CONSTRUCTION OF LPG STORAGE AND FILLING PLANT

M/S SUBHAN ENERGY (PRIVATE) LIMITED

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Prepared by

Climate Caretakers

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EXECUTIVE SUMMARY

In Pakistan, LPG (Liquefied Petroleum Gas) plays a crucial role in the energy landscape as a versatile and efficient fuel source. With its growing demand in both domestic and industrial sectors, LPG provides a reliable alternative to traditional fuels such as natural gas and coal. Its use is particularly significant in regions with limited access to natural gas infrastructure, where LPG serves as a primary cooking and heating fuel. The adoption of LPG contributes to energy security by diversifying fuel options and reducing dependence on imported oil, which aligns with Pakistan's goals of sustainable energy development.

In Rawalpindi, LPG is of particular importance due to the city's expanding population and the resultant increased energy needs. The city's growth has outpaced the expansion of natural gas distribution networks, making LPG an essential fuel for many households and businesses. Its availability ensures that residents have access to a consistent and clean energy source for cooking and heating, which is vital for maintaining quality of life. Additionally, the use of LPG supports local industries and commercial establishments, contributing to the overall economic development of the region. As Rawalpindi continues to grow, the role of LPG in meeting energy demands and supporting urban development becomes increasingly critical.

The proposed project for the commissioning of its objective and construction requires fulfilling the legal requirements of the Punjab Environmental Protection Act (amended act 2012), Section 12, for which this Environmental Impact Assessment (EIA) report is being submitted.

i- TITLE AND LOCATION OF PROJECT:

Title: Construction of LPG Storage and Filling Plant by M/S Subhan Energy (Pvt.) Limited.

Location: Khasra No.2399, 2400, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2417, Khewat No. 827, Khatooni No. 1329, Mouza Wani, Tehsil Taxila and District Rawalpindi.

PROJECT PROPONENT

Proponent: Mr. Irfan Ullah

Address: House No. 296, Street 64, Sector I-8/3, Islamabad.

NAME OF ORGANIZATION PREPARING REPORT:

Organization: Climate Caretakers

Address: 218- Upper Mall Scheme, Lahore.

ii- BRIEF OUTLINE OF PROJECT

The proposed project aims the Construction of LPG Storage and Filling Plant by M/S Subhan Energy (Pvt.) Limited. A storage tank capable of collectively storing a total of 100 metric tons (2x50) of LPG are proposed to be constructed. The daily filling Capacity is 25MT/Day. The total area of the propost project is 15 Kanal. The proposed location for its construction is Khasra No.2399, 2400, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2417, Khewat No. 827, Khatooni No. 1329, Mouza Wani, Tehsil Taxila and District Rawalpindi.

iii- ENERGY AND WATER AVAILABILITY

The electricity supply is the usual 500 kVA supply from electricity board that is IESCO. To meet the emergency as well as critical power requirements during electricity shut down the project also have a supportive facility for standby power generation. The water requirements of the facility will be fulfilled by the Municipal supply for all the construction and operational activities.

iv- PROJECT IMPACTS AND RECOMMENDATIONS FOR THEIR MITIGATION

Impact assessment is crucial for project initiation as it enables the identification and comprehension of a project's potential positive and negative effects. Understanding these impacts aids in tailoring the project to maximize benefits and minimize risks. Impact assessment assists in recognizing environmental, social and economic challenges and risks and gives the directions to develop strategies that mitigate these risks and adjust the plan accordingly.

Table E-1Possible Impacts and their Mitigation Measures

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
CONSTRUCTION PHASE		
Dust emissions likely to occur during the excavation of the top soil. Vehicular Emission from the heavy machinery used.	Minor/Short Term	• Water Sprinkling on construction areas when necessary. • Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard. Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites. • Cleaning of all paved access roads, parking areas and staging areas at construction sites. • Provision of PPEs to workers
Water Quality Degradation.	Minor/Short Term	• Use of impermeable sheets to avoid contamination of the groundwater/surface water • Proper disposal of waste material on dumping sites
Construction waste will be	Minor/Short	• Conduct separate collection of

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
produced from construction activities	Term	construction and domestic waste to promote recycling and re-use. • Proper disposal of waste to the authorized sites. The area to be leveled and contoured after disposing excess material. • No waste or debris will be thrown in the nearest canal water or other water bodies.
Noise pollution due to the moving machines (mixers, tippers, communicating workers) and incoming vehicles	Minor/Short Term	• Install portable barriers to shield compressors and other small stationary equipment where necessary. • Proper maintenance of vehicles and construction equipment. • Minimize/avoid unnecessary use of drills and other noisy machinery • The personal protective equipment (PPE) will be provided to the construction workers and its usage will be made mandatory.
Workers Health & Safety	Minor/Long Term	• Provide training regarding proper handling and use of chemicals/ paints • Install fire extinguishers at fire handling places

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		• Continuous monitoring be carried out to ensure that contractor is following safe working procedures and practices.
OPERATION PHASE		
Air Impact Fugitive emissions such as volatile organic compounds (VOCs), and carbon monoxide (CO) can be released during transfer, storage, and handling operations.	Minor/Short Term	• Frequent inspections, maintenance, and testing of storage tanks will be ensured to identify and leakage or faulty valves. • PEQs for air emissions will be strictly followed to avoid excess air pollution
Impact on Noise LPG storage plants can generate noise from equipment such as compressors, pumps, and generators. The transportation of LPG can also generate noise.	Minor/Short Tem	• LPG storage plants will reduce noise pollution by installing mufflers on equipment and by building sound barriers around the plant.
Fire and Workers Safety LPG is highly flammable and explosive. Leakages, improper handling, or accidental release	Moderate/Long Term	• Routine maintenance, inspections, and testing of equipment to ensure proper functioning and detect potential issues early on to prevent accidents.

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
of LPG can lead to fire or explosion hazards.		

v- Environmental Monitoring Plan

The implementation of a monitoring plan within an EIA is crucial for several reasons. It serves as a fundamental tool to track and evaluate the actual environmental effects of a proposed project against the predicted impacts outlined in the EIA report. By establishing a monitoring plan, it becomes possible to assess the accuracy of the initial predictions, ensuring compliance with environmental regulations and standards. This ongoing assessment aids in identifying any unforeseen or adverse impacts, enabling timely corrective measures or adjustments to the project to mitigate or prevent environmental harm, fostering sustainable development and ensuring the project's alignment with environmental conservation objectives throughout its lifecycle.

Table E-2 Environmental Monitoring

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
A. Construction phase				
1.	**Noise**	Construction vehicle/ machinery/ generators/welding work	Noise meter	Construction vehicles / machinery / generators will be checked regularly for noise level by the contractor during construction phase.
2.	**Air Emissions**	Construction vehicle/ machinery/	Ambient particulate matter	Construction vehicles / machinery / generators will be checked regularly for smoke emissions by the contractor

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
		generators	monitoring.	during construction phase.
B. Operation phase				
1.	**Air Emissions**	Filling of Storage Tanks	Gaseous Emissions	Will be carried out on quarterly basis
2.	**Wastewater monitoring**	Wastewater discharging points	Detection of residual hydrocarbons and Particulate Matter	Will be carried out on quarterly basis.
3.	**LPG leakages**	Storage tanks	Pressure tests	Will be carried out on monthly basis.

1 INTRODUCTION

LPG (Liquefied Petroleum Gas) plays a crucial role in Rawalpindi, providing a reliable and efficient source of energy for both residential and commercial use. In a city where electricity supply can be inconsistent and natural gas infrastructure is limited, LPG offers a valuable alternative for cooking, heating, and powering various appliances. Its portability and ease of use make it an essential fuel source, particularly in areas where access to other energy forms is restricted or unreliable. The availability of LPG ensures that households can maintain their daily routines and businesses can operate smoothly, contributing to the overall quality of life in Rawalpindi. Additionally, the use of LPG in Rawalpindi supports economic development and environmental sustainability. By offering a cleaner-burning fuel compared to traditional options like wood or coal, LPG helps reduce air pollution and the negative health impacts associated with indoor smoke. This transition to a more efficient and environmentally friendly energy source not only enhances public health but also aligns with broader efforts to promote sustainable energy practices in the region. The ongoing availability and utilization of LPG are therefore integral to both the economic stability and environmental well-being of Rawalpindi. The proposed project for the Construction of LPG Storage and Filling Plant is located at Khasra No.2399, 2400, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2417, Khewat No. 827, Khatooni No. 1329, Mouza Wani, Tehsil Taxila and District Rawalpindi. The project's objective is to construct a storage tank capable of collectively storing a total of 100 metric tons (2x50) of LPG. The Daily filling Capacity is 25 MT/Day.

The proposed project aims to fulfill its objectives through construction and operation necessitating compliance with the legal regulations specified in Punjab Environmental Protection Act 2012, Section 12. In accordance with these requirements, this Environmental Impact Assessment (EIA) is being submitted.

1.1 PURPOSE OF THE REPORT

As per the Punjab Environmental Protection Act (PEPA), Section 12, which covers Initial Environmental Examination and Environment Impact Assessment, no project proponent is allowed to initiate construction or operations without filing the necessary documentation with the designated Government Agency under the Provincial Environmental Agencies. If the project is

anticipated to cause adverse environmental effects, it necessitates an environmental impact assessment. Subsequently, approval must be obtained from the Government Agency. This requirement set forth by the Government of Punjab mandates the preparation of this Environmental Impact Assessment (EIA) Report to secure Environmental Approval (EA) from the Environmental Protection and Climate Change Department (EPA), Government of Punjab (GoP), Lahore.

This report provides comprehensive information and data on the environmental, economic, and social impacts of the project, enabling its assessment and justification that the project will comply with the requirements of environmentally sustainable practices during both installation and operation stages, as required by the Punjab Environmental Protection Act, 2012, the Punjab Environment Quality Standards, and the rules and regulations thereof.

1.2 IDENTIFICATION OF PROJECT AND PROPONENT

The proposed project is the Construction of LPG Storage and Filling Plant by M/S Subhan Energy (Pvt.) Limited in Tehsil Taxila & District Rawalpindi.

Proponent detail as following:

Proponent: Mr. Irfan Ullah

Address: House No. 296, Street 64, Sector I-8/3, Islamabad.

1.3 DETAILS OF CONSULTANTS

Organization: Climate Caretakers

Address: 218-Upper Mall scheme, Lahore.

1.4 BRIEF DESCRIPTION OF NATURE SIZE AND LOCATION OF PROJECT:

The proposed project aims the construction of LPG Storage and Filling Plant by M/S Subhan Energy Pvt. Ltd. A storage tank capable of storing a total of 100 metric tons (2x50) of LPG are proposed to be installed. The total area of the project is 15 Kanal. The proposed location for its construction is at Khasra No.2399, 2400, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2417, Khewat No. 827, Khatooni No. 1329, Mouza Wani, Tehsil Taxila and District Rawalpindi.

Figure 1- 1 Proposed Location

2 SCREENING OF THE PROJECT

Based on the Punjab Environmental Protection Act 2012 and the Review of IEE & EIA Regulations, 2022 for filing, reviewing, and approving environmental assessments, the present project is classified under Schedule II class A (5). Following list shows the projects included in Class A.

A. Energy

1. Hydroelectric power generation over 50MW.
2. Transmission lines more than 132 kV and grid stations.
3. Nuclear power plant.
4. Petroleum refineries.
5. **Oil and gas extraction projects including exploration, production, gathering systems, separation and storage.**
6. Renewable energy projects (including wind and solar) more than 100 MW.

LPG storage and filling facilities necessitate an EIA due to their significant scale, potential environmental risks, and complexity of operations. The EIA is required because of the considerable environmental impacts these plants may have, the extensive regulations, and the need for a comprehensive assessment involving public participation, considering potential risks, mitigation term measures, and consequences.

3 SCOPING OF THE PROJECT

The scoping process outlines the essential concerns and impacts requiring detailed investigation. It establishes the spatial and temporal limits, crucial concerns raised during consultations, and significant impacting factors impacting the project.

3.1 SPATIAL AND TEMPORAL BOUNDARIES OF ENVIRONMENTAL ASSESSMENT

Considering spatial and temporal boundaries in environmental assessments is vital to comprehensively evaluate the impact of a project. Spatial boundaries define the area affected, aiding in recognizing the extent of impact on ecosystems and nearby communities. Temporal boundaries assess short and long-term effects, enabling an understanding of how impacts evolve over time and helping in planning mitigation measures and long-term sustainability strategies. This approach ensures accurate, detailed assessments and effective addressing of potential environmental consequences related to the project. The proposed project is located at Khasra No.2399, 2400, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2417, Khewat No. 827, Khatooni No. 1329, Mouza Wani, Tehsil Taxila and District Rawalpindi.

3.2 IMPORTANT ISSUES AND CONCERNS RAISED DURING CONSULTATION

The EIA for the proposed project incorporated a two-stage consultation process, primarily focused on one-on-one meetings. In the initial stage, the consultation was specifically directed towards engaging local government authorities, affected individuals, and local communities. The primary goal of this stage was to evaluation both the short-term and long-term impacts that might result from the new development proposed for the project in its early stages. The intent was to gather insights and perspectives from key stakeholders in the immediate vicinity to better understand potential environmental, social, and economic implications of the project.

The second stage of consultations, as indicated, will be conducted through a more extensive process of public participation if deemed necessary. This broader involvement will allow for a wider outreach to the public, enabling a more comprehensive engagement to gather additional feedback, concerns, and insights from a larger cross-section of the community. This will ensure a more inclusive approach, providing an opportunity for a wider range of stakeholders to contribute their perspectives, concerns, and suggestions, which can be valuable in shaping and refining the EIA for the proposed project.

3.3 SIGNIFICANT IMPACTS AND FACTORS TO BE DETERMINED

At an LPG storage and filing plant, the determination of significant impacts involves assessing environmental risks, safety and health concerns for workers, community impact, infrastructure and property damage, emergency response planning, regulatory compliance, and the adequacy of preventive measures. Understanding and addressing these factors are essential to ensure safe operations, mitigate risks, and protect the environment, workers, communities, and infrastructure from potential hazards associated with LPG handling.

3.4 DEVELOPMENT OF AN ENVIRONMENTAL MANAGEMENT PLAN

The EMP in an EIA is crucial as it outlines strategies to mitigate environmental impacts, ensures regulatory compliance, guides project operations, promotes sustainability, reduces risks, assures stakeholders, and allows for ongoing improvement and adaptation to address environmental concerns throughout the project's lifecycle.

These key parts of EMP include a clear description of the project, an outline of potential environmental impacts and risks, specific mitigation measures tailored to address these impacts, a comprehensive monitoring and reporting system to track environmental indicators, protocols for emergency response and contingency planning, details on stakeholder engagement and communication strategies, and a framework for ongoing review and updates to ensure the plan's adaptability and effectiveness over the course of the project. Together, these components form a comprehensive EMP designed to guide environmental practices, minimize adverse impacts, and maintain compliance with regulations and best practices in environmental management.

4 ALTERNATIVES OF THE PROJECT

The alternatives for the proposed project and their relative potential impacts on the environment were considered to evaluate the best project option. The following alternatives were considered for the project.

Project Alternatives

- No project option/worst scenario option.
- Site Alternative
- Technology Alternative

4.1 NO PROJECT OPTION / WORST SCENARIO OPTION

Analysis

❖ **Strengths and Opportunities**

If the project is not taken up at all then all the funds, efforts and inconvenience will be saved and these will become available for diversion to other projects of the proponent. No more land will be required, and no disturbance will be caused to people through project construction process. Further the recurring cost of the maintenance of the project along with enhanced operational cost will be saved. No disturbance will be caused to any physical, biological and social part of the environment. The people benefiting out of a status quo will continue benefiting.

❖ **Weaknesses and Threats**

The absence of LPG distribution in a particular area poses several drawbacks. It limits the energy choices, potentially leading to reliance on traditional and less efficient fuel sources, which can result in increased expenses, environmental degradation, and health concerns due to indoor pollution on higher carbon emissions. Without the convenience and efficiency of LPG, residents may face challenges in food preparation and heating. Moreover, the lack of LPG distribution can impede economic growth by affecting local businesses and industries reliant on consistent and affordable energy sources. Safety concerns might arise if individuals resort to less safe or unregulated energy sources.

Conclusion

The “No project option” reveals that the absence of LPG distribution impacts affordability, convenience, health, the environment, and economic development in the area. Therefore, this option is not recommended.

4.2 LOCATION ALTERNATIVES

4.2.1 Construction on Government Land

The project proposal includes the option of building the LPG storage tank on Government-owned land. The feasibility study has indicated that the government land is available and suitable for the construction of the storage facility. The preliminary assessments and believes this location meet the technical requirement for the safe storage of LPG. However, it involves additional bureaucratic procedures for obtaining permits and approvals from the government. The additional costs associated with leasing or using government land including fees, and rent could impact project’s financial viability. Moreover, the Government regulations and polices might impose limitations on the scope of development or impose specific conditions on the usage of the land, which could restrict the project’s design or expansion plans.

4.2.2 Construction on Proponent’s Land

The proponent’s land has been carefully chosen due to its proximity to existing infrastructure and logistical convenience. The site has already undergone through assessments, and it is deemed suitable in terms of safety, environmental impact, and compliance with regulations. The proponent’s land is already owned, eliminating the need for additional land acquisition and streamlining the construction process. This option provides more control and flexibility to the proponent over the project’s development and operation. Additionally, it aligns with the proponent’s strategic goals and minimizes potential delays associated with the utilizing government land, making it the preferred choice for the project.

Conclusion

The construction of LPG on proponent’s land was preferred because it provides more control and flexibility to the proponent over the project’s development and operation.

4.3 TECHNOLOGY ALTERNATIVE

LPG Storage tank design as per ASME (American Society of Mechanical Engineers) and API (American Petroleum Institute) standards both provide robust frameworks for ensuring safety, reliability, and efficiency. However, specific distinctions exist between the two in terms of design criteria, and construction processes.

Design as per ASME Standards

ASME guidelines are comprehensive approach to pressure vessel design. They incorporate strict requirements for material selection, fabrication, inspection, and testing, ensuring a high standard of safety and quality. ASME standards also emphasize rigorous quality control, offering a more extensive and detailed framework for pressure vessel construction.

Design as per API Standards

API standards also offer well-defined regulations for the design and construction of LPG storage tanks. However, API standards might be more industry-specific, focusing on certain operational aspects and applications.

Conclusion

Conclusively, the design of LPG storage tanks under ASME guidelines is often considered superior due to its wider acceptance, global recognition, and stringent quality control measures. ASME Section VIII Division 1 provides a more comprehensive and detailed approach, covering a broader spectrum of design and construction considerations. Its rigorous guidelines for material selection, fabrication, inspection, and testing contribute to a higher level of reliability and safety in LPG storage tank design compared to API standards. Therefore, ASME standards are generally regarded as a more preferred choice for ensuring the safety and quality of LPG storage tank designs.

5 DESCRIPTION OF THE PROJECT

5.1 OBJECTIVE OF THE PROJECT

The prime objective of the project is to construct LPG storage tank for ensuring a proper containment of the gas while facilitating its reliable distribution for various industrial, commercial and domestic purposes. These storage tanks serve as a critical infrastructure component, ensuring a continuous and stable supply chain for the efficient utilization of LPG, ultimately supporting economic activities and meeting energy across various sectors. The careful construction and maintenance of these storage facilities are essential to guarantee the safe storage and distribution of LPG, meeting energy demands while prioritizing safety and operational integrity.

5.2 LOCATION AND SITE LAYOUT OF THE PROJECT

The Location of the proposed project is Khasra No.2399, 2400, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2417, Khewat No. 827, Khatooni No. 1329, Mouza Wani, Tehsil Taxila and District Rawalpindi.

5.3 LAND USE ON THE SITE

The selected land for the construction of the project is an expansive and currently undeveloped open space. The open land offers an opportunity for flexible and strategic planning, allowing for thoughtful consideration in designing and shaping the upcoming project.

5.4 ROAD ACCESS

The road access on the project site is shown in the Figure below. Kalabagh-Nathia Gali Road and National Highway-80 are the nearest roads from the project site. All roads around the project site are paved and well connected.

Figure 5- 1Road Connectivity around Project Area

Figure:5-2 Human Settlement near Project Site

5.5 VEGETATION FEATURES OF THE SITE

The land earmarked for the project stands devoid of any significant vegetation, eliminating the need for cutting down or uprooting trees. It is an open land presents a unique advantage, sparing any ecological impact typically associated with land development. This absence of substantial vegetation not only streamlines the construction process for LPG but also mitigates the environmental footprint of the project. With no trees or major vegetation to clear, the project can progress without disturbing the natural ecosystem, allowing for a more environmentally friendly and efficient development process.

5.6 COST AND MAGNITUDE OF OPERATION

The total cost of the project is PKR 60,000,000 (Sixty Million Rupees). The time period for the completion of the project is proposed as 6 months.

5.7 SCHEDULE OF IMPLEMENTATION

The outlined project implementation schedule is intended to be followed, contingent upon smooth execution as per the plan and the absence of significant obstacles. The implementation stages of the project activity include:

1st Stage

The stage –1 comprises the onsite contouring studies and soil investigations and the finalization of storage plant designs.

2nd Stage

The stage –2 comprises the following task:

- Digging the ground to lay foundation and starting to build or put together the structure.
- Building support structures and foundation work.
- Beginning construction, electrical and mechanical tasks.
- Establishing essential infrastructure.
- Fitting of instrumentation

3rd Stage

The stage –3 comprises the following task

- Commercial building civil structure erection completion.
- Completion of the basic infrastructures water supply system, electricity supply etc.

4th Stage

The last stage will be the commencement of regular use of the LPG storage plant.

5.8 DESCRIPTION OF THE PROJECT

The proposed project aims the construction of LPG Storage and Filling Plant. A storage tank with a capacity of 100 (2x50) Metric ton is proposed to be constructed. The LPG storage tank is designed as per the standards of ASME (American Society of Mechanical Engineers) as shown in the figure below. The total area of the project is 15 Kanal.The proposed location for its construction is Khasra No.2399, 2400, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2417, Khewat No. 827, Khatooni No. 1329, Mouza Wani, Tehsil Taxila and District Rawalpindi**.**

Table: 5.1 TANK SCHEDULE

Tag	**Tank I.D (mm)**	**Length) O/L (mm)**	**Tank Capacity in W/L @ (100%)**	**Tank Capacity in W/L @ (15%)**	**LPG Capacity Less @ 100% (M/Ton)**	**LPG Capacity Less @ 15% (M/Ton)**	**Design Code**
V-01	3385	12310	100,000	85,000	50 M/Ton	42.5 M/Ton	ASME SEC-VIII DIV-1
V-02	3385	12310	100,000	85,000	50 M/Ton	42.5 M/Ton	ASME SEC-VIII DIV-1
Total Storage Capacity			**200,000**	**85,000**	**100**	**85**	
Not in bulk LPG Capacity = 20M/Ton							

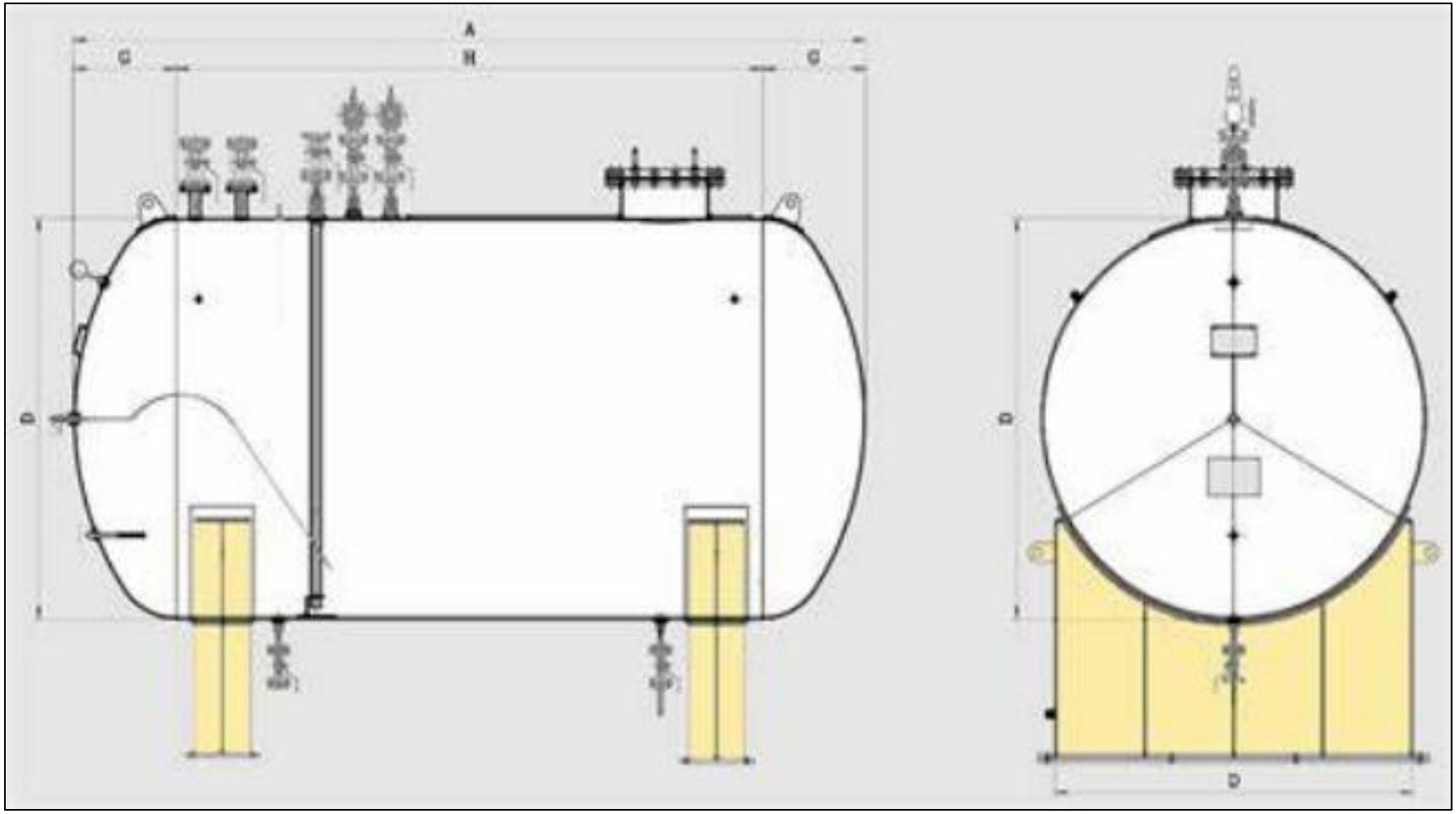

Figure 5- 2 Storage tank Design

5.8.1 Area of the Land

The total area of the plot is 15 Kanal.

5.8.2 Tank Construction Details

The tank construction details are given below.

Table 5- 2 Tank Construction Details

TANK CONSTRUCTION DETAIL			
Design Code	**ASME Sec. VIII Div. 1**		
U Stamp	No	Vessel Size	ID= 3790
Equipment	LPG Storage Tank		T/T Length = 9500
Design Press @ Temp	1723.7 Kpa @ 66°C	NDE	YES
Oper. Press @ Temp	1034 Kpa @ 48°C		
Hydrostatic Press	2240 Kpa	Shell Thk. =25 mm	Head Thk. =14 mm
Specific Gravity	0.55	P.W.HT	No
Joint Efficiency (Shell, Head)	1	Wind Design	70 mph
Support	Saddle	Seismic Design	Yes
Impact Test	No	Vapor Space	10%
LPG Storage	100 MT(2X50)	MAWP@MDMT	1723.7 kpa @ -28°C
Water Capacity	101.83 Cu.M	Shell C.A	1 mm
Ladder & Platform	Yes		

5.8.3 Land Acquisition

Since the proponent owns the project site, there is no necessity for any land acquisition process to be initiated. The absence of land acquisition requirements minimizes the risks related to potential conflicts, delays, or disruptions arising from disputes over land ownership. This

scenario ensures a more seamless initiation and execution of the project, allowing resources and efforts to be focused on the project's core objectives and development activities.

5.9 RESTORATION AND REHABILITATION PLAN

To restore and rehabilitation the project site, a recommendation for tree plantation has been proposed. This strategic initiative aims to rejuvenate and enhance the site's ecological balance following the completion of the project. Tree plantation offers a means to restore the natural environment, promote biodiversity, mitigate potential environmental impacts, and contribute to the overall sustainability of the site. By introducing tree plantation, the project area can experience ecological restoration, afforestation, and the development of a more environmentally friendly landscape, aligning with the commitment to environmental stewardship and sustainability.

6 DESCRIPTION OF THE ENVIRONMENT

6.1 GENERAL

This section covers a comprehensive description of the project area, including environmental attributes which are expected to be affected by the project, as well as those which are not expected to be directly affected by the construction and operation of the project. The existing environmental conditions around the proposed project have been considered with respect to physical, biological and socio-economic aspects. A site visit was conducted to survey the field area and to collect environmental data on physical, biological and socio-economic parameters. Further, consultations were held with the public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project.

6.2 PHYSICAL ENVIRONMENT

6.2.1 Topography

Rawalpindi, located in the northern region of Pakistan, exhibits a diverse topography characterized by rolling plains, undulating hills, and flat lowlands. The city lies on the Pothohar Plateau, a region known for its rugged terrain and limestone formations. To the north, the Margalla Hills provide a scenic backdrop, contributing to the area's varied elevation. Numerous streams and nullahs, such as the Leh Nullah, traverse the city, shaping its landscape and influencing urban planning. The elevation of Rawalpindi varies, with the city center situated at around 488 meters above sea level. This geographical diversity supports a mix of urban and semi-urban environments, with green spaces and agricultural lands interspersed with densely populated areas.

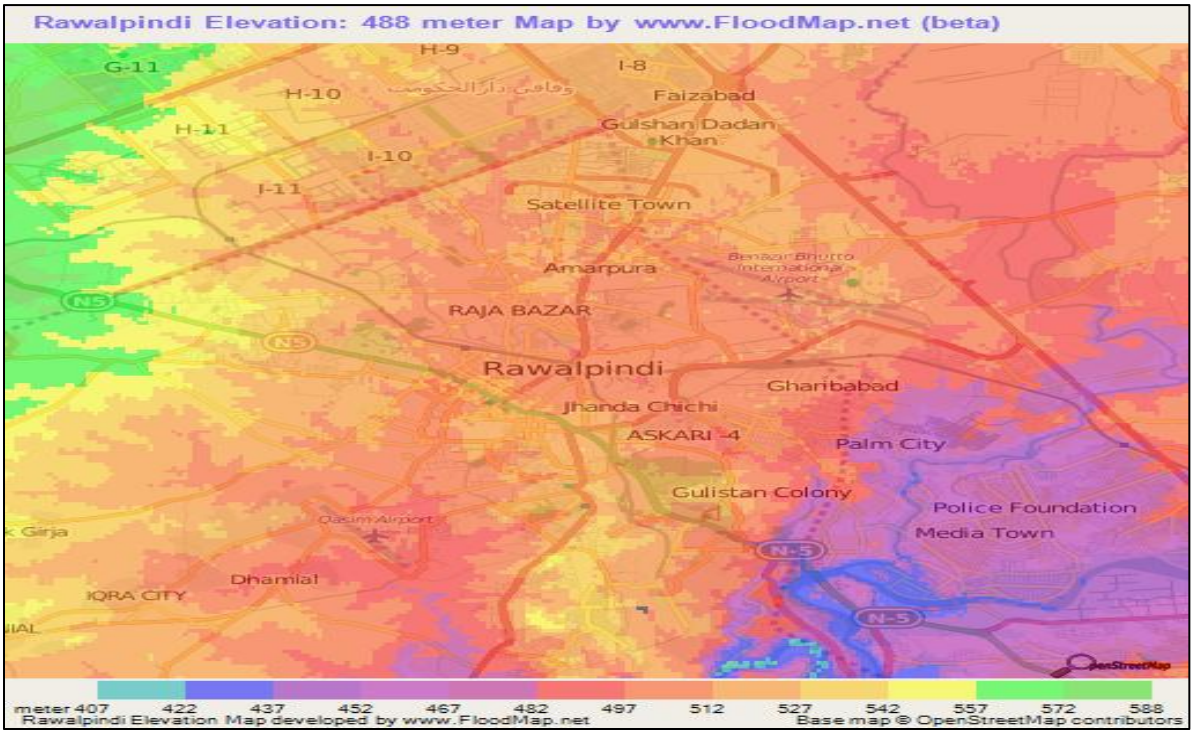

Figure 6- 2Topography of Rawalpindi

6.2.2 Soils

The soils of Rawalpindi are primarily derived from the weathering of the Pothohar Plateau's parent rock materials, resulting in a diverse soil profile. The region predominantly features loamy and clayey soils, which are fertile and suitable for agriculture, especially in the peripheral rural areas. These soils often exhibit good water retention properties but can become compact and less permeable, affecting drainage. In some areas, especially where urban development has intensified, soil degradation and erosion are evident due to construction activities and deforestation. The presence of alluvial soils along the streams and nullahs adds to the diversity, providing a mix of fertile grounds for cultivation and areas prone to seasonal waterlogging. Overall, the soils of Rawalpindi support a range of vegetation, from agricultural crops to urban greenery, contributing to the city's mixed land use.

6.2.3 Climate and Meteorology

Rawalpindi experiences a humid subtropical climate characterized by hot summers, a monsoon season, and mild winters. Summers, from May to September, can be intense, with temperatures often exceeding 40°C (104°F). The monsoon season, occurring from July to September, brings significant rainfall, which can lead to short-term flooding in some areas. Winters, from December to February, are relatively mild, with temperatures ranging from 5°C to 18°C (41°F to 64°F), occasionally dropping lower during cold spells. Spring and autumn serve as transitional periods with moderate temperatures and lower humidity. The city experiences a distinct seasonal pattern, with the variability in precipitation and temperature influencing agricultural activities and water resource management in the region.

Table 6- 1Average Temperature and Rainy Days of Rawalpindi

Month	Lowest Temperature	Highest Temperature	Average Precipitation Days
	°C	°C	Days
January	17	6	4
February	20	8	5
March	25	13	7
April	30	17	6
May	36	22	7
June	39	26	7
July	36	27	15
August	34	26	13
September	34	23	7

Month	Lowest Temperature	Highest Temperature	Average Precipitation Days
	°C	°C	Days
October	31	18	3
November	24	12	2
December	20	8	2

6.2.3.1 Climate

The climate in Rawalpindi, Pakistan, is characterized by short, hot, humid, and rainy summers, along with short, cold, and mostly clear winters. Throughout the year, temperatures generally range from 39°F to 101°F, with rare instances of temperatures falling below 34°F or exceeding 108°F.

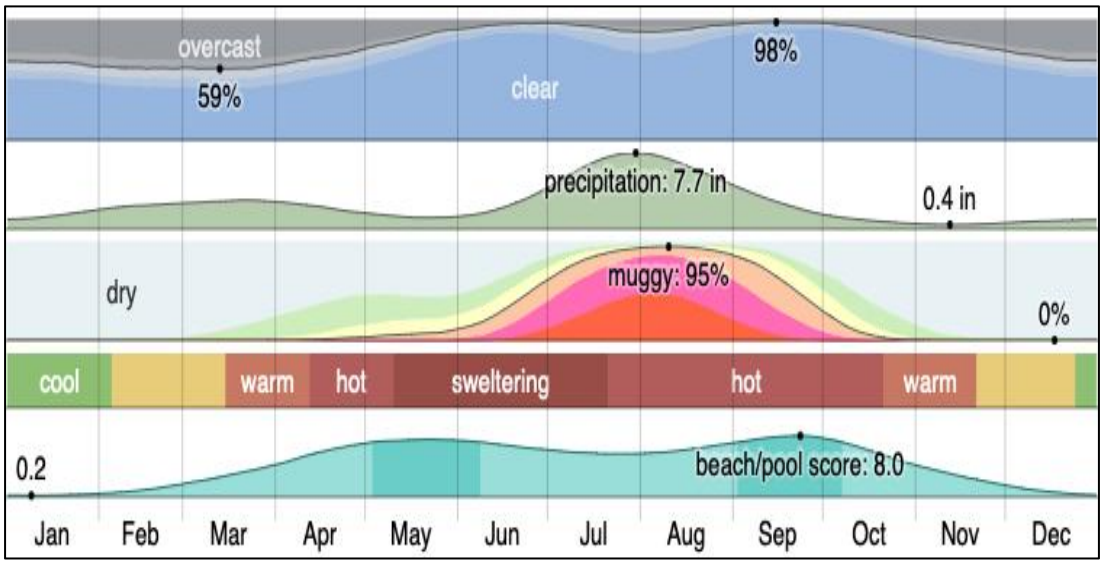

Figure 6-3: Average Climate Change in Rawalpindi

6.2.3.2 Average Temperature

The hot season in Rawalpindi spans 2.8 months, from May 4 to July 31, with average daily high temperatures exceeding 93°F. June is the hottest month, with an average high of 100°F and a low

of 76°F.The cool season lasts for 2.9 months, from December 4 to February 28, with average daily high temperatures below 71°F. January is the coldest month, with an average low of 40°F and a high of 63°F.

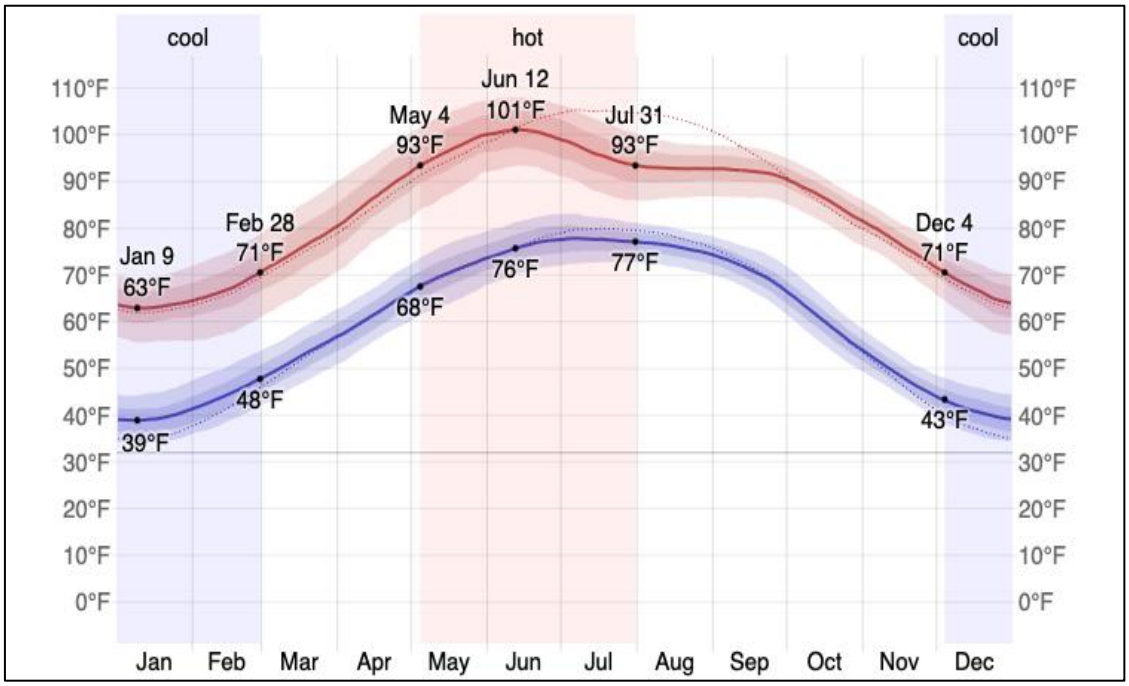

Figure 6-4: Average Temperature of Rawalpindi

6.2.3.3 Average Precipitation

The wet day in Rawalpindi is defined as one with at least 0.04 inches of liquid or liquid-equivalent precipitation. The likelihood of wet days fluctuates significantly throughout the year. The wetter season spans 2.5 months, from June 23 to September 9, with a daily chance of precipitation exceeding 30%. July is the wettest month, averaging 15.3 days with at least 0.04 inches of rainfall. The drier season lasts 9.5 months, from September 9 to June 23. November has the fewest wet days, averaging only 1.6 days with measurable precipitation. Precipitation in Rawalpindi primarily falls as rain rather than snow. July has the highest number of rainy days, averaging 15.3 days of rainfall. The probability of rain alone peaks at 55% on July 27, making it the most common form of precipitation throughout the year.

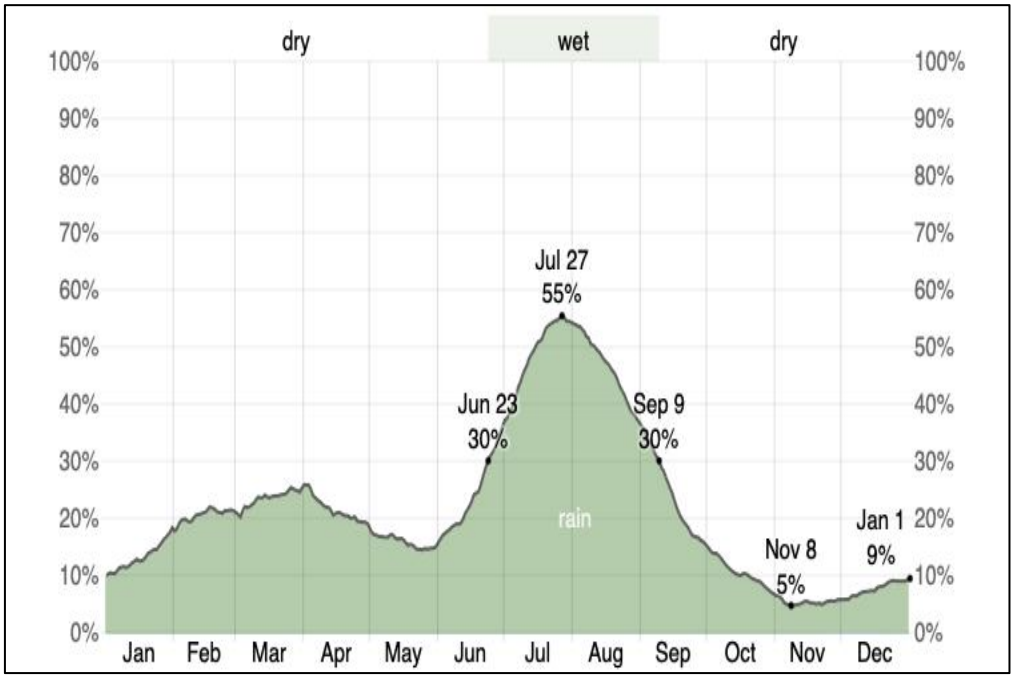

Figure 6-5: Average Precipitation in Rawalpindi

6.2.3.4 Average Rainfall

Rawalpindi experiences significant seasonal fluctuations in rainfall. Rain occurs year-round, but July is the wettest month, receiving an average of 6.7 inches of rainfall. In contrast, November is the driest month, with an average rainfall of just 0.5 inches.

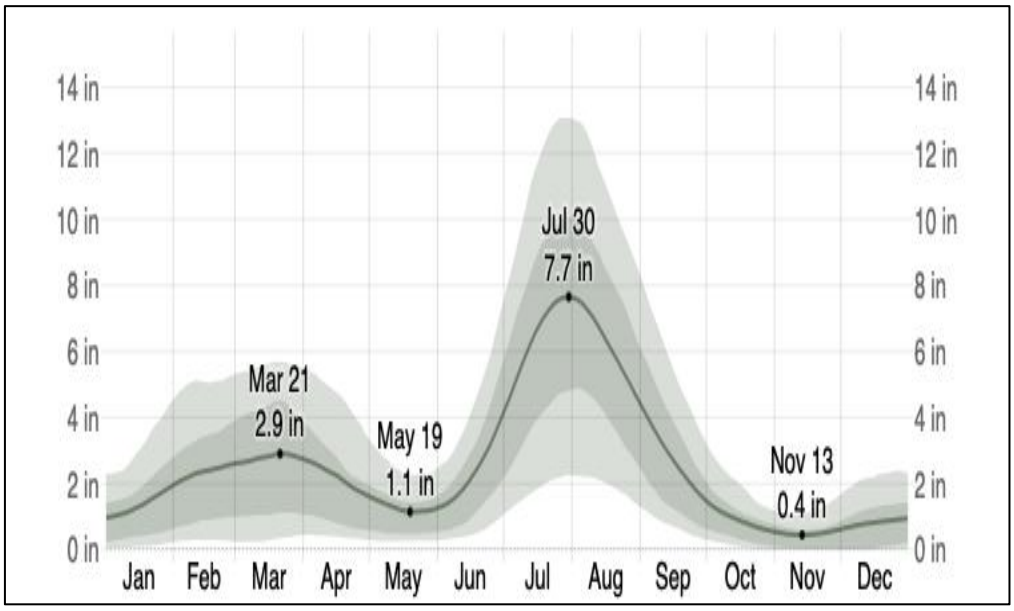

Figure 6-6: Average Rainfall in Rawalpindi

6.2.3.5 Humidity

Humidity comfort levels in Rawalpindi are determined by the dew point, which affects how moisture evaporates from the skin and influences the perception of humidity. Lower dew points create a drier feel, while higher dew points result in more humid conditions. Unlike temperature, which fluctuates significantly between day and night, dew points change more gradually, meaning muggy days are usually followed by muggy nights. Rawalpindi experiences significant seasonal variation in humidity. The muggier period lasts for 3.7 months, from June 12 to October 3, during which the humidity level is classified as muggy, oppressive, or miserable at least 24% of the time. August is the most humid month, with an average of 28.9 muggy or worse days.

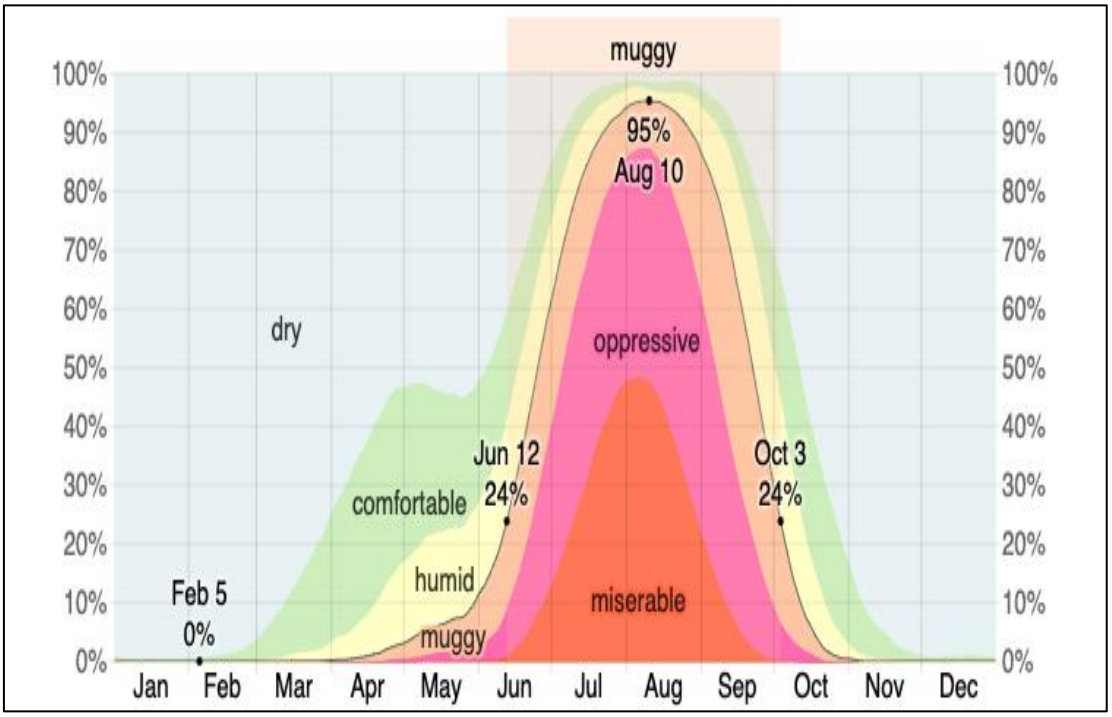

Figure 6-7: Humidity Comforts Level in Rawalpindi

6.2.4 SURFACE AND GROUND WATER

Rawalpindi's water resources include both surface and groundwater, which are vital for the city's domestic, agricultural, and industrial needs.

In Rawalpindi, surface water primarily comes from rivers, streams, and reservoirs, with the Rawal Dam being a significant source. The dam, located on the Korang River, supplies water to both Rawalpindi and the neighboring Islamabad. Numerous smaller streams and nullahs, such as Leh Nullah, traverse the city, playing a crucial role in drainage and water management but also posing flood risks during the monsoon season.

Groundwater in Rawalpindi is extracted through wells and boreholes, serving as a critical supplement to surface water, especially during dry periods. The aquifers in the region vary in depth and yield, with groundwater levels fluctuating due to seasonal variations and increasing demand. Over-extraction has led to a decline in groundwater levels in some areas, raising concerns about long-term sustainability. Water quality issues, including contamination from industrial discharge and untreated sewage, further complicate the management of both surface and groundwater resources. Effective water management strategies are essential to ensure the availability and quality of water for Rawalpindi's growing population.

Figure 6- 8 Rawal Dam

6.3 SEISMOLOGY

Rawalpindi, situated near the geologically active region of the Himalayan foothills, is prone to seismic activity. The city lies within a seismically active zone due to the tectonic interactions between the Indian and Eurasian plates. This region has experienced significant earthquakes in the past, including the notable 2005 Kashmir earthquake, which had widespread effects across northern Pakistan. The seismicity of the area necessitates stringent building codes and construction practices to mitigate earthquake risks. The presence of faults and the potential for seismic events require continuous monitoring and preparedness strategies to safeguard the population and infrastructure. Overall, while not as frequently affected as some other regions, Rawalpindi remains vulnerable to seismic hazards due to its geographical and geological context.

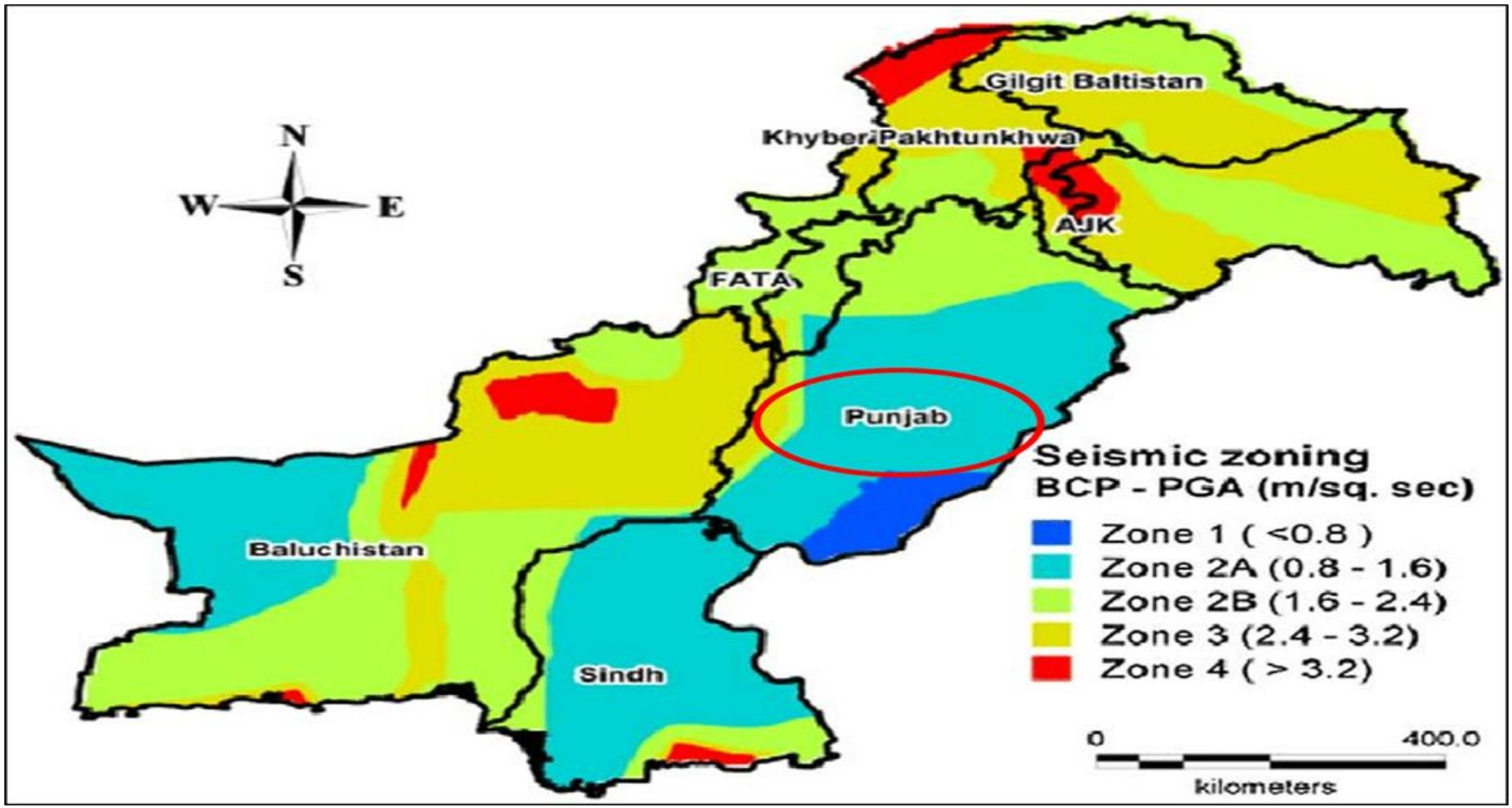

Figure 6-9 Seismic Zones of Pakistan

6.4 ECOLOGICAL RESOURCES

Rawalpindi boasts a range of ecological resources that contribute to its environmental richness and biodiversity. The Margalla Hills National Park, located to the north, is a prominent ecological asset, featuring diverse flora and fauna, including several endangered species. This park provides a vital green lung for the region, supporting various ecosystems from dense forests to scrublands. The Rawal Lake and its surrounding areas serve as important habitats for migratory birds, adding to the avian diversity and providing recreational spaces for residents.

Agricultural lands on the outskirts of the city are another crucial ecological resource, supporting crops, orchards, and pastoral activities that contribute to the local economy. Urban green spaces, parks, and gardens within Rawalpindi offer pockets of biodiversity amidst the urban sprawl, helping to mitigate urban heat island effects and providing recreational areas for the populace. Efforts to preserve and enhance these ecological resources are essential for maintaining environmental balance and ensuring sustainable development in the region. Challenges such as urbanization, pollution, and deforestation pose threats to these resources, necessitating proactive conservation and management strategies.

6.4.1 Flora

The flora of Rawalpindi is quite diverse, thanks to its location at the foothills of the Himalayas. Some of the most common trees found in Rawalpindi include

Table 6- 2Flora of the Project Area

Sr. No.	Common Name	Scientific Name
1.	Shisham	*Dalbergia sissoo*
2.	Keekar	*Acacia arabica*
3.	Siris	*Albizzia lebbeck*
4.	Ber	*Ziziphus jujuba*
5.	Guava	*Psidium guajava*
6.	Citrus	*Citrus spp.*

6.4.2 Fauna

Rawalpindi, nestled in the foothills of the Himalayas, boasts a diverse fauna.

Table 6- 3Fauna of Rawalpindi

Mammals	
Wild Boar	*Sus scrofa*
Pangolin	*Manis crassicaudata*
Indian Hare	*Lepus nigricollis*
Indian Porcupine	*Hystrix indica*
Birds	
Monal	*Lophophorus impejanus*
Himalayan Griffon	*Gyps himalayensis*
Common Kingfisher	*Alcedo atthis*
Golden-eared Bulbul	*Pycnonotus leucogenys*

6.4.3 Water Bodies

Rawalpindi, while not directly bordering any major rivers, does have a couple of notable bodies of water that play a role in the city's ecosystem and recreation.

Rawal Lake: This artificial lake is a popular spot for boating, fishing, and picnicking. It's

located near the Margalla Hills and serves as a source of drinking water for the city.

Figure 6- 10 Rawal Lake

Nullah Lai: Nullah Lai is more of a seasonal stream or ravine that runs through Rawalpindi. During the monsoon season, it can carry a large amount of water, but for most of the year, it's a dry channel. Unfortunately, Nullah Lai suffers from pollution due to wastewater.

The **Soan River**, which flows into the Indus River further south, is another source of water for the Rawalpindi Islamabad area, but it's not located within the city limits itself. This river flows at a distance of 1.7km from the project site (Figure 6-6).

6.4.4 Endangered Species

The endangered plant in Pakistan is the Elm i.e., Ulmus wallichiana which is not found here. No endangered species exist in the project area.

6.5 SOCIO-ECONOMIC ENVIRONMENT

6.5.1 History

Rawalpindi's history stretches back centuries, showcasing a rich tapestry of rulers and influences. Archaeological evidence suggests that during the Indus Valley Civilization (3300-1300 BCE), the Rawalpindi district was an agricultural region with forests. In the Vedic Period (1500-500 BCE), Indo-Aryan tribes arrived from Central Asia and settled in the Punjab region, including the Rawalpindi area. The city witnessed the march of Alexander the Great's army in 326 BCE. During the medieval period, Rawalpindi saw various rulers, including Sultan Mahmud of Ghazni, who destroyed an earlier settlement on the site in the 11th century, and the Gakhar tribe, who re-established the town in the 15th century, naming it Rawal. The city's importance fluctuated during the Mughal era and declined as Mughal power weakened. In the 18th century, Sikh leader Sardar Milkha Singh revitalized Rawalpindi by inviting traders and establishing a thriving marketplace. Under British rule (1849-1947), following the annexation after the Sikh defeat in the First Anglo-Sikh War, Rawalpindi was transformed into a major military garrison town, establishing the largest cantonment in British India and significantly boosting its population and infrastructure. The construction of railways in the 1880s further enhanced its connectivity. Post-independence, Rawalpindi served as Pakistan's capital from 1959 to 1969 and remains a significant military center. Today, Rawalpindi and Islamabad are known as twin cities due to their close proximity and economic ties.

Figure 6- 10 District Map of Rawalpindi

6.5.2 Political Set Up

Rawalpindi's political setup operates within Pakistan's broader administrative and political systems. The city is part of the Rawalpindi District, managed by a district government, and has its own municipal corporation responsible for urban management and public services. It is divided into Union Councils, each represented by elected members addressing local issues. At the provincial level, Rawalpindi is represented in the Punjab Provincial Assembly, with several Members of the Provincial Assembly (MPAs) elected from the city's constituencies. Nationally, Rawalpindi is represented in Pakistan's National Assembly by several Members of the National Assembly (MNAs) and is indirectly represented in the Senate through senators elected by the Punjab Provincial Assembly. Major political parties, including Pakistan Tehreek-e-Insaf (PTI), Pakistan Muslim League (Nawaz) (PML-N), and Pakistan People Party (PPP), have a significant presence in the city, influencing both local and national elections. Additionally, Rawalpindi's notable military presence, being home to the Pakistan Army's General Headquarters (GHQ), intersects with local politics, especially in security and defense-related areas.

6.5.3 Economic Activities

The project area for M/S Liaqat Hayat & Sons (Pvt.) Limited. is primarily agricultural, making agriculture the main economic activity in the region. The local economy relies heavily on farming and related activities, which provide livelihoods for the residents of nearby settlements such as Sadat Town, Faisal Town. The introduction of the LPG plant in this predominantly agricultural zone may impact the local agricultural practices and economy.

Rawalpindi is a bustling economic hub with diverse economic activities contributing to its growth and development. The city's economy is driven by a combination of trade, industry, and services. As a major commercial center, Rawalpindi hosts numerous markets and shopping areas, including the renowned Raja Bazaar, where a wide range of goods, from textiles to electronics, are traded. The industrial sector is also significant, with numerous small and medium-sized enterprises engaged in manufacturing, particularly in textiles, leather, and food processing. Rawalpindi's strategic location, adjacent to the capital city of Islamabad, enhances its economic prospects, facilitating trade and business connectivity. Additionally, the presence of the Pakistan Army's General Headquarters (GHQ) and other military installations contributes to economic stability and growth, with a substantial portion of the population employed in defense-related

services. The city's transportation infrastructure, including its railway station and proximity to major highways, further supports commercial activities and logistics. Overall, Rawalpindi's vibrant economy is characterized by a mix of traditional markets, industrial production, and service-oriented businesses, making it a vital economic center in the region.

6.6 QUALITY OF LIFE VALUES

6.6.1 Demographic Survey

As of the most recent estimates, Rawalpindi's population is approximately 2.4 million people. This population figure reflects the city's status as one of Pakistan's major urban centers, with a high population density and continuous growth due to migration from rural areas and other regions. The city's demographic composition includes a variety of ethnic groups, predominantly Punjabis, but also significant numbers of Pathans, Muhajirs, and smaller communities of Kashmiris and others. Rawalpindi's growing population contributes to its dynamic economy, cultural diversity, and the demand for enhanced infrastructure and public services.

Rawalpindi Urban Area Population History

1950	233,000	1951	240,000	1952	249,000	1953	258,000	1954	268,000
1955	278,000	1956	288,000	1957	299,000	1958	310,000	1959	321,000
1960	333,000	1961	347,000	1962	366,000	1963	385,000	1964	405,000
1965	426,000	1966	448,000	1967	472,000	1968	496,000	1969	522,000
1970	550,000	1971	579,000	1972	609,000	1973	630,000	1974	650,000
1975	670,000	1976	690,000	1977	711,000	1978	733,000	1979	756,000
1980	779,000	1981	804,000	1982	831,000	1983	860,000	1984	889,000
1985	919,000	1986	951,000	1987	983,000	1988	1,017,000	1989	1,051,000
1990	1,087,000	1991	1,124,000	1992	1,163,000	1993	1,202,000	1994	1,243,000
1995	1,286,000	1996	1,330,000	1997	1,375,000	1998	1,416,000	1999	1,446,000
2000	1,477,000	2001	1,508,000	2002	1,540,000	2003	1,573,000	2004	1,606,000
2005	1,641,000	2006	1,675,000	2007	1,711,000	2008	1,747,000	2009	1,784,000
2010	1,822,000	2011	1,861,000	2012	1,901,000	2013	1,941,000	2014	1,982,000
2015	2,024,000	2016	2,067,000	2017	2,111,000	2018	2,156,000	2019	2,196,000
2020	2,237,000	2021	2,281,000	2022	2,327,000	2023	2,377,000	2024	2,430,000

Table 6- 11 Population of Rawalpindi

6.6.2 Religion

Over 99% of the population in Rawalpindi District identifies as Muslim, reflecting the city's strong Islamic heritage and cultural influence. Minority religions include Christianity, which is practiced by around 2% of the population, and Hinduism along with other religions, which together account for less than 1% of the population.

6.6.3 Languages

Rawalpindi boasts a multilingual landscape, reflecting its diverse population. The majority of residents, roughly 67%, speak Punjabi as their first language, with several dialects, including Pothohari, Pahari, and Majhi (Standard Punjabi), prevalent in the city. Urdu, the national language of Pakistan, is widely understood and spoken, particularly in official settings and among the educated elite, with around 10.64% of the population listing it as their first language according to the 2017 census. Additionally, smaller minorities speak Pashto, Hindko, and Kashmiri, with 11.51% speaking Pashto and 3.25% speaking Hindko as their first languages. This linguistic diversity enhances Rawalpindi's cultural richness and facilitates communication and integration among its various ethnic groups.

6.6.4 Cultural and Social Status

Rawalpindi's cultural and social status is a blend of traditional and modern influences, reflecting its rich history and dynamic urban environment. The city is known for its vibrant cultural scene, with numerous festivals, fairs, and events that celebrate its heritage. Traditional Punjabi customs and practices are prevalent, including music, dance, and cuisine, which play a significant role in daily life. The city also showcases a mix of architectural styles, from historic Mughal-era buildings to contemporary structures.

Socially, Rawalpindi is characterized by a strong sense of community and family values. Extended families often live together, and social gatherings are frequent. The influence of Islam is deeply embedded in the social fabric, guiding daily routines, celebrations, and community interactions. Educational institutions, from schools to universities, are abundant, reflecting the population's emphasis on education and professional development.

The city's economic activities have led to a diverse social landscape, where traditional artisans and traders coexist with modern professionals and entrepreneurs. This economic diversity is mirrored in the social stratification, with a range of income levels and living standards. Despite this, there is a noticeable sense of unity and cooperation among the city's residents, driven by a shared cultural identity and communal ties.

6.6.5 Institutions

The project area is situated in an agricultural region, which is characterized by its focus on farming and rural activities. Consequently, there are no prominent educational institutes in the vicinity. The area's development is primarily centered around agriculture, resulting in a limited presence of educational facilities and institutions that cater to academic needs.

However, Rawalpindi is home to a wide array of educational institutions, ranging from primary schools to universities, catering to the educational needs of its diverse population. The city's educational landscape includes both public and private institutions, offering a variety of programs and curricula.

- Pir Mehr Ali Shah Arid Agriculture University
- Fatima Jinnah Women University
- Rawalpindi Medical University
- National University of Medical Sciences (NUMS)
- Government Postgraduate College Asghar Mall
- Army Public Schools and Colleges System
- Beaconhouse School System
- The City School
- Roots Millennium Schools

6.6.6 Health Facilities

The project area, being predominantly agricultural, lacks prominent health institutes. Due to its rural nature, the region does not have well-established medical facilities or healthcare centers that are typically found in more urbanized areas. This limited access to advanced healthcare services underscores the need for careful planning and consideration of health and safety measures for any developments in the area.

However, Rawalpindi in general is well-equipped with a variety of health facilities that cater to the medical needs of its residents. The city has a mix of public and private hospitals, clinics, and specialized medical centers, providing comprehensive healthcare services.

- Holy Family Hospital
- Benazir Bhutto Hospital
- District Headquarters (DHQ) Hospital
- Rawalpindi Institute of Cardiology
- Pakistan Institute of Medical Sciences (PIMS) – Rawalpindi Branch

Figure 6- 3PIMS Rawalpindi

6.7 ARCHEOLOGICAL SITES

There are no archaeological sites in Rawalpindi near our project area. The project's location has been thoroughly assessed and verified to ensure that no historically or culturally significant sites are present. This ensures that the development will not impact any heritage sites, allowing for smooth progress while respecting the region's historical preservation standards

6.8 SITE SUITABILITY

Based on the biological, physical, and social data of the project area, it has been concluded that Tehsil & District Rawalpindi is the most suitable place for the Construction of the LPG plant. The assessment indicates that the location meets all necessary environmental and safety criteria, with minimal impact on local ecosystems. The physical infrastructure, including road connectivity and proximity to key markets, supports efficient logistics and operations. Socially, the local community has shown support for the project, and the area's demographic and economic profile align well with the requirements for a successful LPG plant.

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7 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

7.1 GENERAL

The importance of impact assessment in EIA cannot be overstated, as it serves as a fundamental tool for evaluating and understanding the potential effects of a proposed project on the environment. Impact assessment systematically identifies, predicts, and evaluates the anticipated positive and negative consequences of a project, considering various environmental aspects such as air and water quality, biodiversity, soil health, and community well-being. This process is pivotal in informed decision-making, enabling stakeholders to assess the trade-offs and make choices that balance development with environmental conservation. The impact assessment phase provides a comprehensive understanding of the project's potential impacts, allowing for the development of effective mitigation measures and strategies to minimize or eliminate adverse effects. Additionally, it fosters transparency and accountability by providing a basis for public consultation and engagement, ensuring that the concerns and perspectives of affected communities are considered. Overall, impact assessment in EIA is essential for promoting sustainable development practices, preventing environmental degradation, and fostering responsible and informed decision-making in the planning and execution of projects.

7.2 PROJECT AREA OF INFLUENCE

Before commencing the environmental analysis of the project, its essential to define the specific area of influence. While the primary construction activities will be contained within predetermined boundaries, there are certain aspects where construction-related tasks may extend beyond these confines. These include

- Establishment of construction camps and erection of material grinding plants on temporarily acquired land
- Borrowing soil material from temporarily acquired land
- Quarrying aggregate material; and Construction of haul tracks for transportation of construction material, etc.

Environmental impacts have been identified within the Project Area of Influence, which lies

within 0.5 km boundary of the proposed plant building. Therefore, the identification of Project impacts and recommendations of mitigation measures will be limited within this area.

7.3 METHODOLOGY FOR IMPACT ASSESSMENT

In conducting the impact assessment for the project, a comprehensive methodology was adopted, encompassing both qualitative and quantitative assessments to provide a well-rounded understanding of potential effects. The qualitative assessment involved a systematic and in-depth analysis of the project's potential impacts on various environmental and social aspects. This included considering factors such as air and water quality, biodiversity, community health, and cultural heritage. Qualitative data, often derived from expert opinions, literature reviews, and consultations, were employed to evaluate the significance of these impacts. Simultaneously, a quantitative assessment was carried out to provide a numerical representation of specific parameters, allowing for a more precise measurement of the potential consequences. This involved data collection through field measurements, modeling, and statistical analyses to quantify environmental and social variables. The combination of qualitative and quantitative assessments ensured a holistic and rigorous evaluation, enabling a more nuanced understanding of the project's potential impacts and contributing to the formulation of effective mitigation strategies.

7.4 PROJECT DESIGN RELATED ENVIRONMENTAL PROBLEMS

The design of the storage plant has been meticulously crafted with a steadfast commitment to adhering to standard operating procedures (SOPs), thereby prioritizing safety, operational efficiency, and compliance with industry benchmarks. The emphasis on stringent SOPs ensures that the storage facility operates seamlessly and securely. Beyond functional considerations, a thoughtful tree plantation initiative has been seamlessly integrated into the project's framework, enhancing both the aesthetics and environmental sustainability of the site. This strategic incorporation goes beyond mere visual enhancement; it signifies a conscientious effort to align the project with ecological objectives. The introduction of trees not only contributes to the visual appeal of the surroundings but also plays a pivotal role in fostering environmental well-being, reflecting a holistic approach to the storage plant's development. This harmonious blend of meticulous design, safety protocols, and environmental consciousness underscores the project's commitment to excellence and responsible stewardship.

7.5 IMPACTS DURING CONSTRUCTION PHASE

The detailed risk Matrix of Construction phase is shown in the table.

Table 7- 1 Screening of Possible impacts during Construction Phase

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
Soil Erosion	Likely	Minor	Low
Land Contamination	Likely	Minor	Low
Soil Contamination	Likely	Minor	Low
Solid Waste	Likely	Minor	Low
Contractor Camp	Likely	Minor	Low
Ground Water	Likely	Minor	Low
Dust	Likely	Minor	Low
Noise	Likely	Minor	Low

7.5.1 Soil Erosion

Soil erosion may occur in the construction area due to improper runoff management from equipment washing yards and inadequate construction management practices. This impact is considered negative of minor magnitude.

Mitigation Measures

Soil erosion will be controlled by using good engineering practices especially both at construction site and peripheral area. Following measures should be taken to avoid soil erosion due to runoff water:

- Ensuring that surface run-off controls are implemented and maintained so as to minimize

erosion.

- Main drainage courses within the proposed project development site will be lined to avoid erosion.
- Plantation of indigenous grass which will flourish under project site conditions. This should be done for low road embankments.

7.5.2 Soil Contamination

Soil contamination during the construction phase can occur from waste generated from construction camps, such as garbage, putrescible waste, rubbish, and residues; discarded construction materials, such as wires, plastics, cut pieces of pipes, pieces of empty fuel and lubricant tins, and cardboard packing materials; and paint, varnishes, and other hazardous chemicals and toxic materials used in construction activities. This impact is considered negative of minor magnitude.

Mitigation Measures

- Oil, paint, and other chemical leakages will be controlled by storing these substances in special containers. Keep these containers away from unauthorized people and only allow authorized personnel to access them.
- Store other chemicals in adequate and appropriate places, depending on the type of material.
- Place safety equipment, such as fire extinguishers, near these storage areas, along with signs warning of danger and fire.
- Provide workers with Material Safety Data Sheets (MSDS) for each chemical, and take care when handling and storing these chemicals.
- Develop and implement a proper solid waste management plan to avoid waste problems.
- Collect solid waste by placing solid waste collection containers at various locations. Provide separate arrangements for organic and inorganic waste, and make workers aware of the solid waste management system in place at the site.

7.5.3 Land Contamination

The construction machinery, including cranes, trucks, loaders/dumpers, and batching plants, used during the construction period can release or spill lubricants, oil, chemicals, and toxic materials,

contaminating the land. Paints used in the construction phase can also pose threats to both the environment and human health.

Mitigation Measures

Land contamination will be controlled by the following measures:

- Vehicles and other equipment will be maintained only in designated areas with concrete slabs.
- Prevent the release of contaminated effluent into the environment.
- Direct machinery wash and other potentially contaminated effluents will be drain to a mud pit.
- Proper Handling and storage of fuels, oils, and other hazardous substances according to standard safety practices, such as using secondary containment will be ensured.
- Fuel tanks will be properly labeled and have impervious linings and dykes.
- Leakages during fuel and oil transfer operations will be prevented.
- Checking of fuel, oil, and chemical storage daily for leaks will be ensured.
- Shovels, plastic bags, sandbags, and absorbent materials will be available near fuel and oil storage areas.
- Vehicles will be properly maintained to avoid spills.
- Maintain a leak/spill record for each vehicle.
- Control of soil contaminated by moderate spills or leaks (up to 200 liters) using shovels, sand, and mud.

7.5.4 Impacts of Dust Emissions

Construction activities require machinery and equipment's such as transport vehicles, cranes, excavators, trucks for material excavation, dump/haul truck, etc. This machinery will generate air emissions that contain particulate matter (PM), smoke, dust, Carbon Monoxide (CO), and Oxides of Nitrogen (NO_2).

Mitigation Measures

- Vehicular emissions of NOx, oxides of sulfur, PM, and CO will be controlled by tuning and maintaining vehicles in good working condition.
- Dust emissions will be controlled by regularly sprinkling water and covering trucks carrying earth, sand, aggregate, and other materials.
- Tuning of all equipment, generators, and vehicles used during the construction phase of the LPG storage plant.
- Ensuring that concrete mixers meet the requirements of zero emissions.
- Minimizing dust emissions due to vehicular traffic by reducing speed, minimizing traffic through good traffic management, and sprinkling water when required.
- Minimizing dust emissions at construction sites by implementing best management practices.

7.5.5 Impact of Noise

Construction activities may increase noise levels at active construction sites. Noise impact on construction workers/ laborers may be avoided in case of loud noise by provision of adequate. Protective Equipment's (PPEs) like ear muffs, ear plugs, etc. This impact is considered negative of moderate magnitude.

Mitigation Measures

Following measures should be adopted to minimize the noise levels;

- Noise barriers (paneled fencing) will be installed where possible to keep the noise levels within permissible limits.
- While replacing equipment, quieter alternatives will be purchased. New equipment may introduce a noise problem; therefore, a noise assessment will be carried out while installing new piece of equipment.
- Contractor obligation will be to use appropriate and fit machinery.
- Noise analysis will be done every month during construction phase.

7.5.6 Impact of Solid Waste and Sewerage Generation

The contractor camp is expected to generate waste. Improper disposal of this waste can lead to both land and water contamination. To address this, storage and collection system will be provided. This impact is considered minor but negative.

Mitigation Measures

- Solid waste will be collected and segregated.
- Material suitable for recycling will be stored separately and will be handed to vendor.
- It will be ensured that the dumping area having construction waste will be leveled properly after disposal of waste material.

7.5.7 Impacts on Flora

The installation of LPG storage plant on open land is underway, yet a tree plantation plan is proposed. It aims to offset the environmental impact of construction by introducing trees, enhancing the ecological balance, and contributing to a greener environment. This initiative not only aligns with conservation efforts but also endeavors to mitigate the ecological footprint of the project, promoting sustainability and environmental responsibility in all over operational framework of the LPG storage plant.

7.6 IMPACTS DURING OPERATIONAL PHASE

The detailed risk Matrix of operational phase is shown in the table.

Table 7- 2 Screening of possible impacts during operational phase

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
Air Quality	Likely	Minor	Low
Noise	Likely	Minor	Low
Water Quality	Likely	Minor	Low

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
Soil Quality	Likely	Minor	Low
Safety Hazard	Likely	Moderate	Medium

7.6.1 Air pollution

LPG storage plants can emit a variety of air pollutants into the atmosphere. Fugitive emissions such as volatile organic compounds (VOCs), and carbon monoxide (CO) can be released during transfer, storage, and handling operations. These emissions can also occur due to leaks, pressure relied, or equipment malfunctions. These pollutants can contribute to smog and ground-level ozone formation, which can cause respiratory problems and other health problems. The impact is considered as negative having a moderate effect.

Mitigation Measures

- Frequent inspections, maintenance, and testing of storage tanks will be ensured to identify and rectify any leakage or faulty valves helps prevent emissions from fugitive sources.
- PEQs for air emissions will be strictly followed to avoid excess air pollution.

7.6.2 Water pollution

Accidental leaks during transportation, handling, or storage of LPG can contaminate nearby water sources. When not properly contained, these leakages can seep into the ground and potentially reach nearby water bodies, causing water pollution. LPG is a flammable liquid, and it can also dissolve in water and contaminate groundwater. Operational activities at an LPG storage plant may produce treatment or discharge of this wastewater into water bodies without adequate management can lead to water pollution.

Mitigation Measures

- LPG storage plants will reduce water pollution by preventing leaks.
- This will be done by installing leak detection systems and by using double-walled tanks.
- PEQs for wastewater discharges will be strictly followed to avoid water pollution.

7.6.3 Soil contamination

LPG leaks, and improper disposal of waste can also contaminate soil.

Mitigation Measures

- LPG storage plants will reduce soil contamination by preventing leaks.

7.6.4 Noise pollution

LPG storage plants can generate noise from equipment such as compressors, pumps, and generators. The transportation of LPG can also generate noise. This noise can be disruptive to nearby communities.

Mitigation Measures

- LPG storage plants will reduce noise pollution by installing mufflers on equipment and by building sound barriers around the plant.

7.6.5 Safety Hazard

LPG is highly flammable and explosive. Leakages, improper handling, or accidental release of LPG can lead to fire or explosion hazards, endangering workers and nearby population. LPG leakage can displace oxygen in the air, leading to an oxygen-deficient atmosphere. Workers handling LPG are at a risk of exposure to hydrocarbons, which can cause skin irritation, respiratory issues, or more severe health problems upon prolonged or high-level exposure.

Malfunctioning equipment or over-pressurization of tanks can also pose risks of sudden release or ruptures, leading to physical injuries or exposure to hazardous material. Transportation of LPG to and from the storage point involves risks associated with vehicular accidents and spillage.

Mitigation Measures

- Comprehensive training to the employees on safe handling procedures, emergency response protocols, and the use of personal protective equipment (PPE) to minimize risks will be ensured.
- Routine maintenance, inspections, and testing of equipment to ensure proper functioning and detect potential issues early on to prevent accidents.
- Emergency response plan will be implemented to effectively manage and contain leaks or other potential accidents to minimize their impact on worker safety and nearby communities.
- Safety equipment such as gas detectors, flame arrestors, and personal protective gear to reduce exposure risks.

7.7 POTENTIAL ENVIRONMENTAL ENHANCEMENT PROCEDURES

To minimize these environmental impacts, LPG storage plants can implement a variety of enhancement measures, including:

- Water sprayers can be used to suppress LPG vapors in the event of a leak.
- Leak detection and repair programs can help to identify and repair LPG leaks early on, before they cause significant environmental damage.
- Double-walled tanks can provide a secondary layer of protection in the event of a leak from the primary tank.
- Storm water management plans can help to prevent LPG leakages from contaminating storm water runoff.
- Trees plantation can help to absorb pollutants from the air and water.
- Energy-efficient equipment can help to reduce greenhouse gas emissions.
- Electricity will be used from IESCO; however, available stand by generator will also be used whenever there is casual power shut down. In the first place the generator is to be housed in double built containment/ housing, therefore, its noise will be curtailed well within the limits of the Punjab Environmental Quality Standards (PEQS).

- Adequate firefighting system will be always maintained, and the required quantity of water will always be kept in storage.
- Rainwater disposal will be done through the adequate system.
    - Sewage will be discharged to the main sewerage system; after its treatment through a septic tank and also getting the permission from the competent authority.

8 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

An Environmental Management and Monitoring Program (EMMP) is a crucial component of an EIA because it serves as a systematic framework to ensure the effective implementation of mitigation measures and compliance with environmental regulations. The EIA process identifies potential environmental impacts of a proposed project, and the EMMP is designed to address and manage these impacts throughout the project's lifecycle. By establishing a comprehensive monitoring program, authorities can track the environmental performance of the project in real-time, allowing for timely identification and response to any unforeseen adverse effects. Additionally, the EMMP provides a mechanism for ongoing evaluation and adjustment of mitigation measures, contributing to adaptive management strategies. This proactive approach enhances environmental sustainability, helps prevent or minimize negative impacts, and fosters continuous improvement in environmental performance, thereby promoting responsible and sustainable development practices.

8.1 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The objectives of an Environmental Management Plan (EMP) generally revolve around the following key goals:

- ✓ The safeguard and conserve natural resources, habitat, and ecosystems. This involves preserving biodiversity, protecting endangered species, and maintaining the overall health of the environment.
- ✓ To minimize or eliminate pollution by managing emissions, waste, and other harmful byproducts generated by human activities. This involves adopting cleaner technologies, waste reduction, and recycling initiatives.
- ✓ To ensure the responsible and sustainable use of natural resources such as water, land, energy, and minerals. This involves strategies to conserve resources, reduce consumption, and promote renewable and alternative sources of energy.
- ✓ To adhere to environmental laws, regulations, and standards set by relevant authorities, ensuring that activities and operations are conducted in accordance with legal requirements.

- ✓ To identify potential environmental risks and develop strategies to mitigate these risks. This includes planning for emergencies and establishing protocols to respond to environmental incidents.
- ✓ To constantly assess and improve environmental performance through regular monitoring, evaluation, and adjustment of management strategies. This ensure that environmental goals are being met and that new challenges are addressed effectively.
- ✓ To involve and educate community, stakeholders, and employees in environmental initiative, fostering a culture of environmental responsibility and awareness.
- ✓ They manage environmental concerns in a manner that is cost-effective and integrate sustainability.

These objectives from the backbone of an Environmental Management Plan, guiding strategies and actions to ensure environmental sustainability and responsibility in all the phases of a project.

8.2 INSTITUTIONAL CAPACITY

In the proposed monitoring and evaluation framework, the Project Proponent assumes a central role in overseeing the environmental aspects of the project. The Project Proponent will be responsible for the overarching Monitoring and Evaluation (M&E) process. This includes integrating environmental considerations into the main monthly reports of the project, emphasizing a holistic approach to project reporting.

To ensure a detailed and on-the-ground assessment of EMP implementation, the Project Proponent designates the Environment Consultant, who is part of the proponent's team. This consultant will be actively involved in field monitoring, observing the day-to-day activities related to environmental management, and reporting findings to the Project Proponent. This approach ensures a real-time understanding of the project's environmental performance.

For a comprehensive evaluation at the conclusion of the project, an Environment Specialist from the Supervision Consultant will conduct a final assessment. This specialist will review the overall effectiveness of the EMP throughout the project's lifecycle, providing valuable insights into the long-term impact and sustainability of environmental management measures.

Recognizing the importance of external validation, the Project Proponent commits to engaging an independent agency for 3rd party validation of EMP implementation. This external entity,

whether an NGO, an academic institute, or an individual consultant, will provide an unbiased and objective evaluation, adding credibility to the environmental performance assessment.

At the district level, the District Office of the Environmental Protection and Climate Change Department (EPA) will play a crucial role in monitoring the overall activity at the project site. This involvement ensures that the project aligns with regional environmental regulations and standards. The district-level monitoring adds an extra layer of oversight, promoting accountability and adherence to local environmental guidelines.

In summary, the proposed framework establishes a multi-tiered approach to environmental monitoring and evaluation. It leverages internal expertise, engages external validation for impartial assessments, involves EPA offices for regulatory compliance, and integrates findings into regular project reporting. This comprehensive strategy aims to ensure the effective implementation of the EMP, fostering environmental sustainability throughout the project's lifecycle.

8.3 SCHEDULE FOR IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PLAN

The implementation stages of the project activity include:

- **1st Stage**

The stage –1 comprises the onsite contouring studies and soil investigations and the finalization of the project designs.

- **2nd Stage**

The stage –2 comprises the following task:

1) Laying of foundations excavation and commencement of erection work.
2) Shoring and piling
3) Start of civil, electrical and mechanical work.
4) Development of basic infrastructure.
5) Fitting of instrumentation.

- **3rd Stage**

The stage –3 comprises the following task:

1) Commercial building civil structure erection completion.
2) Completion of the basic infrastructures water supply system, electricity supply etc.

- **4th Stage**

The last stage will be the commencement of regular use.

8.4 SCOPE OF ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides mitigation and management measures for the following phases of the project:

8.4.1 Construction Phase

The EMP outlines crucial management principles tailored for the construction phase of the project. This section meticulously details environmental actions, procedures, and associated responsibilities vital during the construction phase. These specifications are not merely recommendations but are integral components of the contract documentation. Consequently, the contractor is bound to adhere to these specifications with precision. The compliance requirement is stipulated to ensure that environmental considerations are seamlessly integrated into the construction process. The satisfaction of both the Project Manager and the Environmental Control Officer is paramount, as their endorsement signifies the contractor's fulfillment of contractual obligations. The EMP serves as a comprehensive guide, fostering a proactive approach to environmental management within the construction framework. By embedding these specifications in the contract documentation, the project emphasizes its commitment to responsible and sustainable construction practices, aligning with regulatory standards and ensuring that environmental concerns are duly addressed throughout the construction phase. The coordination between the Project Manager and the Environmental Control Officer is pivotal, underscoring the importance of effective communication and collaboration in enforcing and overseeing the adherence to environmental specifications by the contractor.

8.4.2 Operation and Mitigation Phase

This section of the EMP outlines key principles for the project's operation and maintenance phase. It specifies environmental actions, procedures, and responsibilities required from the proponent during this phase. These specifications are contractual obligations, emphasizing the

project's commitment to sustained environmental responsibility beyond construction. The EMP serves as a guide for seamlessly integrating environmental considerations into daily operations. Compliance ensures alignment with regulatory standards and promotes environmentally sound practices. Clear delineation of responsibilities fosters accountability, and regular communication among stakeholders ensures effective coordination. Overall, this section reflects the project's ongoing commitment to environmental stewardship throughout its lifecycle.

8.5 MITIGATION PLAN FOR CONSTRUCTION AND OPERATION PHASE

Table 8- 1 Environmental Management Plan (EMP) for Constructional Phase

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Constructional Phase				
1	**Air quality** Dust and particulate matter resulting from construction activities. Use of heavy machinery will produce dust emissions	Water sprinkling on regular basis will be ensured to limit pollution from dust and particulate matter. Proper maintenance and management of all the construction machinery and vehicles. Tree plantation will be done to reduce air pollution.	Contractor	Proponent and Contractor
2	**Water quality** Run-off water from construction area.	Use of impermeable sheets to avoid contamination of the groundwater/surface water. Proper disposal of waste material on dumping	Contractor	Proponent and Contractor

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Constructional Phase				
	Inappropriate storage of constructional waste can cause leakages contaminating ground water.	sites.		
3	**Waste Generation** Construction waste will be produced from construction activities Domestic waste from workers camp	Conduct separate collection of construction and domestic waste to promote recycling and re-use. Proper disposal of waste to the authorized sites. The area to be leveled and contoured after disposing excess material. No waste or debris will be thrown in the nearest canal water or other water bodies.	Contractor	Proponent and Contractor

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Constructional Phase				
4	**Noise** Noise caused by construction machinery and vehicles used for mobilization of construction equipment and workers.	The contractor will strictly follow the PEQS Proper maintenance of vehicles and construction equipment. Minimize/avoid unnecessary use of drills and other noisy machinery Unloading of constructional material will be done during daytime. The personal protective equipment (PPE) will be provided to the construction workers, and its usage will be made mandatory	Contractor	Proponent and Contractor
5	**Soil Quality**	Chemical leakages will be controlled by storing these substances in special containers. Proper waste management will be ensured.	Contractor	Proponent and Contractor

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Constructional Phase				
6	**Materials Management**	Stockpiles shall not exceed a particulate height. Stockpiles maybe exposed to windy conditions or heavy rain, so they will be properly covered with plastic sheets. Stockpiles may further be protected by the construction of low brick walls around their bases.	Contractor	Proponent and Contractor
7	**Workers Health & Safety**	Personal protective equipment will be provided to the workers. Provision of first aid box at work site to deal with emergency situation. Safety training to the workers. Adequate safety signs on site will be ensured.	Contractor	Proponent

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Constructional Phase				
		Provide training regarding proper handling and use of chemicals/ paints Install fire extinguishers at fire handling places. Inspection that lifting devices, such as cranes, are appropriate for expected loads. Stagnant water at the project site will be prohibited to avoid the dengue larva production. Continuous monitoring will be carried out to ensure that contractor is following safe working procedures and practices.		
8	**Clearance of site from extra material and construction**	Regular removal of extra materials from the site to avoid congestion at workplace. Construction waste will be collected and	Contractor	Proponent and Contractor

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Constructional Phase				
	equipment	disposed of separately from other waste. Careful handling of waste will be ensured.		

Table 8- 2 Environmental Management Plan (EMP) for Operational Phase

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Operational Phase				
1	**Air Impact** Fugitive emissions such as volatile organic compounds (VOCs), and carbon monoxide (CO) can be released during transfer, storage, and handling operations.	Frequent inspections, maintenance, and testing of storage tanks will be ensured to identify and leakage or faulty valves. PEQs for air emissions will be strictly followed to avoid excess air pollution.	EHS Officer	Proponent/EHS Officer
2	**Impact on Noise** LPG storage plants can generate noise from equipment such as compressors, pumps, and	LPG storage plants will reduce noise pollution by installing mufflers on equipment and by building sound barriers around the plant.	EHS Officer	Proponent/EHS Officer

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Operational Phase				
	generators. The transportation of LPG can also generate noise.			
3	**Soil Contamination** LPG leaks, and improper disposal of waste can also contaminate soil.	LPG storage plants will reduce soil contamination by preventing leaks.	EHS Officer	Proponent/ EHS Officer
4	**Water Quality** Accidental leaks during transportation, handling, or storage of LPG can contaminate nearby	LPG storage plants will reduce water pollution by preventing leaks. This will be done by installing leak detection systems and by using double-walled tanks. PEQs for wastewater discharges will be	EHS Officer	Proponent/ EHS Officer

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Operational Phase				
	water sources. LPG is a flammable liquid, and it can also dissolve in water and contaminate groundwater.	strictly followed to avoid water pollution.		
5	**Fire and Workers Safety** LPG is highly flammable and explosive. Leakages, improper handling, or accidental release of LPG can lead to fire or explosion hazards.	Comprehensive training to the employees on safe handling procedures, emergency response protocols, and the use of personal protective equipment (PPE) to minimize risks will be ensured. Routine maintenance, inspections, and testing of equipment to ensure proper functioning and detect potential issues early on to prevent accidents.	EHS Officer	Proponent/ EHS Officer

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
		Operational Phase		
	LPG leakage can displace oxygen in the air, leading to an oxygen-deficient atmosphere. Workers handling LPG are at a risk of exposure to hydrocarbons, which can cause skin irritation, respiratory issues, or more severe health problems upon prolonged or high-level exposure. Malfunctioning equipment or over-	Emergency response plan will be implemented to effectively manage and contain leaks, or other potential accidents to minimize their impact on worker safety and nearby communities. Safety equipment such as gas detectors, flame arrestors, and personal protective gear to reduce exposure risks.		

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Operational Phase				
	pressurization of tanks can also pose risks of sudden release or ruptures, leading to physical injuries or exposure to hazardous material. Transportation of LPG to and from the storage point involves risks associated with vehicular accidents and spillage.			
6	**Accidental Leakages**	Installation of Flame Detectors for rapid identification of open flames. Deployment of state-of-the-art Advanced Gas	EHS Officer	Proponent/EHS Officer

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Operational Phase				
		Leak Detectors for prompt and accurate detection of potential gas leaks. Implementation of emergency shutdown systems to isolate processes in the event of detected flames or gas leaks. Installation of efficient ventilation systems to disperse released gases and maintain a safe working environment. Strategic placement of emergency exit points with clear signage for rapid and safe personnel evacuation.		

8.6 ENVIRONMENTAL MANAGEMENT TEAM ALONG WITH THEIR ROLES AND RESPONSIBILITIES

The project proponent bears the responsibility for overseeing all the project activities. To cater to the varying requirements during operational phase, the proponent will hire personnel specifically dedicated to environmental management at the project site. This step is crucial to ensure the effective implementation and operations of the EMP.

Assigning the responsibilities to designated individuals is paramount to uphold accountability in the event of any oversight or mishap. Each appointed person will have specific duties outlined within the EMP. These responsibilities will be tailored to their roles, ensuring they are accountable for the successful execution of environmental protocols and procedures.

By delineating and assigning these responsibilities to individuals, the project proponent establishes a framework where each person understands their role and obligation within the broader context of environmental management. This structuring allows for a more efficient response to any environmental issue. This approach aims to create a clear chain of accountability, ensuring that the implementation of EMP is conducted diligently and that there are identifiable points of contact for any concerns or queries related to environmental management during the project's operational phase.

8.7 ENVIRONMENTAL MONITORING PROGRAM

An EMP is a structured system designed to consistently observe, assess, and record the environmental conditions and impacts associated with the construction of LPG storage plant. It involves systematic data collection related to air quality, water quality, soil conditions, and biodiversity. This collected data is analyzed to detect any deviations from the PPEQs.

It also involves impact assessments, communication of findings to stakeholder, and adaptive management –making necessary adjustments to mitigate environmental risks and issues. The program's goal is to ensure sustainable environmental practices, minimize adverse impacts, and maintain compliance with set standards, contributing to better environmental management and long-term sustainability.

The objectives of the Environmental Monitoring Plan are given below.

- ✓ Detecting environmental changes to prevent and minimize potential negative impacts on the environment.
- ✓ Ensuring compliance with environmental laws, permits, and regulations by regular monitoring and reporting environmental parameters. This helps in meeting legal requirements and avoiding penalties or sanction.
- ✓ Assessing and managing potential risks to the environment caused by human activities. This involves evaluating the impact of these risks and implementing strategies to mitigate or manage them effectively.
- ✓ Monitoring and managing the use of natural resources such as water, air, soil, and biodiversity. The goal is to conserve these resources and maintain ecological balance.
- ✓ Assessing the impact of specific actions, projects, or processes on the environment to understand their consequences and make informed decisions regarding future actions.
- ✓ Using collected data to improve environmental performance, refine strategies, and adapt measures to achieve better outcomes over time.
- ✓ Establishing protocols and responses for emergencies or unexpected environmental incidents, ensuring a rapid and effective reaction to minimize damage.

Table 8-3 Monitoring Parameters

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
A. Construction phase				
1.	**Noise**	Construction vehicle/ machinery/ generators/welding work	Noise meter	Construction vehicles / machinery / generators will be checked regularly for noise level by the contractor during construction phase.
2.	**Air Emissions**	Construction vehicle/ machinery/	Ambient particulate matter	Construction vehicles / machinery / generators will be checked regularly for smoke

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
		generators	monitoring.	emissions by the contractor during construction phase.
B. Operation phase				
1.	**Air Emissions**	Filling of Storage Tanks	Gaseous Emissions	Will be carried out on quarterly basis
2.	Wastewater monitoring	Wastewater discharging points	Detection of residual hydrocarbons and Particulate Matter	Will be carried out on quarterly basis.
3.	LPG leakages	Storage tanks	Pressure tests	Will be carried out on monthly basis.

8.8 ENVIRONMENTAL BUDGET

An environmental budget is a crucial aspect for the construction of LPG storage tank, as it delineates the financial allocation specifically designated for environmental management, sustainability, and mitigation potential ecological impacts. Before the commencement of the project, a detailed environmental budget was carefully formulated and allocated to ensure the responsible management of environmental aspects throughout the project's lifecycle.

The environmental budget outlined a comprehensive plan detailing financial resources for various environmentally significant aspects of the project. It encompassed expenses associated with the implementation of sustainability measures, compliance with environmental regulations,

and the execution of eco-friendly initiatives. Moreover, the budget accounted for costs related to environmental impact assessments, monitoring systems, and routine environmental audits to ensure adherence to established standards and regulations.

Table 8- 4 Environmental Budget

Environmental Component	Amount PKR	Details	Remarks
A. Environmental Management Cost			
Fire and Health & Safety Measures	400,000	The workers are required to provide the PPEs for work site safety precautionand to avoid any safety hazard.	Amount to be included in the Project Budget.
B. Environmental Monitoring Cost			
(i) Air, Water and Noise Monitoring	200,000	Monitoring will be performed as per EPA Standards	Amount to be Included in Project Budget
C. Tree Plantation Tree Plantations of Endemic /Local Species	400,000	Landscaping around the project site.	Required for implementation of true spirit of EMP
Total Environmental Management and Monitoring Cost in PKR (A+B+C)	**1,000,000**	Summing up A,B, C	Amount to be included in the Project Budget.

9 TREE PLANTATION PLAN

The incorporation of a tree plantation plan within an EIA is of paramount importance for several compelling reasons. Trees play a pivotal role in environmental sustainability, acting as natural carbon sinks, enhancing biodiversity, and mitigating the impacts of climate change. A well-designed tree plantation plan contributes significantly to offsetting carbon emissions associated with a project, thereby fostering a more balanced and ecologically friendly footprint. Beyond their role in carbon sequestration, trees contribute to soil stabilization, preventing erosion and promoting water retention. They also provide habitat for diverse wildlife, supporting biodiversity conservation. Moreover, trees contribute to the improvement of air quality by filtering pollutants and releasing oxygen, thereby enhancing the overall health and well-being of surrounding communities. Integrating a tree plantation plan into the EIA showcases a commitment to ecological stewardship and reflects a proactive approach toward environmental sustainability, aligning the project with broader conservation goals and community well-being.

9.1 OBJECTIVES OF TREE PLANTATION

The following objectives of tree plantation helps to clarify its basic purpose.

- ✓ Trees in urban areas provide shade and heat reduce heat, mitigation the urban heat island heat.
- ✓ Trees store carbon in their biomass, helping and reduce the atmospheric carbon dioxide levels.
- ✓ Trees contribute to visual appeal of urban and rural landscapes, making areas more attractive.
- ✓ Trees yield valuable resource such as timber, fruits, nuts, and medicinal plants.
- ✓ Trees plantations create employment opportunities for the people living in the vicinity of the project area.
- ✓ Trees act as a natural air filters by trapping airborne pollutants and particulate matter.
- ✓ Trees release oxygen during photosynthesis, improving air quality.
- ✓ Trees help maintain healthy watersheds, reducing the risk of floods and ensuring a consistent water supply.
- ✓ Trees help prevent soil erosion by anchoring soil with roots.

- ✓ Trees planted strategically can safeguard against landslides and protect roads and buildings.
- ✓ Trees absorb carbon dioxide and release oxygen, helping reduce greenhouse gas level and circumvent climate change.
- ✓ Trees can efficiently serve as windbreaks.

9.2 BENEFITS OF TREE PLANTATION

A well-executed tree plantation plan offers numerous advantages, covering all the environmental, economic and soil aspects. Some of the key benefits of tree plantation are enlisted below;

- Plants absorb carbon dioxide (CO_2) from the atmosphere and store this carbon in the biomass helping to circumvent climate change by reducing greenhouse gas emissions.
- Roots of the trees help to stabilize soil and prevent soil erosion.
- Trees act as a natural air filter, by trapping particulate matter which leads to healthier living environments.
- Trees can provide habitat and food residues to birds contributing to local biodiversity.
- Trees act as a natural buffer that helps to control and purify water entering into the streams and rivers reducing the risks for the contamination of water.
- Well-maintained tree plantation enhances the visual appeal of the landscapes, making area more attractive.
- Tree roots can improve soil quality by increasing its organic matter content and nutrient availability.
- Tree plantation contribute to climate resilience by moderating temperature extremes, reducing the risk of heatwaves, and providing shelter from extreme weather events.
- Trees can help to enhance the mental and physical well-being of the people living around the project area.
- A well-designed tree plantation plan serves as a long-term investment in the environment and the future, as they continue to provide benefits for generations to come.

9.3 AREA ENHANCEMENT PLAN

Tree plantation plan of the area has been prepared keeping in view the project area and length. The plan is based on best possible estimations and can be modified accordingly at the execution stage.

9.4 TREES RECOMMENDED

Tree species are recommended for the plantation are the indigenous species of District Rawalpindi.

Table 9- 1 Trees to be planted

Sr. No.	Local Name	Scientific Name
1.	Shisham	*Dalbergia sissoo*
2.	Keekar	*Acacia arabica*
3.	Siris	*Albizzia lebbeck*
4.	Ber	*Ziziphus jujuba*

9.5 COST OF TREE PLANTATION

The cost for the plantation and maintenance of trees at the project site is estimated as 3 Lakh PKR. The budget has been calculated for the procurement of manure, continued supply of water throughout the year. The proponent will make a proper record of the current number and conditions of the planted trees.

10 FIRE SAFETY PLAN

A fire safety plan is a structured and comprehensive document that details procedures, protocols, and strategies aimed at preventing, preparing for, and responding to fire emergencies at the project site. This essential plan outlines preventive measures, emergency procedures, evacuation protocols, fire detection and suppression systems, training requirements and communication strategies. It assigns specific roles and responsibilities to individuals and provides clear instructions for evacuations, ensuring occupants, or employees understand what to do in case of a fire. Regular reviews and updates to the plan maintain its relevance, ensuring compliance with fire safety regulations and fostering a safe and prepared environment in the event of a fire emergency.

10.1 OBJECTIVES OF A FIRE SAFETY PLAN

Following objectives collectively aim to create a safe and prepared environment in the face of a fire emergency, ensuring the protection of lives, property, and assets.

- ✓ The primary goal is to prevent fires from occurring by implementing measures that reduce fire hazards, ensuring that all the safety systems, equipment, and protocols are up to standard, and that fire risks are minimized.
- ✓ Protecting the lives and well-being of occupants and employees by ensuring a quick and safe evacuation during a fire emergency. This involves establishing and regularly practicing efficient evacuation routes and procedures.
- ✓ Minimizing damage to property and assets by having effective fire detection and suppression systems in place. This includes regular maintenance of fire safety equipment such as fire alarms, sprinkler systems, and fire extinguishers.
- ✓ Outlining procedures to respond effectively and efficiently in the event of a fire. This involves establishing clear roles and responsibilities for personnel during a fire emergency.
- ✓ Ensuring compliance with local fire safety regulations and standards.
- ✓ Conducting regular training sessions, and fire drills to educate occupants and employees about fire safety procedures, evacuation routes, and the use of fire equipment.

- ✓ Regularly reviewing and updating the fire safety plan to incorporate any necessary changes in equipment, procedures, or regulations. This ensures the plan remains current and effective.

10.2 FIRE SAFETY SYMBOLS

In a LPG storage and filling plant, hazard identification symbols play a crucial role in communicating potential hazards identification symbols play a crucial role in communicating potential dangers to employees, emergency responders, and the public. These symbols, often standardized, convey carious hazard associated with the storage and handling of LPG. Some common symbols and their meanings in such a facility include:

10.2.1 Flammable Symbol

It indicates the flammability of LPG. It warns about the potential for fire explosion.

Figure 10- 1 Symbol for Flammable Material

10.2.2 Gas Cylinder Symbol

It highlights the presence of compressed gas cylinder, signifying the potential pressure and hazards associated with gas containment.

Figure 10- 2 Symbol for Gas Cylinder

10.2.3 Toxic Symbol

It warns about the toxicity of certain chemicals or gases, emphasizing the need for caution and proper handling to avoid health and hazard.

Figure 10- 3 Symbol for Toxic Material

10.2.4 Explosive Symbol

It indicates the potential for an explosion due to certain conditions or elements present in the LPG plant.

Figure 10- 4 Symbol for Explosive Material

10.2.5 Electrical Hazard Symbol

It warns about electrical hazards present in the facility, highlighting the risk of electrical shock or short circuits.

Figure 10- 5 Symbol for Electrical Hazard

10.2.6 PPE (Personal Protective Equipment) Symbol

It emphasizes the necessity of wearing appropriate personal protective equipment while working in the facility.

Figure 10- 6 Symbols of PPEs

10.2.7 Environmental Hazard Symbol

It signifies potential hazards to the environment, like contamination or pollution risks from LPG leaks.

Figure 10- 7 Environmental Hazard Symbol

These symbols are commonly used in combination with written warnings, color codes, and other safety measures to ensure a comprehensive and easily understandable identification system for the hazards present in an LPG storage plant. It's crucial for all personnel to be familiar with these symbols and their meanings to ensure a safe working environment.

10.3 FIRE SAFETY MEASURES

Fire safety measures prevent fires and explosions, safeguard personnel, protect property and equipment, ensure compliance with regulations, maintain emergency preparedness, and mitigate environmental risks associated with potential fire incidents. Following safety measures are proposed at project site.

10.4 FIRE EXTINGUISHERS

Fire extinguishers are necessary in LPG storage areas due to high flammability of LPG. They provide a means to quickly suppress small fires, prevent their escalation, comply with safety regulations, and protect lives, and the environment. These extinguishers ensure emergency preparedness and the rapid containment of fires, offering immediate response and safety for individuals working in or around LPG storage areas.

10.4.1 Dry Chemical Powder Fire Extinguishers

Dry Chemical Powder (DCP) fire extinguishers are crucial in LPG storage and filling plants due to their versatility in combating different types of fires, including those involving flammable gases like LPG. These extinguishers work by interrupting the chemical reaction of the fire, making them effective for a wide range of fire classes, such as Class B (flammable liquids) and Class C (electrical fires). In LPG storage facilities, where various fire risks exist, DCP extinguishers serve as a reliable choice for their ability to quickly suppress fires, prevent their spread, and safeguard the environment, equipment, and personnel. Their adaptability, quick response, and effectiveness against various fire types make them an essential safety measure, ensuring preparedness for diverse fire emergencies in LPG-related settings.

Figure 10- 8 DCP Fire Extinguisher

10.4.2 Fire Extinguishers Foam Type

Fire extinguishers of the foam type play a critical role in ensuring the safety of LPG storage plants. LPG, being a highly flammable and combustible substance, poses inherent risks, and a

potential fire can escalate rapidly. Foam-type fire extinguishers are specifically designed to combat flammable liquid fires, making them indispensable in LPG storage facilities. The foam forms a blanket over the liquid surface, suppressing the release of flammable vapors and preventing the fire from spreading. This targeted approach helps control the situation swiftly and effectively, minimizing the risk of catastrophic incidents. The use of foam extinguishers in LPG storage plants underscores a proactive safety measure, offering a reliable means of first response in the event of a fire emergency, and ensuring the protection of personnel, assets, and the surrounding environment. Regular maintenance, training in proper usage, and adherence to safety protocols will further enhance the efficacy of foam-type fire extinguishers in safeguarding LPG facilities.

Figure 10- 9 Fire Extinguisher Foam Type

10.4.3 Fire Hydrants

Fire Hydrants at LPG storage plants provide immediate access to water for firefighting in emergencies, supporting fire suppression efforts, ensuring site safety by cooling structures, and complying with safety regulations. Although water might not directly extinguish LPG fires, hydrants serve as a crucial resource for firefighting equipment and overall emergency preparedness.

Figure 10- 10 Fire Hydrant

10.4.4 Fire Alarm

Fire alarms are crucial in LPG storage plants for early fire detection, timely warnings, evacuation, facilitation, prevention of fire escalation, and compliance with safety regulations. They play a vital role in ensuring the safety of personnel and protecting the facility and its surroundings. Fire alarm is supposed to be installed at the storage plant.

Figure 10- 11 Fire Alarm

10.4.5 Sand Buckets

Sand buckets hold significant importance in the safety measures at LPG storage plants. In the event of a small fire or a minor leak that may lead to a fire, sand buckets provide a crucial first line of defense. Sand is a non-combustible material, and when swiftly applied to a small flame, it can smother the fire by cutting off its oxygen supply. Moreover, in cases where liquid chemicals are involved, sand can be used to absorb and neutralize spills. The use of sand buckets is particularly essential in situations where traditional firefighting equipment, like water or foam, may not be suitable due to the flammable nature of LPG. These buckets are strategically placed throughout the facility, easily accessible for immediate use, and serve as an additional safety

measure to contain and control potential fire hazards effectively. Regular training and awareness regarding the proper use of sand buckets will further enhance their role in maintaining a secure environment at LPG storage plants. Fire Sand Bucket will be placed to cater any minor fire accident.

Figure 10- 12 Sand Bucket

10.4.6 Fire Pump

A fire pump holds paramount importance in the safety infrastructure of an LPG storage plant. The high flammability of LPG necessitates rapid and effective responses to any fire incidents. A fire pump serves as a critical component of the plant's firefighting system by ensuring a pressurized and reliable water supply. In the event of a fire outbreak, the pump is activated to deliver water at high pressure to firefighting hoses and nozzles. This allows responders to quickly and efficiently extinguish or control the fire, preventing its escalation. The use of a fire pump is essential for overcoming challenges associated with water distribution, especially in large industrial settings like LPG storage plants. It enhances the plant's firefighting capabilities, providing a proactive and effective means to safeguard personnel, assets, and the surrounding environment from the potentially devastating consequences of a fire emergency. Regular maintenance and testing of the fire pump will be crucial to ensure its operational readiness when needed most.

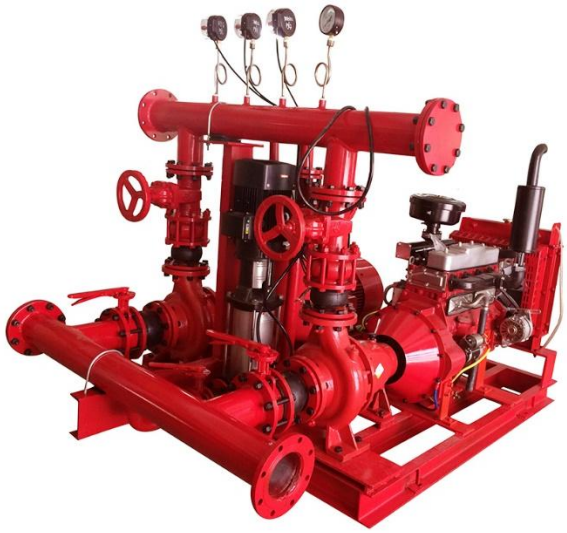


Figure 10- 13 Fire Pump

10.4.7 Jockey Pump

The jockey pump plays a crucial role in maintaining the operational efficiency and safety of an LPG storage plant's fire protection system. This small but vital pump ensures that the fire suppression system's main piping remains pressurized within an optimal range. By doing so, the jockey pump helps prevent unnecessary cycling of the main fire pump and ensures that it only activates when there's an actual fire emergency. This not only conserves energy but also extends the lifespan of the main pump, reducing wear and tear. The jockey pump contributes to the plant's readiness to respond swiftly and effectively to fire incidents by maintaining the required pressure in the fire protection system, guaranteeing that water or fire suppression agents can be delivered promptly when needed. Regular monitoring and maintenance of the jockey pump will essential to ensure its reliability, making it an integral component of the overall fire safety strategy at an LPG storage plant.

Figure 10- 14 Jockey Pump

10.4.8 Standby Pump

The standby pump is a critical component in ensuring the reliability and continuous functionality of the fire protection system at an LPG storage plant. In the event that the primary fire pump faces mechanical failure or requires maintenance, the standby pump serves as a backup, ready to seamlessly take over the crucial task of maintaining water pressure for fire suppression. This redundancy is vital for preventing any downtime in the plant's ability to respond promptly to fire emergencies. The standby pump ensures that there is no compromise in the fire protection system's effectiveness, providing a constant and reliable water supply even during unexpected failures. This redundancy not only enhances the overall safety of the LPG storage facility but also contributes to the resilience of the plant's fire safety infrastructure, ensuring uninterrupted protection against potential fire hazards. Regular testing and maintenance of the standby pump will be imperative to guarantee its operational readiness when called upon.

11 OCCUPATIONAL HEALTH AND SAFETY PLAN

The Occupational Health and Safety (OHS) plan holds paramount importance within the framework of an EIA. This plan is a comprehensive document that outlines strategies and protocols to safeguard the well-being of workers involved in the project. Beyond the ethical imperative of ensuring a safe working environment, the OHS plan is integral to regulatory compliance and risk management. It identifies potential occupational hazards associated with the project, establishes preventive measures, and details emergency response procedures. By incorporating an OHS plan into the EIA, not only is the health and safety of the workforce prioritized, but it also contributes to the overall success and sustainability of the project. A well-executed OHS plan minimizes the likelihood of accidents, injuries, and occupational health issues, fostering a workplace culture that values the welfare of its personnel. In essence, the OHS plan, as part of the EIA process, aligns with responsible and ethical project management, ensuring that occupational health and safety considerations are seamlessly integrated into the project's design, implementation, and ongoing operations.

11.1 OBJECTIVES OF OCCUPATIONAL HEALTH AND SAFETY

The objectives of Health and Safety plan at LPG storage are given below

- ✓ Protect the health and safety of employees, contractors, visitors, and the surrounding community. This includes preventing injuries, illnesses, and fatalities caused by LPG releases, explosions, fires, and other hazards.
- ✓ Minimize the environmental impact of LPG storage and handling. This includes preventing releases of LPG to the air, water, and soil.
- ✓ Comply with all applicable health, safety, and environmental regulations.

11.2 SCOPE OF OCCUPATIONAL HEALTH AND SAFETY PLAN

Following scope of occupational health and safety will be followed;

- Assessment and identification of potential hazards specific to the LPG storage and filling operations, including risks associated with handling, storage, transportation, and potential exposure to LPG will be ensured.

- Detailed guidelines on the use, maintenance, and adequacy of personal protective equipment required for various tasks, such as flame-resistant clothing, safety goggles, gloves, respirators, and other specialized gear will be provided.
- Comprehensive training programs for workers, ensuring they are well-informed about the risks involved in working with LPG, handling emergency situations, and the correct usage of safety equipment will be ensured.
- Detailed protocols and procedures for handling emergencies such as gas leaks, fires, and other incidents, including evacuation plans, communication strategies, and coordination with emergency services.
- Compliance with relevant occupational health and safety regulations and conducting regular audits to review and update safety protocols based on changing circumstances or regulations.
- Implementation of the regular maintenance schedules and inspections of equipment, machinery, and facilities to ensure safe working conditions and prevent potential hazards.
- Involving workers in safety decisions, creating a culture of safety awareness, and encouraging reporting of safety concerns or incidents will be implemented.

11.3 PERSONAL PROTECTIVE EQUIPMENT

The use of Personal Protective Equipment in a paper manufacturing plant is vital for safeguarding workers, ensuring regulatory compliance, mitigating risks, and promoting a culture of safety that is conducive to both employee well-being and operational excellence. The importance of Personal Protective Equipment (PPE) at a paper manufacturing plant cannot be overstated. Here are several key reasons highlighting the significance of PPE in this industrial setting:

- PPE provides a crucial line of defense against various occupational hazards prevalent in a paper manufacturing environment. It includes items such as safety helmets, gloves, safety glasses, and respiratory protection, which shield workers from potential injuries, chemical exposures, and airborne particles.

- Utilizing PPE is often a legal requirement and is mandated by occupational health and safety regulations. Adhering to these regulations not only ensures the safety of workers but also prevents regulatory penalties and legal issues for the manufacturing unit.

- Paper manufacturing involves machinery, chemicals, and processes that pose inherent risks. PPE serves as a risk mitigation strategy by minimizing the likelihood and severity of injuries or illnesses, contributing to a safer working environment.

- In the paper manufacturing process, workers may come into contact with various chemicals used in pulping, bleaching, and other stages. PPE, such as chemical-resistant gloves and protective clothing, safeguards workers from direct skin contact and potential harm.

- Dust and other airborne particles are common in paper mills. Respiratory protection, such as masks or respirators, is vital in preventing inhalation of harmful substances, promoting respiratory health, and minimizing the risk of respiratory-related illnesses.

- PPE not only prioritizes safety but also contributes to the overall comfort of workers. Comfortable and well-fitted PPE encourages adherence to safety protocols, fostering a positive work culture and enhancing overall productivity.

- In the event of unexpected incidents or emergencies, PPE can be crucial for protecting workers and mitigating the impact of accidents. Items like hard hats and steel-toed boots provide added protection during emergencies.

- Providing PPE demonstrates the employer's commitment to the health and safety of its workforce, instilling confidence and trust among employees. This, in turn, contributes to a positive work environment and employee morale.

11.4 PPE REQUIRED FOR CONSTRUCTION PHASE

During the construction of a project, including a paper manufacturing unit, a comprehensive set of Personal Protective Equipment (PPE) is necessary to safeguard the health and safety of workers involved in various tasks. The specific PPE requirements may vary based on the nature

of construction activities, potential hazards, and regulatory standards. Here is a general list of PPE commonly required during construction:

Head Protection: Hard hats to protect against falling objects, impact, or head injuries.

Eye and Face Protection: Safety glasses or goggles to shield the eyes from dust, debris, or other airborne particles. Face shields for additional protection during tasks with a higher risk of facial exposure.

Hearing Protection: Earplugs or earmuffs to reduce exposure to loud noises, especially in areas with heavy machinery or construction equipment.

Respiratory Protection: Dust masks or respirators to protect against inhalation of dust, particulates, or hazardous substances.

Hand Protection: Safety gloves appropriate for the specific tasks, such as cut-resistant gloves, leather gloves, or chemical-resistant gloves.

Body Protection: High-visibility vests or clothing to enhance visibility, especially in areas with moving equipment. Reflective clothing for nighttime or low-visibility construction activities. Protective clothing, such as coveralls, for tasks involving exposure to hazardous substances.

Foot Protection: Steel-toed safety boots or shoes to protect against crushing injuries, falling objects, or punctures.

Fall Protection: Safety harnesses, lanyards, and other fall protection systems for workers operating at heights or in elevated areas.

Hand and Arm Protection: Elbow and knee pads for tasks that involve kneeling or crawling. Wrist support or braces for tasks with repetitive motions.

Weather Protection: Weather-appropriate clothing, such as rain gear, insulated clothing, or sunscreen, depending on the climate and weather conditions.

First Aid Kit: Access to a well-equipped first aid kit to provide immediate care for minor injuries.

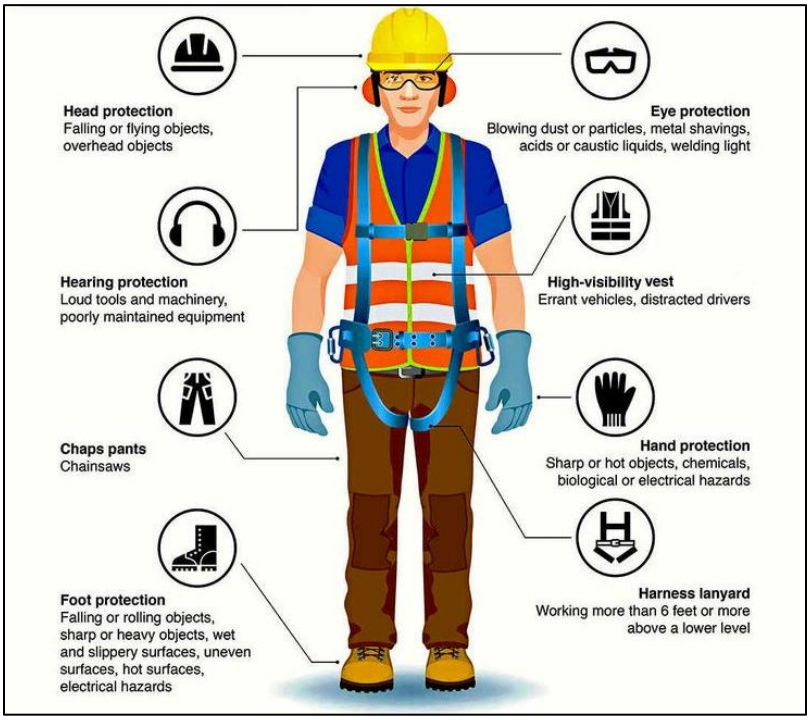


Figure 11- 1 PPEs for Construction Phase

It is essential for the construction project management to conduct a thorough hazard assessment to identify the specific risks associated with each construction activity and determine the appropriate PPE for the workers involved. Regular training, monitoring, and enforcement of PPE usage contribute to a safer construction environment.

11.5 SAFETY SIGNS DURING CONSTRUCTION PHASE

Safety signs serve as critical elements in maintaining a secure and hazard-free environment at construction sites. Their importance lies in their ability to effectively communicate potential risks and hazards to workers, visitors, and contractors. By providing clear information about safety procedures, required personal protective equipment, and safe work practices, these signs play a pivotal role in preventing accidents and injuries. Moreover, safety signs contribute to regulatory compliance, ensuring adherence to local regulations and occupational health and safety standards. They also serve as essential tools for emergency response by indicating the location of emergency exits, first aid stations, fire extinguishers, and other emergency equipment. In addition to their role in risk reduction, safety signs assist in site navigation, guiding individuals to specific areas and enhancing overall organization. Beyond practical benefits,

safety signs contribute to fostering a culture of safety awareness among the workforce. They communicate important safety policies, promote compliance with site-specific regulations, and reduce the project's liability by showcasing a commitment to responsible construction practices. Ultimately, safety signs are integral components in creating a safe, compliant, and organized construction site conducive to the well-being of all involved parties.

Figure 11- 2 Safety signs for Constructional Phase

11.6 PERSONAL PROTECTIVE EQUIPMENT DURING OPERATIONLAL PHASE

Personal protective equipment (PPE) is an important part of any health and safety plan at an LPG storage plant. PPE can help to protect employees from a variety of hazards, including:

- PPE can help to protect employees from exposure to LPG vapors, which can be harmful to the respiratory system and can cause burns.
- PPE can help to protect employees from flying debris and from the heat and flames associated with an explosion.
- PPE can help to protect employees from burns and from exposure to smoke and toxic gases.

- PPE can also help to protect employees from other hazards, such as slips, trips, and falls.

11.6.1 PPE Required for LPG Storage and Filling Plant

PPE is crucial in LPG storage and filling plants to ensure the safety of workers and minimize the risk of accidents. The necessary PPE for such environments typically includes:

1. **Safety Goggles/Face Shields:** Protect the eyes and face from potential splashes or contact with LPG, chemicals, or other hazardous materials during filling or maintenance operations.

2. **Chemical-Resistant Gloves:** Shield hands from direct contact with LPG, chemicals, or corrosive substances used in the process to prevent skin irritation or burns.

3. **Flame-Resistant Clothing:** Clothing made of fire-resistant materials is essential to protect against potential fire hazards. This includes flame-retardant coveralls or other specialized clothing designed to resist ignition.

4. **Safety Shoes/Boots:** Non-slip, closed-toe footwear is important to protect the feet from spills, slips, or potential impact hazards.

5. **Respiratory Protection:** In some cases, respiratory masks or respirators may be required to safeguard against inhalation of fumes, vapors, or airborne contaminants in the LPG storage or filling environment.

6. **Hard Hats:** Essential for protecting the head from falling objects, particularly during maintenance or handling tasks where there is a risk of items falling from above.

7. **Ear Protection:** If the operations involve loud machinery or equipment, ear protection in the form of earplugs or earmuffs can prevent damage to hearing.

8. **Safety Harnesses:** In instances where workers are operating at elevated heights or working in confined spaces, safety harnesses can prevent falls and ensure worker safety.

The specific PPE required in an LPG storage and filling plant might vary based on the site's procedures, potential hazards, and regulatory requirements. Employees working in these

areas should be trained in the correct usage of PPE and adhere to safety protocols to mitigate risks associated with handling LPG and ensure a safe working environment.

Figure 11- 3 PPES for Operational Phase

12 STAKEHOLDER CONSULTATION

Stakeholder consultation is of paramount importance in the EIA process as it facilitates inclusive decision-making, fosters transparency, and enhances the overall quality of the assessment. Involving stakeholders, including local communities, governmental bodies, non-governmental organizations, and affected parties, ensures that diverse perspectives, concerns, and local knowledge are taken into account. This inclusive approach contributes to the identification of potential environmental and social impacts that might not be evident from a solely technical or regulatory standpoint. Stakeholder consultation is a way to involve both the primary and secondary stakeholders in making decisions about the project. Stakeholder engagement builds trust, allows for the exchange of valuable information, and empowers communities by giving them a voice in the decision-making process. Moreover, it helps to align the project with the needs and expectations of the local population, minimizing conflicts and fostering a sense of shared responsibility for environmental stewardship. In essence, stakeholder consultation transforms the EIA into a more robust and credible tool, enhancing the sustainability and social acceptance of proposed projects.

12.1 OBJECTIVES OF STAKEHOLDER CONSULTATION

In 1992, the United Nations Conference on the Environment and Development (UNCED) supported the idea of involving the public in decision-making, and this was outlined in one of the key documents of the conference called Agenda 21.

Agenda 21 is a comprehensive plan for global actions focused on sustainable development and deals with how people interact with the environment. It highlights the importance of including the public in making decisions about the environment to achieve sustainable development.

The objectives of stakeholder consultation in the context of EIA are multi-faceted, aiming to foster meaningful engagement, inclusivity, and informed decision-making. Some key objectives include:

- ✓ Ensure the inclusion of diverse stakeholder perspectives in the decision-making process, promoting a more comprehensive understanding of potential environmental and social impacts.

- ✓ Provide a platform for stakeholders to express their concerns, values, and local knowledge related to the project, contributing to a more nuanced understanding of potential impacts and benefits.
- ✓ Gather valuable insights and feedback that can be integrated into the project design, helping to address and mitigate potential adverse impacts and enhance positive contributions.
- ✓ Establish trust among stakeholders by being transparent, responsive, and open to dialogue. Building trust is essential for the successful implementation of the project and its long-term acceptance by the community.
- ✓ Fulfill regulatory requirements by actively engaging with stakeholders, demonstrating a commitment to compliance with environmental and social standards, and addressing concerns raised during the consultation process.
- ✓ Facilitate an open and inclusive dialogue to build understanding and acceptance of the project within the affected communities, minimizing potential conflicts and fostering a sense of shared responsibility.
- ✓ Integrate local knowledge and community input to enhance the overall sustainability of the project, aligning it with the needs and aspirations of the affected stakeholders.
- ✓ Disseminate accurate and accessible information about the project, its potential impacts, and proposed mitigation measures to ensure that stakeholders are well-informed and can actively participate in the decision-making process.
- ✓ Consider the needs and interests of all affected parties, including vulnerable or marginalized groups, to ensure that the benefits and burdens of the project are distributed equitably.
- ✓ Create a platform for addressing conflicts and disputes, allowing for the resolution of issues through open communication and negotiation.

Figure 12- 1 Stakeholder Management

By achieving these objectives, stakeholder consultation contributes to the overall success and sustainability of the project, enhancing its social, environmental, and economic outcomes while fostering positive relationships with the communities it impacts.

12.2 PROPONENT ENVIRONMENT MANAGEMENT TEAM

A comprehensive discussion on all conceivable impacts and corresponding mitigation measures related to the project was conducted with both the proponent and project management. In this collaborative dialogue, a thorough examination of potential environmental, social, and economic implications of the project took place. The proponent and management, demonstrating a proactive commitment to responsible practices, assured the incorporation of all suggested mitigation measures to effectively control and address any discrepancies that may arise during the project's implementation. Their pledge to embrace these measures underscores a dedication

to environmental stewardship and sustainable practices. By actively engaging in this discourse, the proponent and management not only exhibit a commitment to regulatory compliance but also demonstrate a broader responsibility to the well-being of the community and the preservation of the surrounding environment. This collaborative approach ensures that the project aligns with best practices, fostering a positive impact on the environment and minimizing any potential adverse effects.

12.3 THE RESPONSIBLE AUTHORITY

The Proponent assumes the crucial role of the responsible authority, pledging to undertake all necessary measures both prior to the commencement of the project and throughout its operational phases. This commitment encompasses a comprehensive approach to project management, ensuring that all regulatory requirements, environmental standards, and best practices are diligently adhered to. Before project initiation, the Proponent commits to conducting thorough assessments and implementing necessary preparatory measures to mitigate potential impacts. This includes adopting robust environmental management strategies, obtaining required permits, and addressing any concerns raised during stakeholder consultations. Throughout the operational phase, the Proponent maintains an ongoing commitment to environmental sustainability and regulatory compliance. This involves continuous monitoring, prompt response to emerging issues, and the implementation of adaptive management practices. By assuming the mantle of responsibility, the Proponent not only safeguards the project's integrity but also prioritizes the well-being of the environment, local communities, and all stakeholders involved. This proactive stance ensures that the project operates within the parameters of environmental and ethical standards, reflecting a dedication to responsible and sustainable project execution.

Table 12- 1 Stakeholders and Their Roles and Responsibilities

Stakeholders	Roles
Proponent/Responsible Authority	The discussion with the proponent proposed the mitigation measures and alternatives to control any disparity in the project.

Stakeholders	Roles
Environmental Expert	The consultants from the Climate Caretakers survey the project site to gather relevant information and to record the local community stance and behaviors regarding the project. And also the evaluation of socio-economic impacts of the project has been done.
Government Departments	The consulted government department includes Environmental protection agency, wildlife, planning, and development. The departments overviewed the proposed projects and its socio-economic impacts.
Local affected communities	The surveys determined the extent of community that could be affected and their verdict about the proposed project.

12.3.1 Other departments and agencies

A comprehensive impact analysis was conducted in collaboration with key stakeholders, including project management, the local community, educational institutes, health institutions, hospitals, and non-governmental organizations (NGOs). This inclusive approach sought to gather diverse perspectives and insights related to the implementation of the project. The engagement process involved scoping sessions, focused group discussions, and wayside consultations, providing a multifaceted platform for dialogue and information exchange. Through these forums, all pertinent issues associated with the project were thoroughly examined, including potential environmental, social, and economic impacts. The proactive involvement of stakeholders, representing various sectors of the community, ensured that a holistic understanding of the project's implications was achieved. This collaborative effort not only fostered transparency but also allowed for the incorporation of valuable local knowledge and concerns into the impact analysis. By actively engaging with stakeholders through diverse communication channels, the project management demonstrated a commitment to responsible and inclusive decision-making, setting the stage for a well-informed and socially accepted project implementation process.

12.4 ENVIRONMENTAL PRACTITIONERS AND EXPERTS

Our dedicated team undertook a comprehensive site visit, engaging in extensive discussions with a broad spectrum of project stakeholders. This inclusive approach involved reaching out to residents from nearby villages and beyond, ensuring a diverse representation of perspectives to assess the socio-economic impacts of the project. The community demographic was richly diverse, encompassing individuals from various professions, such as those employed in different fields, business owners, doctors, expatriates, military personnel, and educators. In a conscious effort to ensure gender inclusivity, consultations with women were prioritized to gather their unique perspectives on how the project could contribute to the improvement of the area. While some women openly shared their thoughts, it was evident that social norms in the area made many feel hesitant, creating discomfort with speaking or being photographed. This nuanced understanding allowed our team to respect and navigate the cultural sensitivities of the community. The local community, nonetheless, proved to be a wellspring of information, offering valuable insights into the project and expressing predominantly positive views regarding its potential for development. This holistic approach to stakeholder engagement not only highlights the diverse fabric of the community but also underscores the importance of cultural sensitivity in ensuring meaningful and respectful interactions during the assessment of socio-economic impacts.

12.5 DISCUUSED POINTS

The points that have been kept in view while consulting stakeholders are as follows:

- Activities of the project and their consequences.
- Requirements of the people likely to be affected.
- Mitigation measures or compensation strategies.
- Role of the affected people in the implementation and development of the project.

12.6 AFFECTED AND WIDER COMMUNITY

In the vicinity of the proposed project, there is no identified affected community; however, the proactive engagement of the proponent with inhabitants from various villages has been instrumental in understanding and addressing local perspectives. The absence of a distinct affected community does not diminish the importance of comprehensive consultations. The

proponent has undertaken conscientious efforts to reach out to residents across different villages, fostering a dialogue to assess the community's sentiments towards the project. Remarkably, the feedback from these consultations has been overwhelmingly positive, with residents expressing favorable views regarding the proposed endeavor. This positive reception is indicative of the proactive communication and collaborative approach adopted by the proponent, establishing a foundation of mutual understanding and support within the broader community. While the absence of an affected community streamlines certain aspects of the engagement process, the commitment to inclusive consultations with diverse stakeholders remains integral to building a harmonious relationship with the local population.

Figure 12- 2 Pictorial View of Consultation

13 GRIEVANCE REDRESS MECHANISM

A Grievance Redress Mechanism is a structured system established to address and resolve complaints, concerns, or issues raised by individuals or entities regarding their experiences or interactions. This mechanism typically involves clear channels for lodging complaints, whether through written communication, online platforms, or dedicated grievance officers. Once a grievance is registered, the mechanism ensures a systematic and fair investigation of the matter, taking into account all relevant information and perspectives. Timely resolution and effective communication with the aggrieved party are essential components, helping to restore trust and rectify any perceived injustices. An efficient Grievance Redress Mechanism not only safeguards the rights and interests of individuals but also contributes to organizational transparency, accountability, and continuous improvement in service delivery.

13.1 OBJECTIVES OF GRIEVANCE REDRESS MECHANISM

The objectives of a GRM are designed to provide an effective and transparent process for addressing and resolving complaints or grievances raised by individuals or entities affected by a project or organization. The key objectives of a Grievance Redress Mechanism include:

- Ensure that the grievance redress process is easily accessible to all stakeholders, providing a straightforward means for individuals or communities to voice their concerns.
- Promote a fair and impartial mechanism that treats all grievances with equal consideration, regardless of the stakeholder's background, status, or affiliation.
- Establish a system that addresses grievances in a timely manner, minimizing delays and providing prompt resolution to concerns to prevent prolonged dissatisfaction.
- Foster transparency in the grievance redress process, ensuring that stakeholders are informed about the status of their complaints and the steps taken to address them.
- Hold the organization or project accountable for addressing and resolving grievances in accordance with established policies and procedures.
- Utilize the grievance redress process as an opportunity for organizational learning, collecting feedback to identify areas for improvement in project implementation or organizational practices.

- Empower affected individuals or communities by giving them a voice in the decision-making process and acknowledging the importance of their concerns.
- Serve as a mechanism for resolving conflicts and disputes in a constructive manner, minimizing the potential for escalation and promoting harmonious relationships.
- Use insights gained from the grievance redress process to enhance project design, implementation strategies, and overall organizational practices for continuous improvement.
- Ensure that the grievance redress mechanism aligns with legal requirements, industry standards, and the principles of social responsibility.
- Strengthen community engagement by demonstrating a commitment to addressing concerns and maintaining open communication channels.

By achieving these objectives, a Grievance Redress Mechanism contributes to building trust, fostering positive relationships with stakeholders, and enhancing the overall social and environmental sustainability of a project or organization.

13.2 COMPONENTS OF GRM

GRM typically involves several basic steps to address and resolve complaints or grievances effectively. While specific procedures may vary depending on the organization or context, the following are common steps in a basic GRM:

- Individuals submit their grievances through designated channels, which may include online platforms, written communication, or direct contact with a grievance officer.

- The received grievance is formally registered in the system, assigning a unique identifier. This step ensures proper tracking and documentation of each complaint.

- A preliminary assessment is conducted to determine the nature and severity of the grievance. This step helps in categorizing grievances and prioritizing them based on urgency.

- A thorough investigation is carried out to gather relevant information and facts related to the grievance. This may involve interviews, document reviews, or other means of inquiry.

- Clear and timely communication is maintained with the aggrieved party throughout the process. Regular updates and feedback are provided to keep them informed about the progress of the investigation.

- Once the investigation is complete, appropriate measures are taken to address the grievance. This may involve corrective actions, policy changes, compensation, or other forms of redress, depending on the nature of the complaint.

- The resolution is communicated to the aggrieved party, and feedback is sought to ensure their satisfaction. Follow-up may be conducted to confirm that the resolution has been implemented and to monitor any lingering concerns.

- The entire process, from grievance registration to resolution, is documented for record-keeping and reporting purposes. This documentation aids in analyzing trends, identifying systemic issues, and improving the overall grievance-handling process.

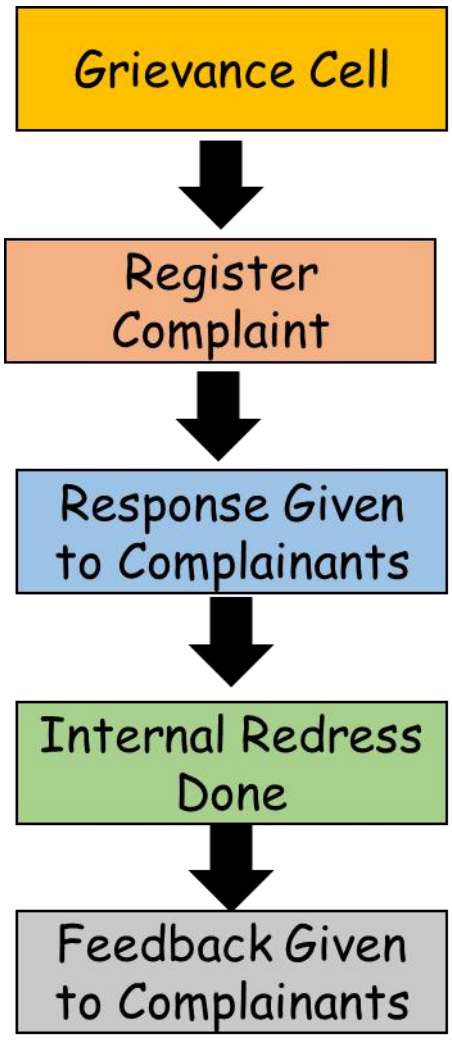


Figure 13- 1 Grievance Redress Mechanism

CONCLUSION AND RECOMMENDATION

Based on the study conducted for EIA of the project, the following recommendations are made:

- Plantation as far as permissible and within the scope of the project to be carried out.
- Sustainable development approach through conservation of natural environment is followed.
- Environmental aspects of the project should be well taken care through implementation of the Environmental Management Plan as recommended in this report.
- The project management may adopt “cleaner and greener environment” as its motto and this will make the project more environment friendly.

On the basis of the findings of the EIA, it is concluded that the project will not pose any adverse impact on the local population and the environment. Therefore, it is recommended that the competent authority may please be issues Environmental Approval for the construction and operation of this project.

Glossary

Air quality	Measurement of the pollutants in the air; a description of healthiness and safety of the atmosphere.
Area	Area is the quantity that expresses the extent of a two-dimensional figure or shape, or planar lamina, in the plane.
Compensation	Includes cash payment, deferred payment, a bond, an insurance policy, stipend, payment in kind, rendition of services, grant of privileges and disturbance money, entitlement to special treatment by government and semi government entities, grant of alternative land, grant of import licenses and business, trade and commercial facilities in addition to the rehabilitation and resettlement of an affected person.
Consultation	Consultation refers to two-way transfer of information or joint discussion between project staff and the affected population. Systematic consultation implies a sustained and rigorous sharing of ideas. Bank experience shows that consultation often yields the best resettlement alternatives, fruitful procedures for continued participation, and independent information on actual conditions for implementation.
Coordinates contaminate	Each of a group of numbers used to indicate the position of a point, line, or plane to make impure, pollute
Disclosure	The action of making new or secret information known
Disruption	Disturbance or problems which interrupt an event, activity, or process.
Environmental Management	Attempt to control human impact on and interaction with the environment in order to preserve natural resources
Evaluation	The making of a judgment about the amount, number, or value of

	something; assessment.
Geology	A science that studies rocks, layers of soil, etc., in order to learn about the history of the earth and its life
Ground water	Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solid content of 10,000 milligrams per liter or less, and are not "exempted aquifers.
Hazardous	Substance or material, which could adversely affect the safety of the public, handlers or carriers during transportation
Impact	Effect on someone or something
Land acquisition	The process whereby a person is compelled by a public agency to cede all or part of the land a person owns or possesses, to the ownership and possession of that agency, for public purpose in return for compensation.
Mitigation	The action of reducing the severity, seriousness, or painfulness of something
Occupational health	Maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs
Parking	A parking garage is a building, or an area under a building, where cars can be parked.
Project area	The area specified by the funding and/or implementing agency according to the official gazette notification and includes the areas within the administrative limits of the federal or a provincial

	government.
Proponent	A person who advocates a theory, proposal, or course of action.
Rehabilitation	Include all compensatory measures to re-establish; at least lost incomes, livelihoods, living and social systems. It does not include the payment of compensation for required assets.
Resettlement	Means all measures taken to mitigate any and all adverse impacts, resulting due to execution of a project on the livelihood of the project affected persons, their property, and includes compensation, relocation and rehabilitation.
Scope	The extent of the area or subject matter that something deals with or to which it is relevant
Social Environment	It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact.
Stakeholders	Include affected persons and communities, proponents, private and public businesses, NGOS, host communities and EPA.
Topography	Details of the surface features of land. It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth.

LIST OF ABBREVIATION

API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DCP	Dry Chemical Powder
EA	Environmental Approval
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EMMP	Environmental Management and MonitoringPlan
EMP	Environmental Management Plan
EPA	Environmental Protection and Climate Change Department
Gop	Government of Punjab
IEE	Initial Environmental Examination
IESCO	Islamabad Electric Supply Company
LPG	Liquefied Petroleum Gas
MAWP	Maximum Allowable Working Pressure
MDMT	Minimum Design Metal Temperature
NGO	Non-Governmental Organizations
P.W.H.T	Post Weld Heat Treatment
PEPA	Punjab Environmental Protection Act
PEQs	Punjab Environmental Quality Standards
PPE	Personal Protective Equipment
TDS	Total Dissolved Solid
UC	Union Council
UNCED	United Nations Conference on the Environment and Development

VOCs	Volatile Organic Compounds
WAPDA	Water and Power Development Authority

REFERENCES

Listed below are some of the documents, reports and other references consulted during the preparation of this report:

1. Information and data provided by project proponents;
2. Project Pre-Feasibility Study Report;
3. Technical Design Data related to the project.
4. Information gathered through discussions with the project related persons of the project proponent;
5. Information collected from the Technical documents of various suppliers of machinery/equipment.
6. Punjab Environment Quality Standards for Ambient Air August 2016;
7. Punjab Environment Quality Standards Noise Levels August 2016;
8. Punjab Environment Quality Standards for Drinking Water August 2016:
9. Pakistan Environmental Protection Act, 1997;
10. The Punjab Environmental Protection (Amendment) Act 2012 covers aspects related to:

    - The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;
    - Establishing complete regulatory and monitoring bodies, policies, rules, regulations and national environmental quality standards; and
    - To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.

i. Environment related Laws in Pakistan and the Province of Punjab;
ii. Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2022;
iii. Google earth, maps.
iv. Guidelines for Public Consultations - These guidelines cover:

- Consultation, involvement and participation of Stakeholders
- Techniques for public consultation (principles, levels of involvements, tools, building trust)
- Effective public consultation (planning, stages of EIA
- where consultation is appropriate)
- Consensus building and dispute resolution.

1. workplace safety and health act 2011
2. Land Acquisition Act (LAA) of 1894
3. The forest Act 1927
4. Pakistan Penal Code, 1860
5. Provincial Wildlife Act, 1974
6. Drugs Act 1976

TERM OF REFERENCES

1. The Consultant is required to carry out an Environment Assessment Study of the Project as required under section 12 of Pakistan Environmental Protection Act 1997/ Punjab Environmental Protection Act 2012.
2. The Study should be comprehensive and should cover all aspects which are envisaged under the relevant national and provincial's laws & regulations including but not limited to:

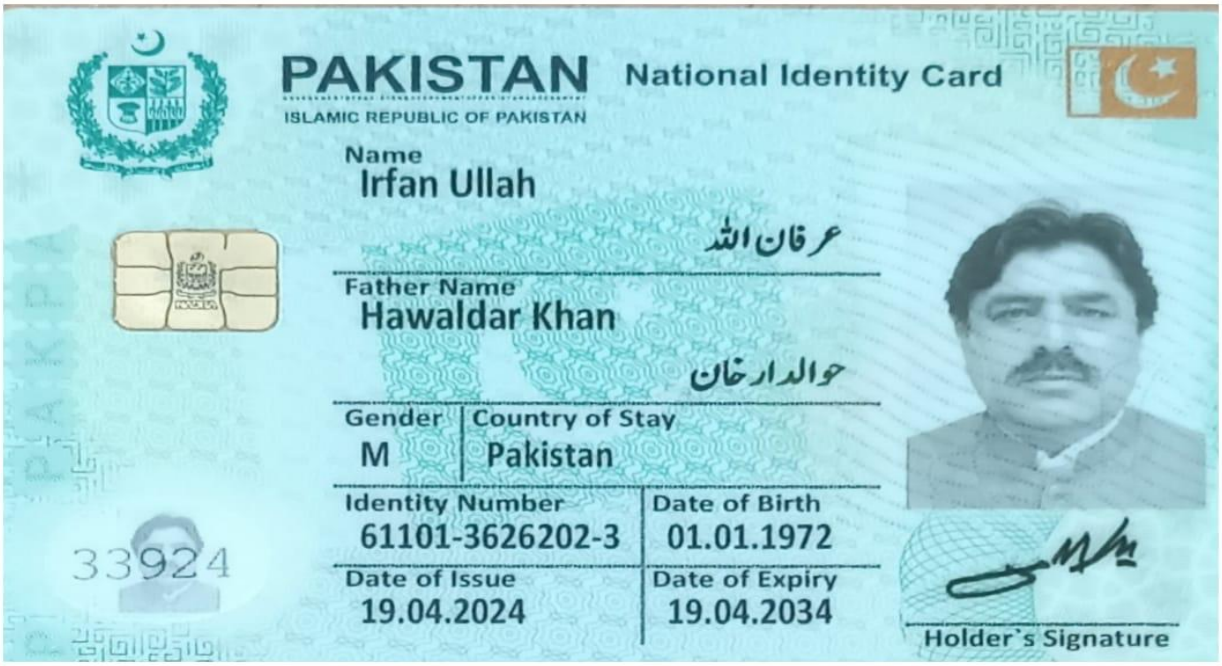
- Identification and recommendation for suitable solution/treatment/mitigation measures of emissions and effluents such as waste water and sludge etc. in accordance with Punjab Environmental Quality Standards (PEQS).
- Identification and recommendation for suitable solution/treatment/mitigation measures of solvents, oils (tar), hazardous waste, organic compounds, steam, flue gases, particulate matter and chemical compounds harmful for the environment and other substances leading to air, noise, water and soil pollution in accordance with PEQS.

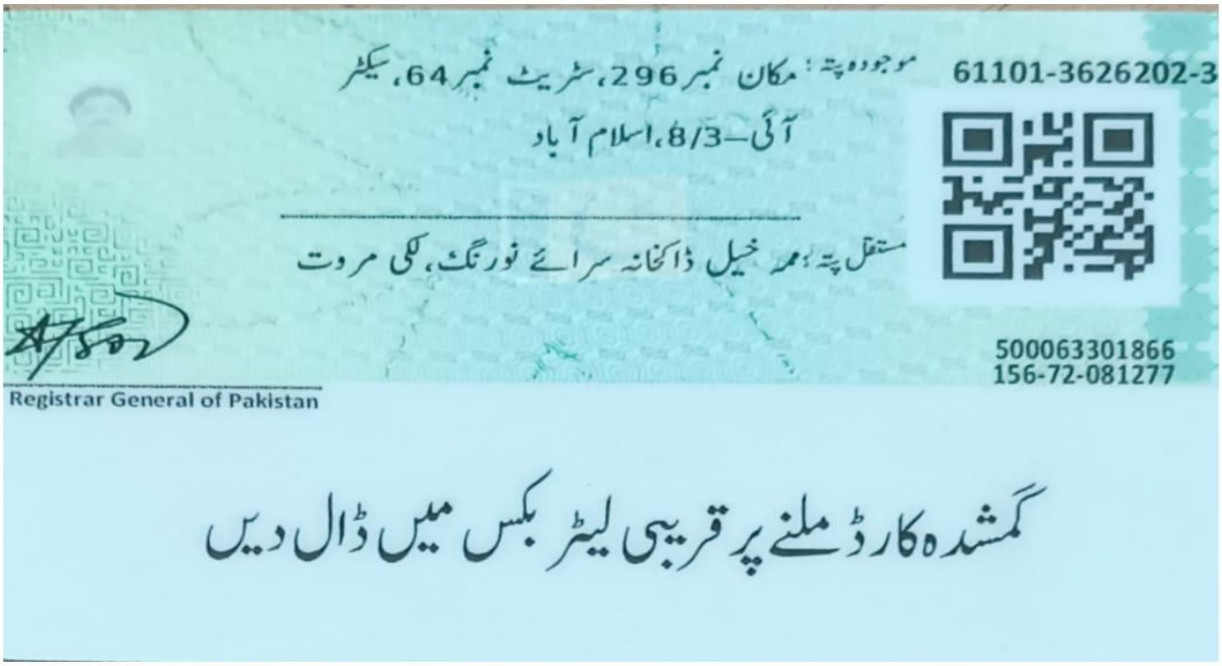
The Study should be acceptable to the relevant national and/or provincial authorities (relevant authorities) in Punjab.

ANNEXURES

Annexure-I

PROPONENT'S CNIC


PAKISTAN
ISLAMIC REPUBLIC OF PAKISTAN
National Identity Card
Name
Irfan Ullah
عرفان اللہ
Father Name
Hawaldar Khan
حوالدار خان
Gender
M
Country of Stay
Pakistan
Identity Number
61101-3626202-3
Date of Birth
01.01.1972
Date of Issue
19.04.2024
Date of Expiry
19.04.2034
Holder's Signature
33924


موجودہ پتہ: مکان نمبر 296، سٹریٹ نمبر 64، سیکٹر آئی-8/3، اسلام آباد
61101-3626202-3
مستقل پتہ: محمد خیل ڈاکخانہ سرائے نورنگ، لکی مروت
500063301866
156-72-081277
Registrar General of Pakistan
گمشدہ کارڈ ملنے پر قریبی لیٹر بکس میں ڈال دیں

Annexure-II

0550-30646127

E-STAMP

PB-RWP-F6AC37660CAF6347

Non-Judicial

Rs 1,200/-

First Party	: SHAHEEN AKHTER [3740502986436]
Second Party	: IRFAN ULLAH [61101362620231]
Agent	: IRFAN ULLAH [61101-3626202-3]
Stamp Duty Paid by	: IRFAN ULLAH [6110136262023]
Issue Date	: 09-May-2025, 11:48:32 AM
Paid Through Challan	: 2025E0EAF1A9EDFB
Amount in Words	: One Thousand Two Hundred Rupees Only

Please Write Below This Line

﴾لیز ایگریمنٹ﴿

شاہین اختر زوجہ نذر خان ساکن: ڈاک خانہ قطبال، موہڑی کھراں، تحصیل وضلع راولپنڈی۔ (فریق اول)

شناختی کارڈ نمبر: 37405-0298643-6

عرفان اللہ ولد حوالدار خان، (سی ای او: سبحان انرجی پرائیویٹ لمیٹڈ) ساکن: مکان نمبر 296، سٹریٹ نمبر 64، سیکٹر I-8/3، اسلام آباد۔ (فریق دوئم)

شناختی کارڈ نمبر: 61101-3626202-3

یہ کہ فریق اول اراضی تعدادی 15 کنال، کھیوٹ نمبر 827، کھتونی نمبر 1329،

خسرہ نمبرات 2417,2410,2409,208,2407,2406,2405,2404,2403,2402,2400,2399، واقع موضع (دنی) تحصیل ٹیکسلا، ضلع راولپنڈی کا مالک وقابض بلاشرکت غیرے ہے جو کہ مذکورہ اراضی تعدادی 15 کنال موضع پر بنگل پلانٹ واقع ہے جس کا حدود اربع درج ذیل ہے:

یہ کہ پلانٹ مذکورہ بلاشرکت غیر متوفہ بلا کہ فریق اول ہے یہ کہ فریق دوئم مذکورہ بالا پلانٹ پر ایل پی جی فلنگ اینڈ سٹور یج پلانٹ نصب کرنے کا ارادہ رکھتا ہے لیکن فریق اول فریق دوئم کو جائیداد مذکورہ بالا پر ایل پی جی فلنگ اینڈ سٹور یج پلانٹ نصب کرنے کیلئے پٹہ / کرایہ پر دینے کیلئے راضی ہوگئی ہے اور مابین فریقین اراضی مذکورہ کو کرایہ پر دینے کیلئے بشرائط ذیل معاہدہ۔

العبد_____

نام: شاہین اختر زوجہ نذر رحمان

شناختی کارڈ نمبر: 37405-0298643-6

العبد_____

نام: عرفان اللہ ولد حوالدار خان (سی ای او: سبحان انرجی پرائیویٹ لمیٹڈ)

شناختی کارڈ نمبر: 61101-3626202-3

(جاری ہے۔۔۔۔۔صفحہ نمبر 2)

E-STAMP
CONTINUATION SHEET

1۔ یہ کی مکمل اراضی مذکورہ بالا کا کرایہ مبلغ-/180,000 (ایک لاکھ اسی ہزار) ماہانہ مابین فریقین نے پایا ہے۔ جس میں سے فریق دوئم نے فریق اول کو تین ماہ کا کرایہ مبلغ-/540,000 (پانچ لاکھ چالیس ہزار) بذریعہ چیک نمبری D-50160725، تاریخ 09-05-2025، میزان بنک، I-8 مرکز برانچ اسلام آباد ایڈوانس ادا کر دیا ہے۔

2۔ یہ کہ معاہدہ ہذا کے مطابق معیاد کرایہ داری/پٹہ داری 20 سال مقرر کی گئی ہے۔ یہ معیاد کرایہ داری یکم جولائی 2025 سے شروع ہو کر یکم جولائی 2045ء میں ختم ہوگی۔

3۔ معیاد عرصہ 20 سال گزارنے کے بعد فریقین کی باہمی رضامندی سے کرایہ نامہ کی معیاد میں مزید توسیع کر سکیں گے۔ اگر باہمی رضامندی سے معاملات طے نہ ہوئے تو معاہدہ منسوخ تصور کیا جائیگا۔

4۔ یہ کہ فریق اول منکحہ مال سے فریق دوئم کی ضرورت کیلئے جو بھی کاغذات فرد برائے ملکیت اور فرد برائے کرایہ داری اور پٹہ داری نکس اور نظری نقشہ دینے کا پابند ہوگا۔

5۔ یہ کہ قبضہ اراضی مذکورہ حوالہ فریق دوئم کرنے کے بعد یوٹیلٹی بلز (بجلی، پانی، گیس) وغیرہ کے کنکشن بل کی ادائیگی بذمہ فریق دوئم ہوگی اور کاروبار پر جو بھی ٹیکس ہوں گے وہ بھی فریق دوئم کے ذمہ ہوں گے رقبہ ہذا پر پلانٹ مذکورہ کی وجہ سے کوئی ٹیکس لگتا ہے تو وہ بھی فریق دوئم کے ذمہ واجب الادا ہوگا۔

6۔ یہ کہ دوران معیاد کرایہ داری فریق دوئم پلانٹ مذکورہ کو بیچ، رہن، ہبہ یا کسی اور طریقے سے کسی دوسرے شخص یا ادارے کو منتقل کرنے کا مجاز ہوگا اور نہ ہی دوران کرایہ داری حقوق کرایہ داری کو منسوخ کر سکے گا اور نہ ہی فریق دوئم فریق اول کی تحریری اجازت کے بغیر رقبہ ہذا کسی اور شخص کو کسی مقصد کیلئے نہ دیگا۔

7۔ یہ کہ فریق دوئم فریق اول کو ہر تین ماہ کا کرایہ بطور ایڈوانس دے گا۔

8۔ یہ کہ فریق اول معاہدہ کرایہ داری ہذا کے ذریعے فریق دوئم کو اختیار دیتا ہے کہ وہ جائیداد پر سرکاری محکموں سے اجازت نامہ (NOC) حاصل کر کے جائیداد مذکورہ بالا پر ایل پی جی فلنگ اور سٹوریج پلانٹ نصب کرے۔

9۔ یہ کہ اگر NOC دو ماہ کے اندر نہیں ملتی تو فریق اول وصول شدہ ایڈوانس کرایہ مبلغ دس لاکھ اور دو مہینے کا ایڈوانس کرایہ بھی فریق دوئم کو واپس کرنے کا پابند و ذمہ دار ہوگا۔

10۔ یہ کہ معیاد کرایہ داری میں توسیع کی صورت میں دونوں فریقین کی رضامندی سے نئی شرائط کی جائیں گی۔ اگر دونوں فریقین میں کسی بھی وجہ سے لیز ایگریمنٹ آگے نہیں بڑھتا تو سول کام کے علاوہ مشینری فریق دوئم اپنی اٹھالے جائے گا۔

11۔ یہ کہ اگر مستقبل میں دوران معیاد کرایہ داری کے بعد کسی وجہ سے ایل پی جی فلنگ اینڈ سٹوریج کا کام نہ ہو سکے یا گورنمنٹ اسے بند کر دے یا دیگر آمدہ حالات کی وجہ سے فریق دوئم کا کاروبار بند کرنے کا فیصلہ کرے تو فریق دوئم اراضی مذکورہ پر نصب شدہ اپنا ایل پی جی فلنگ اینڈ سٹوریج پلانٹ ہٹالے گا اور سول ورک تعمیرات، فریق اول کے حوالے کرے گا۔

12۔ فریق دوئم اگر پلانٹ کو کسی دوسری پارٹی کو فروخت کرنا چاہے تو اس میں فریق اول کی کسی قسم کی دخل اندازی نہیں ہوگی اور فریق اول کو کسی قسم کا اعتراض نہیں ہوگا اور یہی مذکورہ بالا ایگریمنٹ دوسری پارٹی کے ساتھ چلے گا۔

13۔ مین روڈ سے راستے کیکلرنس دینا فریق اول کی ذمہ داری ہوگی۔

14۔ سالانہ نو (9%) کے حساب سے کرایہ میں اضافہ ہوگا۔

15۔ ایڈوانس دس لاکھ روپے (1,000,000) بذریعہ چیک نمبری D-50160724 مورخہ: 10-08-2025، بینک Meezan Bank فریق اول نے فریق دوئم سے وصول کر لیا ہے۔ جو کہ معاہدہ ہذا ختم یا کینسل ہونے کی صورت میں قابل واپسی ہے۔

16۔ فریق دوئم فریق اول کو ہر ماہ تین سلنڈر 11.8kg والے بھر کر دینے کا پابند ہوگا۔ الرقوم: 09-05-2025

العبد

نام: شاہین اختر زوجہ بذر رحمان

شناختی کارڈ نمبر: 37405-0298643-6

العبد

نام: عرفان اللہ ولد حوالدار خان (سی ای او: سبحان انرجی پرائیویٹ لمیٹڈ)

شناختی کارڈ نمبر: 61101-3626202-3

گواہ نمبر 1

37405-3997507-7

گواہ نمبر 2

82203-8027345-1

SECURITIES AND EXCHANGE COMMISSION OF PAKISTAN

Business Centre at Head Office Islamabad

CERTIFICATE OF INCORPORATION

[Under section 16 of the Companies Act, 2017 (XIX of 2017)]

Corporate Unique Identification No. 0276269

I hereby certify that **SUBHAN ENERGY (PRIVATE) LIMITED** is this day incorporated under the Companies Act, 2017 (XIX of 2017) and that the company is **Limited by shares.**

Given at **Islamabad** this **Twenty Fifth** day of **November**, Two **Thousand** and **Twenty Four**

https://leap.secp.gov.pk/#/verify-company-info/0276269

This is an electronically generated document and does not require a physical signature

Disclaimer: This certificate of incorporation is not a permission to accept deposits from the general public by offering fake jobs/investment packages and return thereon, indulge in leasing/ financing of vehicles and household products etc., MLM, Pyramid and Ponzi Schemes, Lottery Business, trading in forex and virtual currencies or any other unlawful business activities

LAYOUT PLAN