesso A 100 (C-9 aromatic solvent), which is a petroleum-derived chemical commonly used as an industrial solvent. The project is to be undertaken entirely within the existing factory premises, minimizing land-use conflicts and making use of available industrial infrastructure.

Given the nature of the chemical and its potential environmental and health risks, an Environmental Impact Assessment (EIA) is required under the Pakistan Environmental Protection Act, 1997 and the Punjab Environmental Protection (Review of IEE/EIA) Regulations, 2000. The EIA will help identify, predict, and evaluate the likely environmental impacts of the proposed project and recommend appropriate mitigation measures to ensure environmental protection and regulatory compliance.

The project is aligned with the broader goals of industrial development while recognizing the importance of sustainable environmental management. The EIA study will therefore play a critical role in balancing industrial growth with environmental safeguards, thereby facilitating informed decision-making by both the project proponent and the Environmental Protection Agency (EPA).

1.1 THE PROPOSED PROJECT

The Proposed Project is entitled “Construction of Petroleum Product (Solvesso A-100) Storage Tanks within the Existing Premises of FMC United Private Limited, Mehdiपुर Road, 18 km Off Multan Road, District Lahore”.

10.	Project Title	Construction of Petroleum Product (Solvesso A 100) Storage Tanks within
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		the Existing Premises of FMC United Private Limited.
11.	Project Location	Mehdipur Road, 18 km off Multan Road, District Lahore”
12.	Nos of Storage Tanks and storage capacity	04 Tanks, Total capacity of the proposed project is 3,7500 liters
13.	Proponent	Mr. Haseebullah Zahur
14.	Consultant	Environmental Services Pakistan Private Limited
15.	Area of Project	Approx. 2 Kanal
16.	Present Status of Land Use	Vacant Land within the premises
17.	Cost of Project	400 million
18.	Status of Project	Pre-Construction Phase

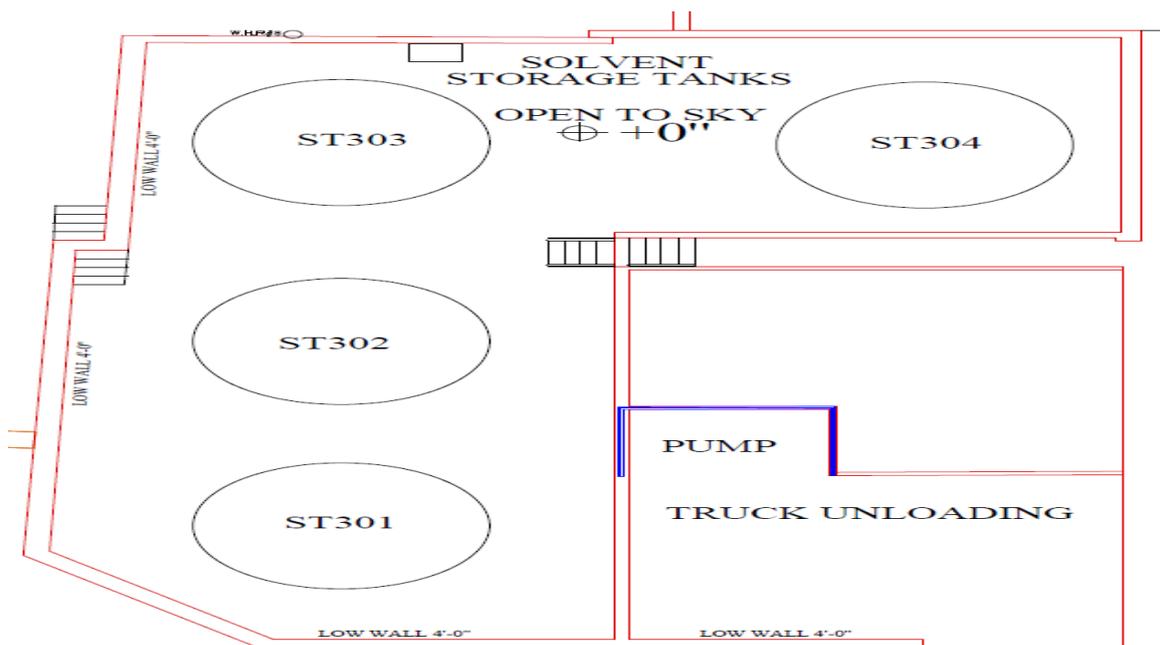
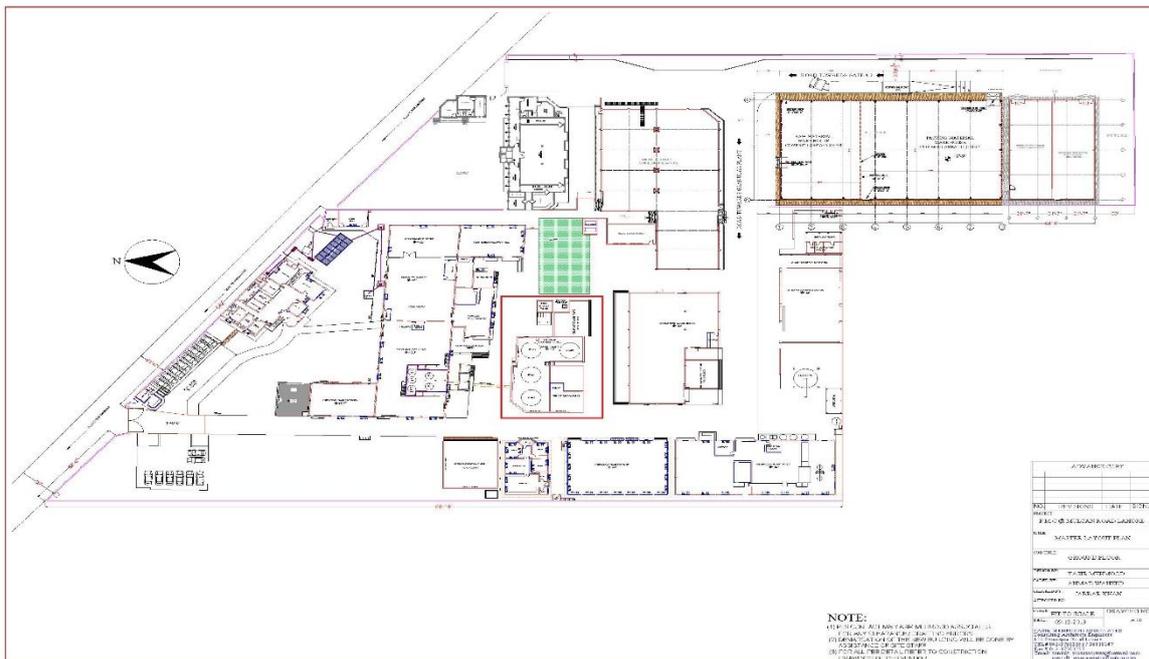


Figure 1-1: Layout Plan

1.1.1 PROJECT DESCRIPTION

FMC United Private Limited intends to develop a dedicated storage infrastructure within its existing factory premises located at Mehdiपुर Road, 18 km off Multan Road, District Lahore. The project involves the construction of four storage tanks designed to store Solvesso A 100 (C-9 aromatic solvent); a petroleum-based chemical used in the industrial processes of the factory. The stored product will be utilized exclusively for self-consumption, ensuring uninterrupted availability of raw material for production and minimizing dependency on external storage or supply chain disruptions.

The proposed storage facility will be constructed on a designated portion of the factory land (approx. 2 kanal). The facility will be equipped with modern safety and environmental protection systems in line with national standards and best industrial practices. Key features of the project are summarized below:

- Number of Tanks: 04 storage tanks.
- Stored Product: Solvesso A 100 (C-9 aromatic solvent).
- Purpose: Storage of raw material for in-house consumption.

1.1.2 INFRASTRUCTURE COMPONENTS

- Civil works for tank foundations and bund walls.
- Pipelines for product transfer and loading/unloading.
- Firefighting and safety systems including hydrants, extinguishers, and foam systems.
- Spill control and containment system.
- Monitoring and control instruments.

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 storage tanks.

1.2 OBJECTIVES OF THE PROJECT

The construction of petroleum products storage tanks at Mehdiपुर Road off Multan Road, 18 km, District Lahore, is driven by various objectives. The primary objective of the proposed project is to establish a safe, reliable, and environmentally compliant storage facility for **Solvesso A 100 (C-9 aromatic solvent)** within the existing premises of FMC United Private Limited. The construction of these storage tanks will support the factory's operational requirements while minimizing risks associated with handling and storage of petroleum-based chemicals.

Specific objectives of the project are as follows:

1.2.1 Ensure Uninterrupted Supply:

To provide a dedicated storage facility that guarantees the continuous availability of Solvesso A 100 for in-house consumption, reducing dependence on external supply chains.

1.2.2 Enhance Operational Efficiency:

To streamline the storage, handling, and transfer of petroleum products within the factory premises, thereby optimizing production processes.

1.2.3 Improve Safety and Environmental Management:

To adopt modern safety features (bund walls, spill containment, firefighting systems) and environmental safeguards (leak-proof tanks, monitoring, and waste management systems) to minimize risks to the environment and human health.

1.2.4 Promote Sustainable Industrial Growth:

To balance industrial development needs with environmental protection measures, ensuring that FMC UNITED PRIVATE LIMITED continues operations in line with best practices for sustainable development.

These objectives collectively reflect the multifaceted goals of constructing a petroleum products storage tank, encompassing economic, environmental, safety, and community-focused considerations. The successful achievement of these objectives contributes to the overall success and sustainability of the project.

1.3 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.

1.4 THE PROPONENT

FMC UNITED PRIVATE LIMITED.

Contact Person: Haseebullah Zahur

Designation: Chief Executive Officer

1.5 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 Private Limited (ESPAK)**. A team comprising environmental scientists, environmental engineers, and sociologists has worked on this report. The following table lists the names of those experts:

Table 1-1: List of Experts

Sr. No.	Team Member	Position Held	Qualifications
a)	Ali Ramzan	Lead Environmentalist	B.S Environmental Sciences
b)	Miss Asma Akram	Environmentalist	MS Environmental Sciences
c)	Miss Qurat Ul Ain Nadeem	Environmentalist	M.Phil. Environmental Sciences
d)	Shahzad Ahmad Khan	Cordinator	MBA Marketing

1.6 LOCATION OF THE PROJECT

The proposed project will be located at 18 km Multan Road Lahore

The required land is 2 Kanal out of 47 Kanals that is available for the proposed project.

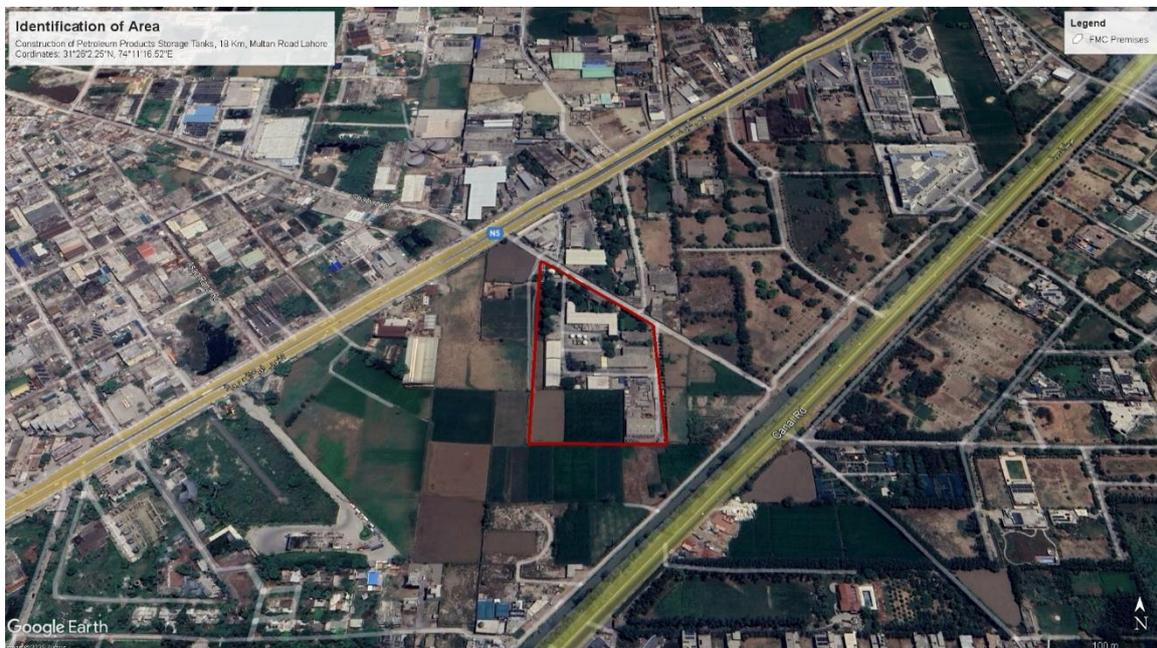


Figure 1-2: Proposed Location (31°26'2.25"N, 74°11'16.52"E)

1.7 IMPACT ASSESSMENT

The environmental and socio-economic features and other project information collected are 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 definition 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 an 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.” The PEPA Act provided the guidelines for categorizing the projects.

The Proposed Project, i.e., the construction of a Petroleum Products Storage Tanks, falls under Schedule-II, Category A (Energy), Clause 5 “Oil and gas extraction projects including exploration, production, gathering systems, separation and storage, i.e., the project requires an EIA study. Thus, an 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 Environmental Impact Assessment (EIA) define the timeframe during which the potential environmental impacts of the proposed project are assessed. These boundaries cover the **entire project life cycle**, from planning and construction to operation and eventual decommissioning.

The temporal boundaries for this project are as follows:

3.1.1 Construction Phase:

Duration: Approximately **6–9 months** (depending on site development and installation schedule).

Activities include site preparation, civil works, tank installation, pipeline laying, and commissioning of safety systems.

Potential impacts during this stage mainly relate to dust emissions, noise, waste generation, and disturbance to local communities.

3.1.2 Operational Phase:

Duration: **Long-term (20–25 years or more)**, covering the useful life of the storage tanks.

Activities include receipt, storage, and transfer of Solvesso A 100 for in-house consumption, routine maintenance of tanks, and periodic inspection.

Environmental impacts during this stage are associated with possible emissions of VOCs, risks of spills/leakages, generation of sludge during tank cleaning, and occupational health and safety concerns.

3.2 SPATIAL BOUNDARIES

The spatial boundaries define the geographic extent within which the environmental impacts of the proposed project are likely to occur. These boundaries help determine the **area of influence (Aoi)** for baseline studies and impact assessment. For the proposed storage tanks at FMC UNITED PRIVATE LIMITED, the spatial boundaries are categorized as follows:

3.2.1 Project Site Boundary (Core Zone):

The area within the existing premises of FMC UNITED PRIVATE LIMITED, where the **four storage tanks**, associated pipelines, and firefighting systems will be constructed and operated. This core zone represents the immediate location of potential impacts such as soil disturbance, localized noise, emissions, and occupational safety risks.

3.2.2 Immediate Surroundings (Buffer Zone):

An area of approximately **500 meters radius** around the project site, covering adjacent industrial plots, internal roads, and open spaces. Potential impacts in this zone may include temporary dust and noise during construction, and minor risk of air quality degradation (VOCs) or accidental spill dispersion during operation.

3.2.3 Extended Influence Area:

A wider area extending up to **2–3 kilometres** from the project site, encompassing nearby industrial units, residential settlements, access roads, and basic infrastructure. This zone is considered to assess broader environmental and social impacts, including traffic movement from supply trucks, emergency preparedness in case of accidental releases, and public health and safety concerns.

3.2.4 Environmental Receptors:

- **Air Quality:** Sensitive receptors such as nearby residences, industrial workers, and roadside vegetation.
- **Water Resources:** Groundwater aquifer beneath the site and any nearby surface drains.
- **Socioeconomic Environment:** Local workforce, nearby communities, and industries in the vicinity.

In summary, the spatial boundaries of the project extend from the core project site to its immediate surroundings and further to the regional context where indirect or cumulative impacts may be felt. This tiered approach ensures that both localized and broader environmental concerns are comprehensively addressed in the EIA.

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 plant.

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 3-1: 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.
Mr. Nihal Asghar	Director	SEAL	

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

4.1.1 Option 1 - Within the Existing FMC Premises (Selected Option)

The storage tanks are planned within the already established industrial premises of FMC UNITED PRIVATE LIMITED.

Advantages:

- No requirement for additional land acquisition.
- Minimizes land-use conflict since the site is already industrial.
- Existing infrastructure (utilities, security, boundary wall) can be utilized.
- Easier monitoring and operational control.

Disadvantages:

- Limited available space (2 kanal). Requires efficient layout planning.

4.1.2 Option 2 - Off-site Storage Facility

Establishing a separate facility outside the FMC factory.

Disadvantages:

- Land acquisition challenges.
- Higher cost of infrastructure development.
- Increased transportation and handling risks.
- Not preferred due to higher environmental and economic burden.

Conclusion: The selected option (within FMC premises) is environmentally and economically most viable.

4.2 TECHNOLOGY ALTERNATIVES

Since no technology will be used in this project, and this project is a DP 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

4.3.1 Option 1: “No Project” Alternative

Avoids any environmental risks from storage tanks. However, FMC would face operational inefficiencies, supply disruptions, and higher dependency on external storage/transportation.

4.3.2 Option 2: Proceed with Project Without Mitigation Measures

- Would pose unacceptable risks to the environment and human health (spills, VOC emissions, fire hazards).
- Not acceptable under regulatory requirements.

4.3.3 Option 3: Proceed with Project with Mitigation and Environmental Management (Selected Option)

- Incorporates bund walls, firefighting systems, spill control, and regular monitoring.
- Balances development needs with environmental protection.

4.4 Economic Alternatives

4.3.4 Option 1: Dependence on External Storage and Supply

- Would require regular procurement and transportation of Solvesso A 100 from third-party facilities.
- Higher long-term operational costs and supply chain vulnerabilities.

4.3.5 Option 2: Establish On-site Storage Tanks (Selected Option)

- Involves upfront capital investment in construction.
- Provides long-term economic benefits through reduced transportation cost, improved supply reliability, and operational efficiency.
- Enhances the competitiveness of FMC by ensuring steady raw material availability.
- Conclusion: On-site storage is economically preferable due to cost savings, reliability, and operational efficiency.

4.4 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 Chunian bypass 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. BASELINE ENVIRONMENTAL PROFILE

This section describes the baseline conditions, which cover the existing Physical, ecological and socio-economic environment of the project as well as the study area. Data was collected by reviewing secondary data and field survey.

The data regarding the physical environment was collected mainly within the project surroundings and some relevant information about Lahore city is also included where required. In the case of the biological and socioeconomic environment, efforts were made to collect the information within one Km around the project area and even up to 10 Km where any direct or indirect impacts were envisaged.

5.1 METHODOLOGY OF CONDUCTING BASELINE STUDY

Establishing the environmental baseline includes both the present and likely further state of the environment, considering changes resulting from natural events and other human activities, assuming the project is not undertaken – the no action alternative.

5.2 PHYSICAL ENVIRONMENT

This Section examines the physical resources such as topography, geology and soil, climate, surface and groundwater resources, wastewater effluent handling, noise levels and ambient air quality of not only the Project site but also the surroundings as a whole to assess whether the project under assessment can or does have any impact on any of these parameters

5.2.1 Topography

Lahore is generally flat and slopes towards south and south-west at an average gradient of 1:3000. It occupies a focal position in the Upper Indus Plain and is located along the eastern bank (left bank) of the River Ravi. It can be divided into two parts i.e., the low-lying area along the River Ravi and the comparatively upland area in the east away from Ravi. Lahore is bounded on the north and west by the Sheikhpura District, on the east by Wagah, and on the south by Kasur District. Lahore city covers a total land area of 404 square kilometers (156sqmi) and is still growing^{5,6}

The geographical coordinates of project site in Lahore are 31°26'51.88" N latitude and 74°16'13.5" E longitude and 209-meter elevation. The topography of the project site is almost flat. The area around the project site is mostly covered by artificial surfaces.

5.2.2 Geology and Soil

Lahore city lies on the alluvial plain called Bari Doab. Doab is a local word for an area between rivers as shown in Figure 4.1. It is bounded by the Ravi and Chenab rivers in the northwest and west and by the Sutlej River in the southeast.

The soil in the project area is cohesion less and is of alluvial type deposited by River Ravi. Deep boreholes drilled near Niazbeg Thokar (around 5 km from the project site at SKMCH&RC) encountered bedrock at 383 meters depth. This is possibly due to the underground ridge of Precambrian rocks extending from Shahpur to Dehli. From this it can be inferred that the thickness of alluvium under the city of Lahore is more than 380 meters.

Various geotechnical studies and boring of tube wells for water supply by WASA/LDA confirm that the Lahore soil is mainly composed of clayey silt, sandy silt, silty sand, lean clay and sand. Beds of gravel or coarse sand are uncommon. However, pebbles of siltstone or mudstone may be found embedded in silty or clayey sand. The major mineral composition for Lahore soil is Quartz, Muscovite and Clinocllore, which shows that the alluvial deposit received sediments from metamorphic origin.

5.2.3 Seismology

Seismic zoning map of Pakistan proposed by the building code of Pakistan⁸ (BCP: 2007) is shown in Figure 4.2. According to this map, Pakistan is divided in five seismic hazards zones (Zones 1, 2A, 2B, 3 and 4); Zone 1 being the lowest and Zone 4 is the highest seismic zone. Figure 4.3 shows the seismic zoning map of Pakistan. The project area falls in Zone 2A that shows a low to moderate level of seismicity. Zone 2A represents peak ground acceleration (PGA) from 0.08 to 0.16g (Table 4.1).



Figure 3.1 Geology and Soil

Table 5.1: Seismic Zones

Seismic Zone	Peak Horizontal Ground Acceleration	Zone Factor Z
1	0.05 to 0.08g	0.075
2A	0.08 to 0.16g	0.15
2B	0.16 to 0.24g	0.20
3	0.24 to 0.32g	0.30
4	➤ 0.32 g	0.4

Where “g” is acceleration due to gravity

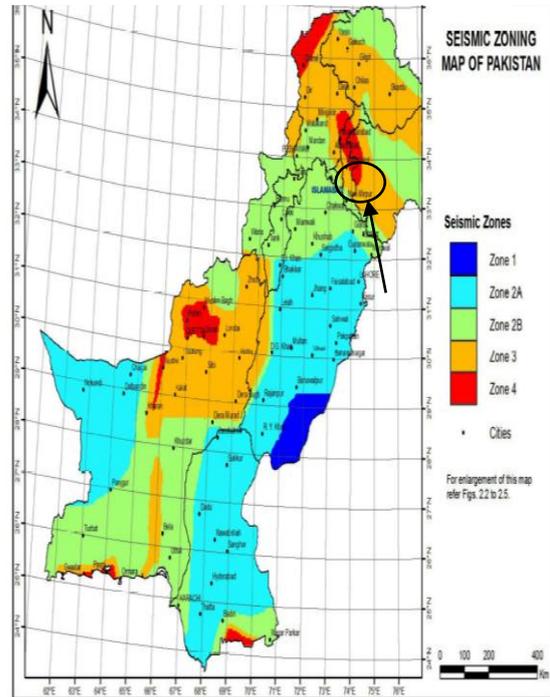


Figure 4.2 Seismic Zones

The epicenters of low to moderate magnitude earthquakes recorded in the Punjab Plain are associated with the subsurface fractures in the basement rocks which are concealed by the thick alluvial deposits. The known main active fault near Sargodha is the Main Boundary Thrust (MBT) which passes at a distance of about 180 km towards the northeast along the Himalayan front. The project region has also been subjected to severe shaking in the past due to earthquakes in the Himalayas; these should also be taken into consideration while designing.

5.2.4 Land Use and Land Cover (LULC)

Lahore being the second largest city of Pakistan is facing dramatic changes in LULC associated with rapid urbanization and increased population demands including the construction of new residential and commercial areas, public utilities and road infrastructure. In Lahore city, the area covered by water bodies, vegetation, and barren land is decreasing day by day due to the transformation of different land-use categories into built-up areas as comparison of 1998 and 2018 given in Table 4.2 and in Figure 4.3.

Table 4.2: Land-use categories of Lahore in 1998 and 2018

	1998	2018
Water bodies	2.7%,	0.6%,
vegetation	24.9%	22.6%
Barren land	42.5%	35.7%
Built-up	29.8%	41.0%

Transformation of one land-use type to another, may bring changes in surface energy, because different classes of LULC have different reflectance and evapotranspiration. Such rapid changes lead to significant changes in local climate, particularly having impacts on land surface temperature (LST) and local air temperature. The LST increases with decrease in vegetation and with increase in urban built-up and barren land. The LST in Lahore city has substantially increased during last 20 years.

The proposed project site is already in the hospital use as grassy lawns with few trees on the boundaries. This land is being currently used as temporary parking. Neighboring land of the Hospital have mixed use such as commercial buildings, marriage halls, restaurants, hotels, hostels, petrol stations, housing colonies, shopping centers and a university.

5.3 Climate

Lahore has a semi-arid climate, with extremely hot summers and cool winters.

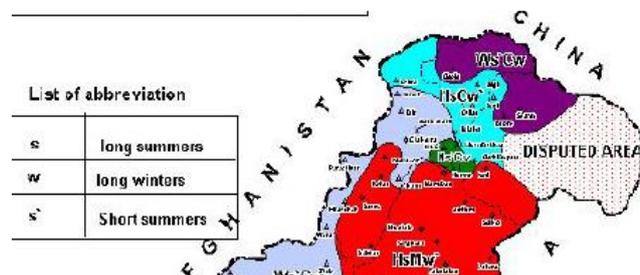
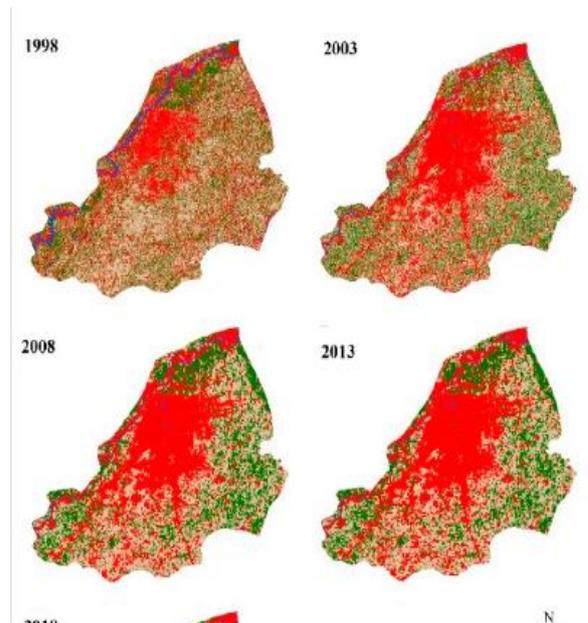


Figure 4.3 Land-use categories



Figure 4.4 Climate

There is a monsoon season between July and September. The temporal division of the country is given in Figure 4.4. The project site in Lahore falls under hot long summers and mild short winters. Maximum, minimum and average temperature of Lahore from 2000 to 2020 are exhibited in Figure 4.5. June is the hottest month with average maximum temperature around 40°C. The coldest month is January in which average minimum temperature was around 6.6°C.

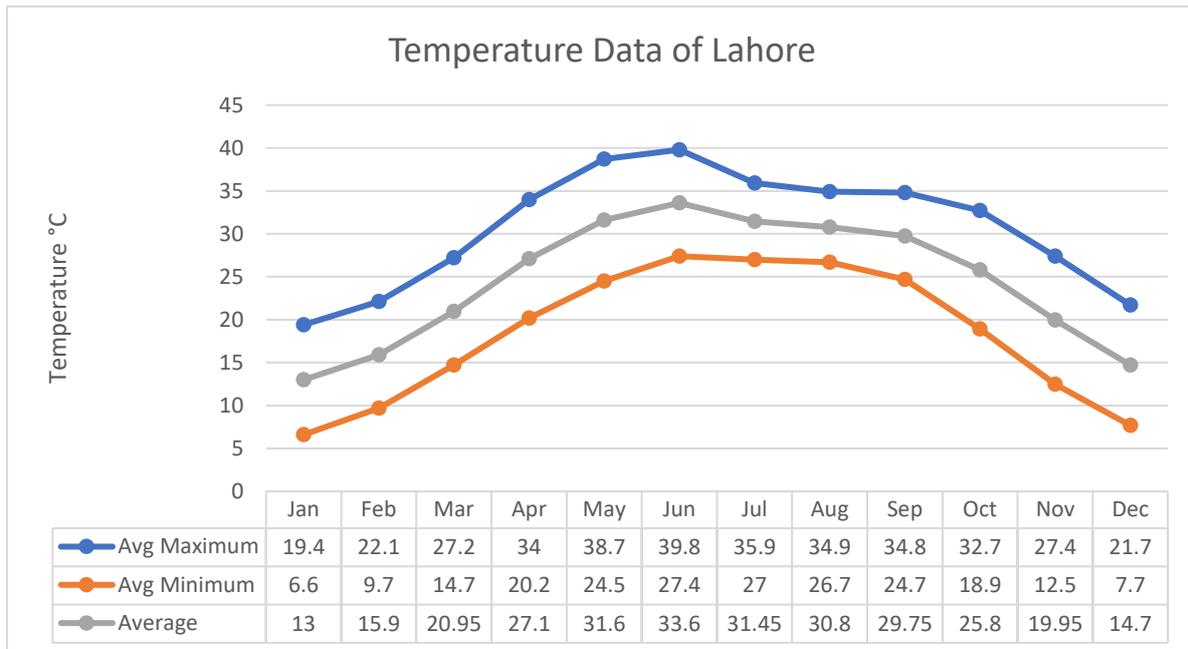


Figure 4.5: Temperature Data Lahore Region (Data Source: Climatic Data Processing Centre)

5.3.1 Rainfall

The monsoon rains hit Lahore in July, August and September, with July being the wettest month. The yearly variations are considerable. Nearly 70% of it received in the form of high-intensity showers during the monsoon and the remaining in winter. Average rainfall from 2000 to 2025 is illustrated in Figure 4.6.

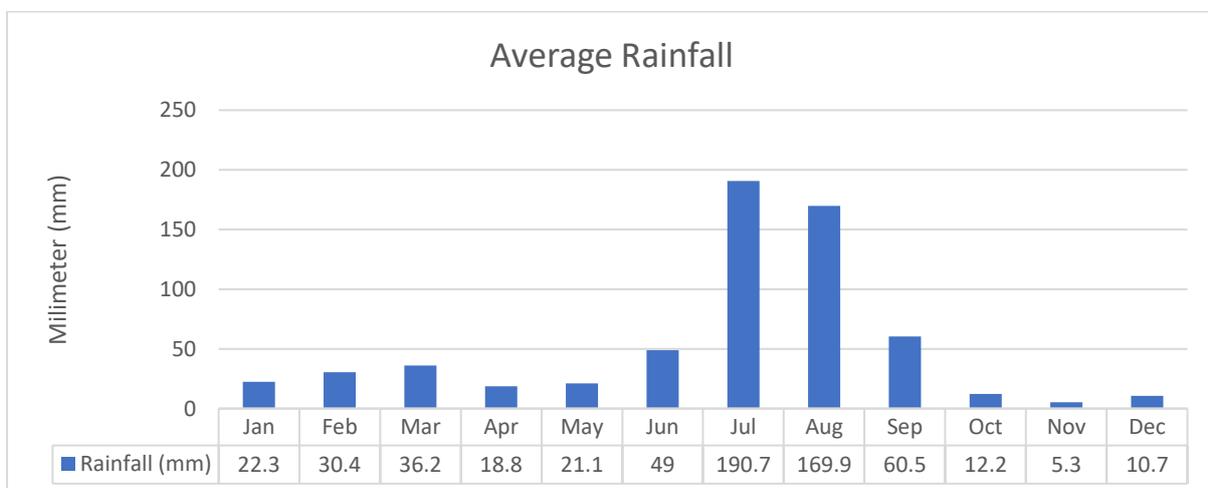


Figure 4.6: Rainfall Amount Data Lahore Region (Data Source: Climatic Data Processing Centre)

5.3.2 Humidity

The average humidity of the Lahore region for years (2000-2025) is exhibited in Figure 4.7.

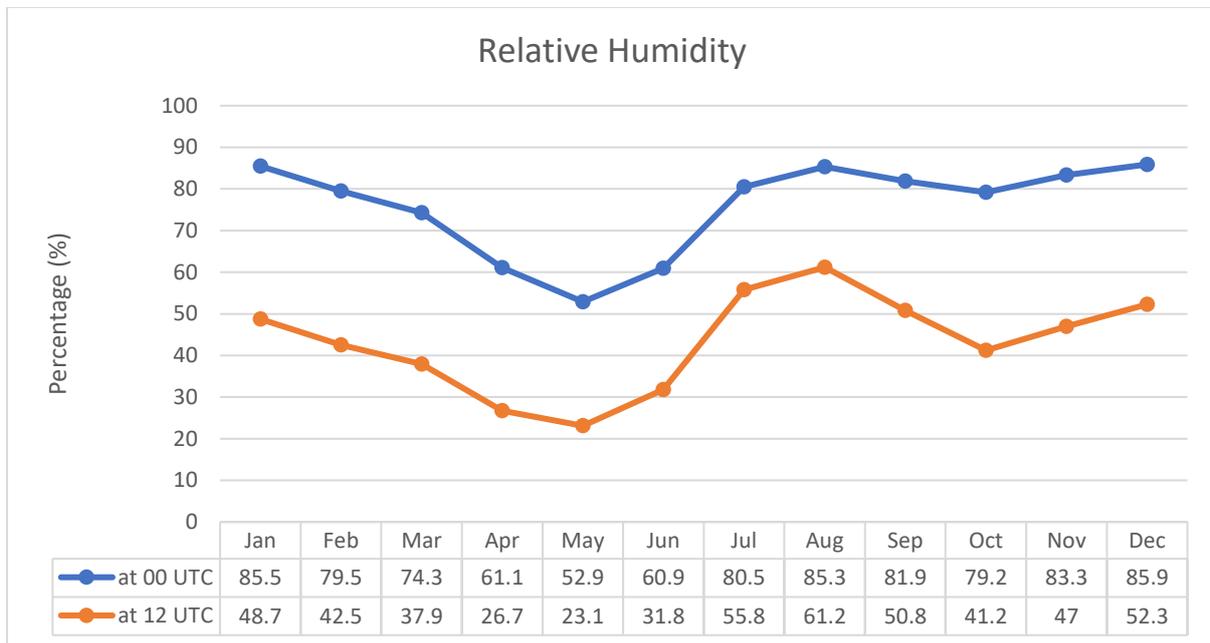


Figure 4.7: Relative Humidity Data Lahore Region (Data Source: Climatic Data Processing Centre)

5.3.3 Wind

The monthly mean velocities for 2000 – 2025 are exhibited in Figure 4.8.

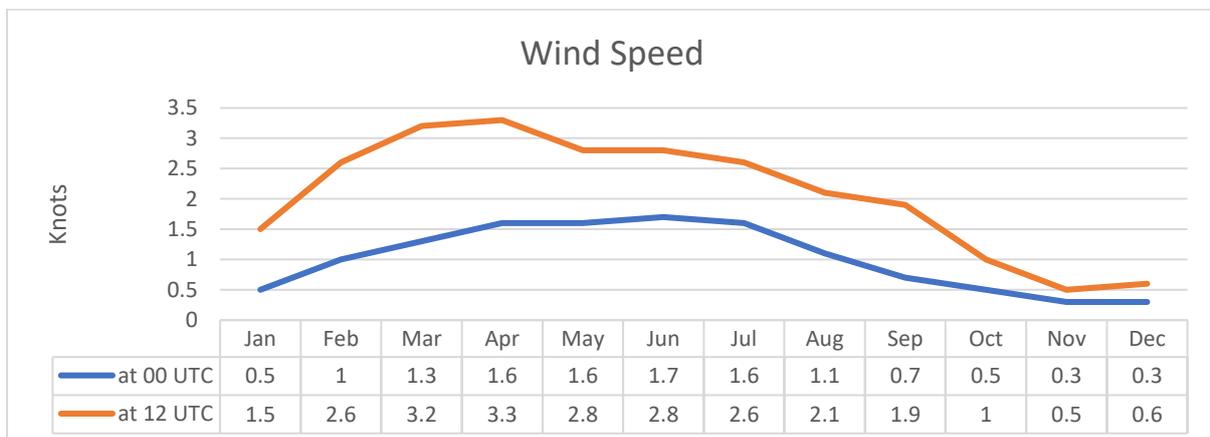


Figure 5.8: wind_Data Lahore Region (Data Source: Climatic Data Processing Centre)

Wind Direction: The wind is most often from (weatherspark.com):

North: From mid-February to mid-May and from mid-October to mid-November.

West: From mid-May to mid-July and from mid-November to mid-February.

East: From mid-August to mid-October

5.4 Water Resources

The resources of surface water and ground water have been discussed in this section. Most of the information is based on review of the published literature. The groundwater from the Hospital was also analyzed to check the quality of water available at the Project site.

5.4.1 Surface Water

Historically River Ravi was a dependable surface water source for Lahore. The average flow in Ravi during 1922-1961 was 1,300 MCM/day. Indus Water Treaty 1960 was the biggest setback for Lahore which allocated water rights of three eastern rivers (Ravi, Beas and Sutlej) to India. Since 1995, the average flow in Ravi remained above 400 MCM/day. Unfortunately, the operation of Thein Dam on River Ravi in 2000 by India dramatically reduced the water flow. Except flood events during an extraordinary rainy season, no regular flows of appreciable amount are expected. Therefore, due to very low water intake of River Ravi it can no longer be considered as a dependable surface water source to cater increasing water supply demand of Lahore and to recharge the Lahore aquifer. On the other hand, the entire municipal waste from Lahore city is collected through a network of 14 main drains and discharged into the River Ravi without any treatment which is a big threat to the quality of groundwater.

The main recharge to Lahore's aquifer comes from the River Ravi on the northwest and Bambawala- Ravi-Badian- Deplapur (BRBD) link canal (fed by Upper Chenab Canal off-taking from Marala Barrage) on the east. The area is commanded jointly by Lahore Branch, Khaira and Buthar khana distributaries and Main Branch Lower, all of them off-taking from BRBD link canal (Figure 4.9). As an alternative to groundwater in Lahore, the main resources of surface water that can be considered are the BRBD canal and its branch canals.

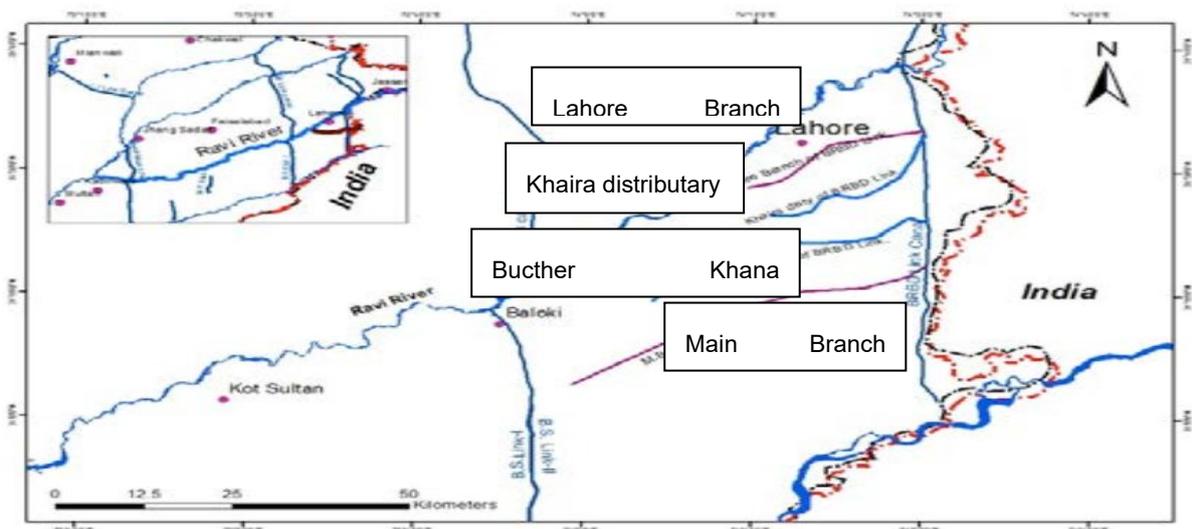


Figure 4.9: Canals System Feeding Lahore City (Canals off-taking from BRBD Canal)

Recently WASA is working on a proposal of using Bambawala-Ravi-Badian-Deplapur (BRBD) canal to augment existing groundwater supplies with the surface water resource. The Water Supply Infrastructure component of the Lahore Water and Waste Management Project (LWWMP) includes the following:

- a) Diversion of 100 cusec (245,000 m³/day) of water from BRBD canal to the proposed surface water treatment plant and supplying 100 cusec (after treatment) drinking water quality water to the most affected areas of the city.
- b) Construction of 3.5km-long transmission main pipeline for water supply from the SWTP to 55 feeding mains pipeline (28 km long) connecting to the existing distribution network of four selected serving areas, and rehabilitation of existing distribution pipes (81km).

The Ravi Riverfront Urban Development (RRFUD) project is another environment friendly initiative of Govt. of Punjab addressing severe issues of Lahore city like contamination of the River Ravi and fast depletion of underground water besides stimulating economic activities. The Ravi Riverfront will be developed in three phases and, in the initial phase, a lake covering 46 kilometers area, six wastewater treatment plants, three barrages and urban forest would be developed during the first three years. (Figure 4.10).

5.4.2 Groundwater

At present groundwater is the only available source to meet the water needs of 11.1 million population (CENSUS 2017) of Lahore. Lahore WASA is the second largest water utility in Pakistan (after Karachi Water and Sewerage Board) with operating service area of more than 350 sq. km. LWASA is delivering water to its customers through 700,000 water connections, 585 tube wells and 5,400 km of 3" to 20" diameter pipeline distribution networks. These tube-wells comprising of variable depths (400-850 ft.) are being used for the extraction of groundwater and then pumped into the distribution system. Currently, the groundwater abstraction by LWASA is 540 million gallons per day (MGD), or equivalent to 2.45 million cubic meters per day (1,000 cusecs).

In view of increasing demand due to ongoing urbanization and increased commercial activities, the number of tube-wells are also increasing with every passing day. Excessive abstraction of groundwater with less aquifer recharge owing to the reduction in inflow of river Ravi are the major causes of depleted aquifer level that is drastically depleting with an average of 1 meter per annum. Lahore receives an average annual rainfall of about 715 mm, which does not contribute much to recharging the aquifer. This uneven groundwater development has resulted in a big groundwater level recession, with maximum depth to

groundwater up to 47 m in some areas. However, in Johar Town, where the Expansion Project has been proposed, the static water level is around 35 m.

Tapping deep aquifer is also associated with increasing consumption of electricity. Currently, the energy expense is over 40% of the annual expenditure of LWASA as per LWASA report. To cater this situation, the Government's proposed projects of augmenting existing groundwater supplies with the surface water resource and RRFUD Proposed Project, as mentioned above in Subsection (4.3.7.1) are appreciable and must be implemented on fast track.

In the project, there is no water supply from LWASA water network, and the water requirement is being fulfilled by 5hp water turbine. These tubewells have sufficient capacity to cater the additional water requirement of the Proposed Project. To establish baseline, the samples of groundwater were collected from potable water circuit of the Hospital. The laboratory analyses of groundwater are presented in Table 4.4. The lab reports are attached as Annexure-D.

5.4.3 BIOLOGICAL ENVIRONMENT

5.4.3.1 Natural Habitat

Due to fast-paced urbanization, the project site and its close vicinity has almost lost its natural habitat. As habitat loss proceeds, there is an increasing need to focus on smaller patches of vegetation for the conservation of remaining habitat. The Lahore canal that passes adjacent to Johar Town and is 4 Km from the Project Site was declared as "The Lahore Canal Heritage Park" in 2013. Thousands of trees were cut down from both sides of the Canal Bank for expansion of the Canal Bank Road. However, this "Canal Heritage Park" still shows signs of natural habitat that presents a diverse variety of vegetation and trees of different species on the green belts and both sides of canal bank. The dominant tree species are Eucalyptus, Alstonia (Apocynaceae family), Poplar (Salicaceae family), Weeping Willow (*Salix babylonica*), Peepul (*Ficus religiosa*), Kachnar (*Bauhinia variegata*), Jaman (*syzygium cumini*), and Gul e Nishtar. During recent years, Parks and Horticulture authority (PHA) has planted a number of figs, guava, Chinese lemon and jujuba (*Beri*) trees on canal bank and green belts of Johar Town. The nests of some birds were also observed on the canal bank trees. Lahore Wildlife Park is around 10 Km and Lahore Botanical Garden is in the Jallo Park, about 20 Km from Project site.

5.4.4 Flora

There are a number of trees and shrubs on green belts of roads outside the Hospital which are managed by Parks and Horticulture Authority. At the boundaries of the Project land,

trees of different species and sizes are planted. Main species that will be affected by the Project are Pine (1), Alstonia (24), Jaman (32), Arjun (12) and Sukh chain (20).

5.4.5 Fauna

Common birds found in the neighborhood of the Project site are house crows, sparrows, pigeons, and common mynas, red vented bulbuls. Sometimes, little egrets (*Egretta garzetta*) and lapwings are also observed. The parrots in Lahore are declining fast and normally kept in cages where their survival rate is quite low. Black kites can also be found soaring around the Hospital. Rubbish dumps have become feeding sites for few species. Stray dogs, feral cats, palm squirrel, frogs, house mouse and common lizards were observed in the study area. Mongooses were also seen near the canal. The buildings in the neighboring housing societies and some trees had been infested by termites. It seems that buildings have been built over their former habitat.

5.4.6 SOCIOECONOMIC ENVIRONMENT

5.4.6.1 Demographics

The population of Lahore was determined (Census 2017) to be 11,126,285 with an annual growth rate of 4.07% since 1998. Gender-wise, 52.35% of the population is male, while 47.64% is female, and transgender people make 0.01% of the population. Lahore is a young city with over 40% of its inhabitants below the age of 15. Lahore's 2020 population is now estimated at 12,642,423 (Figure 4.14). These estimates represent the urban agglomeration of Lahore, which typically includes Lahore's population in addition to adjacent suburban areas. The population density currently sits around 6,300 residents per square kilometer (16,000 individuals per square mile). There are Muslims (95.4%), Christians (3.0%), Hindus (1.0%), Sikhs (0.5%), others (0.1%) in Lahore⁵. The average household size in Punjab is 6.4 whereas number of households in Lahore is 1,758 thousand. The data also apply to the population in Johar Town.

5.4.7 Administration Setup

Metropolitan Corporation Lahore is divided into nine administrative zones. Each zone in turn consists of a group of Union Councils. Overall, nine zones are further divided into 271 Union Councils as per notification of Government of the Punjab in 2017.

The project site is located in Johar Town in Union Councils 114/115 within Administrative Zone 8 "Allama

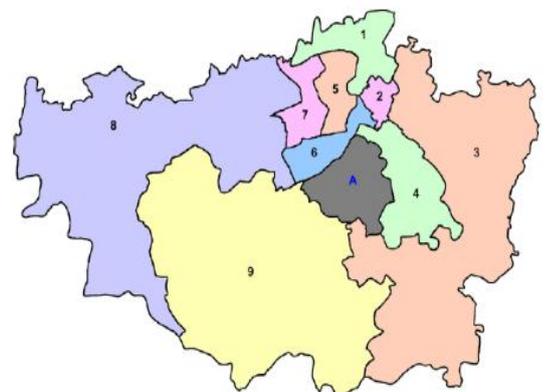


Figure 4.15 Administration Zones of Lahore

Iqbal” of Lahore. (Figure 4.15)

Business and Recreational Activities around the Project Site

Lahore is the country’s second largest city and represents almost 11% of the GDP of Pakistan. Over the past few years, Lahore’s economy has shifted from manufacturing to education and IT because Lahore being the most urbanized city of the country. The project site is surrounded by major business centers and is at the heart of Lahore.

The International Expo Center is around 2 Km from the project's site. The main objective of the center is to host trade exhibitions, conferences and consumer fairs to promote the different sectors of the economy.

Another major business hub about to open in the area is the Finance and Trade Center of Johar Town. The area for this center comprises 1123 Kanals and the site includes corporate offices, a five-star hotel, a super store and executive apartments amongst other things. This project is expected to provide a comprehensive place for Corporate Businesses and will attract many foreign investors to Pakistan.

Lahore Development Authority (LDA) Head Office and Lahore Sports Club are very close to the Hospital.

Emporium Mall is just 2 Km from the Project site and is home to over 200 International and local brands. It includes a nine-screen multiplex cinema and Pakistan's largest cinema called Universal Cinemas. It also contains a large food court with a sitting area that accommodates 3000 people. Other features include Fun Factory Park (kids play area), banquet halls, restaurants, eateries, a large hypermarket named Carrefour and a 110-Room five-star hotel.

5.4.8 Education and Literacy

There are several educational institutions that offer pre-school to graduate degree programs. These are private and public institutions including institutions for technical, special and religious education (madrasas). The private institutions are maintaining better environment of education however not easily affordable by the middle-class citizens of the community. On the other hand, a few local public institutions are unable to serve a large proportion of the area population with quality education. Therefore, parents prefer sending their children to Private schools despite the low fee structure of public schools. Some of the public and private institutions are listed below. The presence of public and private Special Education Schools in the community is quite admirable.

The Pakistan Economic Survey revealed that country's literacy rate increased by two percent to 60% in 2018 -19 from 58% in 2015-16. Among the population aged 10 year and above, the literacy rate in the urban area was higher at 74% as compared to the rural areas with a rate of 51%. In Punjab the literacy rate in 2018-19 was 73% for male and 57% for female with total Transportation and Access to the Project Site

5.5 Healthcare Facilities

Healthcare needs are taken care of by the Public as well as Private Sectors. The people in Johar Town prefer the Private Hospitals and Clinics of the area. The major hospitals in Johar Town are Iqra Medical Complex, Ihsan Mumtaz Hospital, Latif Hospital, Horizon Hospital, Doctors Hospital and Mughal Eye Hospital. Jinnah Hospital, a public Hospital and Allama Iqbal Medical College are in the neighborhood of Johar Town. The other major Public Hospitals in Lahore are Services Hospital, General Hospital, Children Hospital, Gulab Devi Hospital and Punjab Institute of Cardiology-PIC. These public Hospitals are delivering diversified healthcare services even with limited resources.

5.6 Culture and Religious Resources

There is not any known archeological or historical site around the project site. The Project Site is surrounded by developed housing societies and commercial area having large grocery stores, restaurants, marriage halls, petrol pumps, educational institutions and small and medium size markets. With reference to urbanization, the population is swiftly moving towards urban centers to avail better socioeconomic facilities. This has considerably changed the culture of Lahore which is home to different cultural sects such as Punjabi, Pathan, Saraiki, Udru speaking etc. The old age people normally speak their native languages however new generation prefer to speak Urdu. Most of the Johar Town is a developed area and the people have an urban living style. There are a few Kacchi abadis where people have their own village culture. There are quite a number of mosques and madrasas in Johar Town. A Jamia Masjid is also located in the Hospital for the visitors and employees.

Some katchi abadis or urban villages such as Bheer Pind and Ferozewala are couched within Johar Town where residents' way of life partially reflects the rural environment. Although Lahore Development Authority (LDA) has not given them property rights and demolished some of their buildings, the residents of these katchi abadis are building good quality housing as they had political backing from influential MPAs and MNAs in the past. However, these settlements have no impact on the Proposed Project.

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

Impact identification for the proposed project was carried out using internationally recognized EIA techniques and tools, supplemented by site-specific observations and stakeholder consultations. The following methodologies were applied:

6.1.1 Review of Project Activities

- Each activity of the project was reviewed across **construction, operation, and decommissioning** phases.
- Activities considered included site clearance, tank and bund construction, material handling, tank filling and transfer, storage, sludge removal, and emergency scenarios.

6.1.2 Baseline-Interaction Method

- The **interaction of project activities with baseline environmental components** (physical, biological, and socioeconomic) was examined to identify potential sources of impact.
- Environmental receptors included **air, noise, soil, groundwater, flora/fauna, and local communities**.

6.1.3 Checklists & Matrices

- Standard **impact checklists** were used to ensure all possible environmental aspects (air, water, soil, waste, risk, safety, and social) were evaluated.
- An **impact matrix** was developed to establish activity–receptor linkages, enabling systematic identification of significant impacts.

6.1.4 Expert Judgment & Past Experience

- Professional experience and **case studies of similar chemical storage facilities** were used to anticipate potential risks (e.g., VOC emissions, leakage, fire/explosion hazards).

Phase Impact Matrix

Each identified impact was assessed using the following criteria:

The following matrix summarizes potential impacts of project activities during the construction phase on different environmental and socioeconomic components:

Legend:

- **O** = No Impact
- **LA** = Low Adverse
- **MA** = Medium Adverse
- **HA** = High Adverse
- **LB** = Low Beneficial
- **MB** = Medium Beneficial
- **HB** = High Beneficial

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CONSTRUCTION PHASE

Project Activities	Topography & Drainage	Soil Quality	Landscape	Surface Water Quality	Ground Water Quality	Air Quality	Noise	Flora	Fauna	Agricultural Land	Health & Safety	Public Utilities	Employment	Population Disturbance	Social Disorder	Cultural Values	Traffic Management
Placement of construction machinery	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 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/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 groundwater	O	O	O	O	MA	O	O	MA	O	MA	LA	HA	O	O	LA	O	O
Material mixing/preparation	LA	MA	LA	LA	LA	LA	HA	O	O	O	HA	HA	HB	MA	LA	MA	O
Welding/cutting/steel fixing	O	O	O	O	O	MA	HA	O	O	O	HA	O	HB	MA	LA	LA	O
Shuttering/beams	O	O	O	O	O	MA	HA	O	O	O	HA	LA	HB	MA	MA	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 for temporary storage	O	O	O	LA	LA	O	O	O	LB	O	LA	LA	B	LA	O	O	O

OPERATIONAL PHASE																	
Project Activities	Topography & Drainage	Soil Quality	Landscape	Surface Water Quality	Ground Water Quality	Air Quality (VOCs/odors)	Noise	Flora	Fauna	Agricultural Land	Health & Safety	Public Utilities	Employment	Population Disturbance	Social Disorder	Cultural Values	Traffic Management
Tank operation & solvent storage	O	MA	O	LA	MA	HA	O	LA	LA	O	HA	O	MB	O	O	O	O
Transfer/loading/unloading of Solvesso	O	LA	O	MA	HA	HA	MA	O	O	O	HA	O	MB	MA	O	O	MA
Tank maintenance & cleaning (sludge removal)	O	MA	O	LA	MA	LA	O	O	O	O	MA	O	LB	O	O	O	O
Waste/sludge handling & disposal	O	MA	O	LA	MA	LA	O	O	O	O	MA	O	LB	O	O	O	O
Emergency scenarios (spills, leaks, fire)	O	HA	O	MA	HA	HA	MA	LA	LA	O	HA	HA	O	HA	MA	LA	MA
Generator/ancillary equipment use	O	O	O	O	O	MA	MA	O	O	O	MA	O	O	O	O	O	O
Employment of operational staff	O	O	O	O	O	O	O	O	O	O	O	O	HB	O	O	O	O
Monitoring & safety drills	O	O	O	O	O	O	O	O	O	O	HB	O	LB	O	O	O	O

Vehicle/tanker movement (supply & dispatch)	O	LA	O	LA	MA	MA	MA	O	O	O	MA	LA	MB	MA	LA	O	HA
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6.2 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.

6.3 MEETINGS

For the identification of the social impacts of the project, meetings and group discussions were held with the local people, stakeholders, nearby residents and passerby because social acceptability of the project and the area is a key to success. Consultation with the stakeholders is a tool for managing two-way communication between the project proponent and the affected public. Its goal is to improve decision making and built understanding by actively involving individuals, groups and organizations, which have stake in the project. This involvement increases project's long-term viability and enhances its benefits to locally affected people and other stakeholders. To identify the different types of stakeholders and ascertain their perceptions about the project, an initial environmental examination was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed in the following. The EIA team carried out public consultations at various locations around the Project Site. The stakeholder's consultation during this phase of the work targeted the project area, administrative and private offices, Govt. offices, shops, etc. near the Project area:

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

6.4 CHARACTERISTICS OF IMPACTS

6.4.1 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.

6.4.2 Potential Positive Impacts

The project is envisaged to have followed major positive impacts;

- Employment opportunities:

Construction of proposed unit by M/s FMC UNITED 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 500 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 of M/s FMC UNITED PRIVATE LIMITED. will improve the infrastructure of the area as proponent has incorporated aesthetic values and regeneration of site in its planning stage.

6.4.3 Economic benefits:

Construction of M/s FMC UNITED 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.

6.4.4 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.

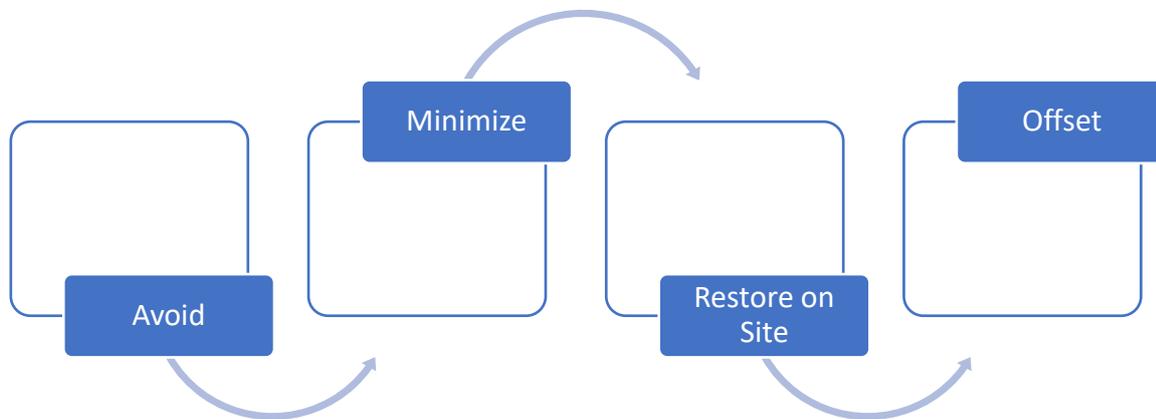
Moderate Impacts These impacts need specific and additional mitigation measures.

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?

6.5 Impact Significance

6.5.1 Ecological Importance – Natural Vegetation

Assessment of Impact: The project is within an industrial premises (2 kanal) where vegetation is already minimal and no tree cutting is required. A significant impact would occur only if vegetation outside the site were unnecessarily cleared.

- **Nature of Impact:** Direct
- **Duration:** Long-term
- **Timing:** Construction phase
- **Reversibility:** Irreversible if removal occurs
- **Likelihood:** Low
- **Consequences:** Mild (no rare/endangered species present)
- **Impact Significance:** Not significant
- **Mitigation Measures:**
 - Avoid parking or material storage on any existing green strips.
 - Implement compensatory plantation of suitable species after construction.

- Residual Impact: Insignificant if mitigation is followed.

6.5.2 Fauna

The site is within a built-up industrial zone with no wildlife.

- **Nature of Impact:** Direct
- **Duration:** Short-term
- **Timing:** Construction phase
- **Reversibility:** Not applicable
- **Likelihood:** Very low
- **Consequences:** Nil
- **Impact Significance:** Not significant
- **Residual Impact:** No impact expected.

6.5.3 Social Importance

During construction, vehicular movement and heavy equipment transport may cause temporary disturbance and minor inconvenience to road users.

- **Nature of Impact:** Direct
 - **Duration:** Short-term
 - **Timing:** Construction phase
 - **Reversibility:** Reversible
 - **Likelihood:** Moderate
 - **Consequences:** Minor traffic delays and road wear
 - **Impact Significance:** Slightly significant
 - **Mitigation Measures:**
 - Schedule transport during off-peak hours.
 - Enforce load restrictions to prevent road damage.
 - Coordinate with local authorities for traffic management.
 - **Residual Impact:** Slight.
-

6.5.4 Cultural Issues

The project site is in an industrial estate with limited community interaction. Risks of cultural conflict are minimal.

- **Nature of Impact:** Direct
- **Duration:** Short-term
- **Timing:** Construction phase
- **Reversibility:** Reversible
- **Likelihood:** Low
- **Consequences:** Negligible
- **Impact Significance:** Not significant
- **Mitigation Measures:** Hire local workers where possible; orient external workers on local customs.

6.5.5 Accident Risks

Handling construction equipment and later storage of flammable chemicals (Solvesso A-100) poses accident risks.

- **Nature of Impact:** Direct
- **Duration:** Long-term (covers both phases)
- **Timing:** Construction & Operation phase
- **Reversibility:** Irreversible in case of major accident
- **Likelihood:** Moderate
- **Consequences:** High (fire, explosion, injury)
- **Impact Significance:** Significant
- **Mitigation Measures:**
 - Provide PPE, safety training, and first-aid facilities.
 - Install fire hydrants, extinguishers, and foam system.
 - Prepare an Emergency Response Plan (ERP).
 - Residual Impact: Low if safety systems are effectively implemented.

6.5.6 Noise

Noise will be generated from machinery during construction and from pumps/generators during operation.

- Nature of Impact: Direct
- Duration: Short-term (construction) and intermittent (operation)
- Timing: Both phases
- Reversibility: Reversible
- Likelihood: Moderate
- Consequences: Annoyance to workers/nearby residents
- Impact Significance: Slightly significant
- Residual Impact: Minor

Mitigation Measures:

- Limit noisy activities to daytime.
- Provide ear protection for workers.

6.5.7 Health & Safety

Occupational health risks include exposure to volatile organic compounds (VOCs), fire, and slips/trips.

- Nature of Impact: Direct
- Duration: Long-term
- Timing: Operational phase
- Reversibility: Partially reversible
- Likelihood: Moderate
- Consequences: Moderate to high
- Impact Significance: Significant
- Mitigation Measures:
 - Regular medical check-ups for workers.
 - Proper ventilation and monitoring of VOCs.
 - Training in safe handling of Solvesso.
- **Residual Impact:** Slightly significant.

Land Use & Resettlement

- The project is located on FMC-owned industrial land.
- No land acquisition, displacement, or resettlement is involved.

- Impact Significance: Not significant.

Solid Waste / Sludge Management

- Nature of Impact: Direct
- Duration: Short-term (tank cleaning intervals)
- Timing: Operational phase
- Reversibility: Reversible
- Likelihood: Low
- Consequences: Mild (if not managed)
- Impact Significance: Low
- Mitigation Measures: Safe handling and disposal via licensed hazardous waste contractors.
- Residual Impact: Insignificant.

6.5.8 Air Quality

VOC emissions during storage/transfer are the most critical issue.

- Nature of Impact: Direct
- Duration: Long-term
- Timing: Operational phase
- Reversibility: Reversible (with controls)
- Likelihood: Moderate
- Consequences: Moderate to high (localized impact)
- Impact Significance: Significant
- Mitigation Measures: Vapor recovery, sealed transfer lines, monitoring.
- Residual Impact: Slightly significant.

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 project proponent (M/s FMC Pvt. Ltd.) will adopt the following management approach:

- A dedicated **Environmental and Safety Officer (ESO)** will be appointed at site.
- Clear responsibilities will be defined for contractors, supervisors, and workers.
- Mitigation measures will be integrated into contracts with construction contractors.
- Standard Operating Procedures (SOPs) for safe handling, transfer, and storage of Solvesso A-100 will be developed and implemented.
- Periodic environmental audits will be carried out by third-party consultants or EPA, as required.

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
	Gaseous/ Dust emissions		<p>Control speed of construction vehicles</p> <ul style="list-style-type: none"> - To minimize dust generation water should be sprinkled on the construction site and on drive ways as frequently as possible. - Regular maintenance of equipment. - People who are working and exposed to severe dust and exhaust fumes should be provided with PPEs. - The use of low sulphur fuels in construction equipment and ensuring proper vehicle and equipment maintenance. - Construction vehicles and machinery shall be equipped with standard pollution control devices to minimize emissions. - Civil debris, if generated during construction phase, shall be disposed in low-lying areas for land filling. - Construction materials i.e., sand, clay should be transported to the project site in covered trucks. - All project vehicles should be checked regularly to ensure that engines are in sound working condition and are not emitting smoke. - 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. - The site proposed for the extension of M/s M/s FMC UNITED PRIVATE LIMITED. 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. 	HSE/Environment Manager
	Noise		<ul style="list-style-type: none"> - Ensure Noise level compliance according to Rules and Regulation - Ensure all construction machinery are maintained and 	HSE/Environment Manager

#	Environmental Parameter/ Element	POTENTIAL IMPACTS	MITIGATION MEASURE/ENHANCEMENT MEASURES	RESPONSIBILITIES
			<p>serviced in accordance with the contractor's specifications</p> <ul style="list-style-type: none"> – Ensure exhaust mufflers and engine enclosures are in place and in good working order for all construction equipment and industrial trucks. – Ensure Noise generation activities to be relegated during daytime. – Ensure that vehicles undergo routine maintenance – Notifying the neighbour in case there would be some noisy events. – Ear plugs will be provided & implemented in case of heavy noise. 	
	Health & safety		<ul style="list-style-type: none"> – Workers/people will be informed in advance when work is about to start at the project site. – Machinery will never be left unattended. – Safe driving practices will be adopted, particularly while passing through human settlements. – Basic health facilities will be provided to workers. 	HSE/Environment Manager
	Soil and water pollution		<ul style="list-style-type: none"> – Prevention of accidental oil or chemical spillage, solid matters, contaminants, debris and other pollutants and wastes from entering into surface and ground water. – Awareness on environmental protection. – Avoid deposition of stockpiling materials near or on-stream banks or another watercourse perimeter. – No grey water runoff or uncontrolled discharges from the 	HSE/Environment Manager

#	Environmental Parameter/ Element	POTENTIAL IMPACTS	MITIGATION MEASURE/ENHANCEMENT MEASURES	RESPONSIBILITIES
			<p>site/working areas (including wash down areas) without treatment shall be permitted. 9. Water containing pollutants such as cement, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site.</p> <ul style="list-style-type: none"> – Spills during construction or operations shall be absorbed with absorbent blankets, socks, or absorbent 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. – 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. – 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. – 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. – Proper handling and storage procedures for hazardous wastes e.g., fuel oil should be stored in areas with hard 	

#	Environmental Parameter/ Element	POTENTIAL IMPACTS	MITIGATION MEASURE/ENHANCEMENT MEASURES	RESPONSIBILITIES
			<p>standing and containment to handle spills.</p> <ul style="list-style-type: none"> - Minimize waste production by utilizing best available techniques for site preparation. 	

Table 7-2: Environmental Management Plan (Operational Phase)

Aspect	Potential Impact	Mitigation Measures	Responsibility	Monitoring
Air Quality (VOCs)	<ul style="list-style-type: none"> – Solvesso A-100, being an aromatic solvent, emits volatile organic compounds (VOCs) – Can degrade air quality, – Causes odors and impacts worker health (headaches, irritation, respiratory issues). 	<ul style="list-style-type: none"> – Install vapor recovery systems at tanks and transfer points – Use sealed transfer lines – Provide vent filters on tanks – Conduct quarterly VOC monitoring against NEQS. 	Proponent / HSE Dept.	Quarterly ambient air quality monitoring.
Noise Pollution	Operation of pumps, generators, and tank filling may cause continuous noise, disturbing workers and nearby facilities.	<ul style="list-style-type: none"> – Enclose noisy equipment in acoustic housing. – Carry out maintenance activities only during the daytime – Provide PPE (earmuffs, plugs) to exposed workers. 	Proponent	Monthly monitoring and worker feedback.
Soil & Groundwater Contamination	Leakage or rupture of tanks may lead to hazardous contamination of soil and groundwater.	<ul style="list-style-type: none"> – Construct bund walls around tanks (110% of the largest tank capacity) – Install leak detection systems and shut-off valves – Provide spill kits at transfer points 	Proponent / Maintenance Team	Continuous monitoring and quarterly soil/water testing.

Aspect	Potential Impact	Mitigation Measures	Responsibility	Monitoring
		<ul style="list-style-type: none"> – Use impermeable flooring in all tank areas. 		
Hazardous Waste (Sludge, oily rags)	Tank cleaning generates sludge and oily rags, which, if disposed of improperly, can pollute land and water.	<ul style="list-style-type: none"> – Collect sludge in sealed containers – Dispose of hazardous waste through EPA-approved contractors – Maintain waste inventory log 	Proponent / HSE Dept.	Semi-annual waste audits.
Occupational Health & Safety	Workers face risks from VOC exposure, fire/explosion hazards, and accidents during transfer operations.	<ul style="list-style-type: none"> – Provide flame-resistant PPE (masks, gloves, helmets, safety shoes) – Install a fire detection and foam-based suppression system – conduct quarterly fire and spill drills – Provide first aid and emergency medical arrangements. 	Proponent / HSE Dept.	Daily safety inspections and quarterly drills.
Traffic Management (Tankers)	Tanker deliveries of Solvesso may increase road congestion and accident risks.	<ul style="list-style-type: none"> – Schedule tanker deliveries in off-peak hours – Inspect all tankers before entry – Train drivers in defensive driving 	Proponent / Transport Supervisor	Ongoing monitoring and vehicle logs.

Aspect	Potential Impact	Mitigation Measures	Responsibility	Monitoring
		and spill response.		
Emergency Preparedness	Fire, explosion, or chemical spill may threaten workers and neighbouring industries.	<ul style="list-style-type: none"> – Develop and implement Emergency Response Plan (ERP) – Install hydrants, extinguishers, and foam system – Maintain evacuation routes and assembly points – coordinate with Rescue 1122 and local hospitals. 	Proponent / HSE Dept.	Bi-annual mock drills.
Green Belt Development	Lack of plantation may reduce site aesthetics and increase dust dispersion.	<ul style="list-style-type: none"> – Develop a green belt along the boundary using indigenous species – maintain 70% plant survival rate through watering and care. 	Proponent	Quarterly plantation monitoring.

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 7-3: 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.
- An assembly point will be established for the gathering of the workforce regarding the daily HSE Toolbox Talk at the project site.
- HSE Toolbox Meeting will be held by the 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 PPEs (Safety Helmet, Safety Jacket, Safety Shoes, Coverall, Full body Harness, Safety Goggles, Earplugs, Earmuffs, 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 workers aware of / train workers about safety rules. Mainly, safety signs include signs of speed limit signs, electric sparks, 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 minimize the risk of adverse impacts of dust on workers and the surrounding areas. Water sprinkling will be carried out regularly to minimize dust pollution and avoid 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. Training will be conducted for capacity building of employees/workers/labor/sub-subcontractors 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 7-4: Estimated Cost for the Implementation of the 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 = 100
- 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 Multan Road.
- 20 km per hour speed limit will be maintained at the project site.
- All the light vehicles, cars, jeeps, etc., will be parked in a designated area.
- All traffic signals will be followed properly.
- Experienced and licensed 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, indicators, etc.) will be checked and maintained regularly.
- All the warning lights, 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 (office site).
- The emergency siren will be installed at assembly points.
- Contact numbers of the 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 a month for the 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 the First Aid Post at the site under the command of the HSE Manager.
- A 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 situations and control.
- The entire workforce will be provided with the mandatory PPEs for a 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 FMC UNITED 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. A framework for the environmental and social training program is being provided

Table 7-5: 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. STAKEHOLDER AND PUBLIC CONSULTATION

The consultation process with various stakeholders of ESPAK has been carried out to involve the community and other stakeholders at earlier stages. Information dissemination during public consultation is fundamental to the 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 consult with the workers of the surroundings and environmental practitioners. Public consultation has been done during the planning and design phases of the Project with neighboring 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's 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.

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8.4 Analysis of Stakeholder Consultation

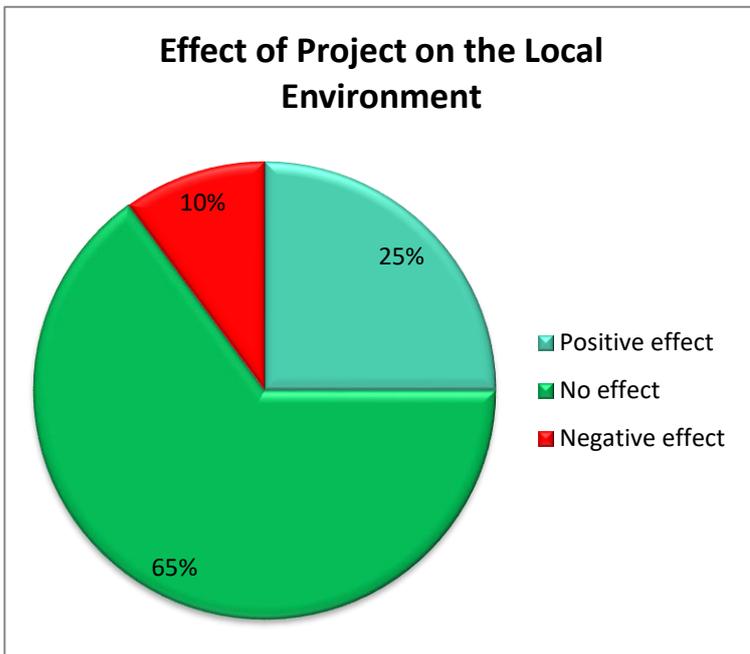
8.4.1 Sample Size

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

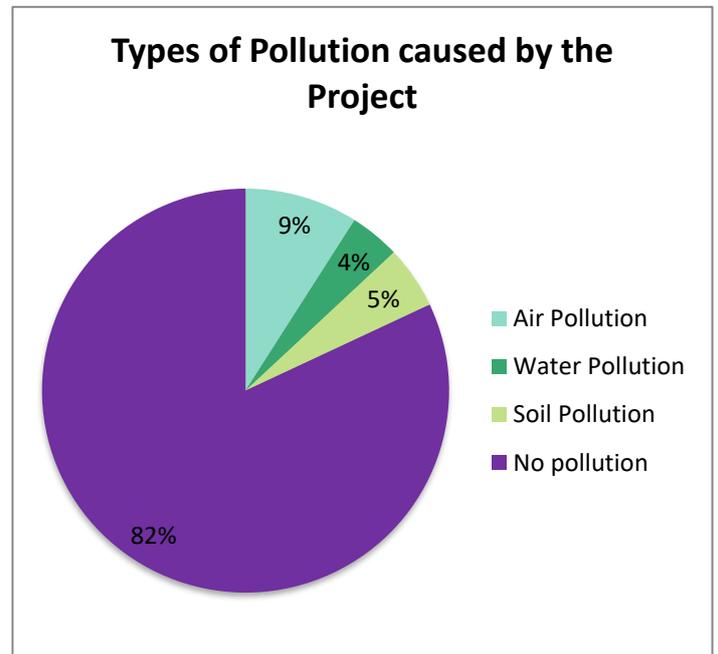
8.4.2 Statistical Analysis

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

8.4.1 Result and Discussion

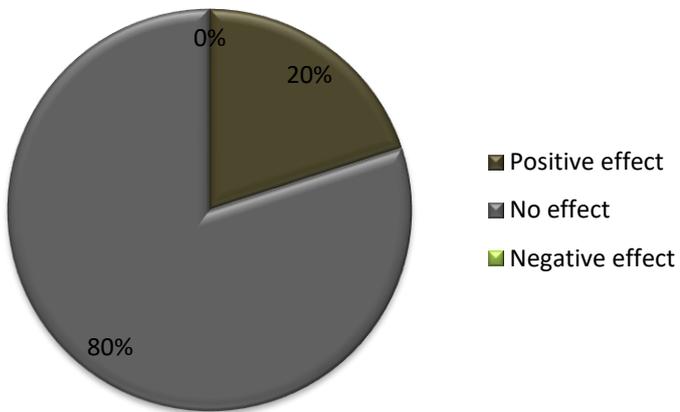


Effect of project on local environment



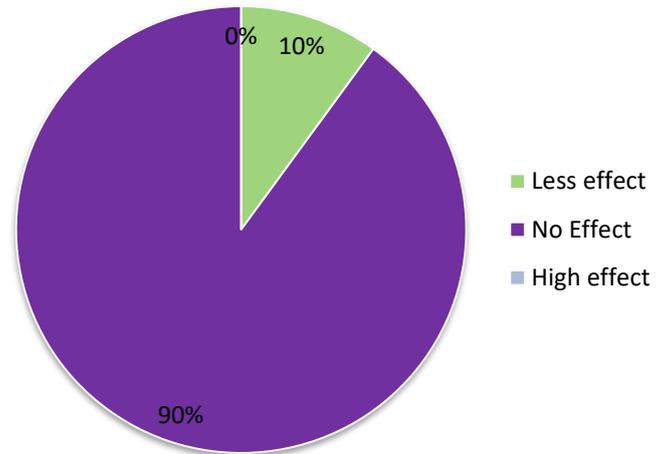
What type of pollution caused by project

Effect of Project on Living Standards of the Area



Effect of project on the living standard of area

Effect on Plant Species of the 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 was willing to giving feedback on that site.

Chapter # 9. CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSION

The report presents Environmental impact Assessment (EIA) of the proposed project “Construction of Petroleum Products Storage Tanks by FMC UNITED 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-G
AUTHORIZATION LETTER

ANNEXURE-I
OTHER RELEVANT NOCS