Establishment of Anodized Aluminum Profiles Manufacturing Unit by M/S Standard Aluminum Industries Private Limited

Plot No. 447 Sundar Industrial Estate, Lahore

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

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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.

EXECUTIVE SUMMARY

The proposed project titled "Establishment of Anodized Aluminum Profiles Manufacturing Unit by M/s Standard Aluminum Industries (Pvt.) Ltd." is planned to be set up at Plot No. 447, Sundar Industrial Estate, Lahore. The project aims to establish a modern and efficient facility for the production of high-quality anodized aluminum profiles to meet the growing demand in construction, architectural, and industrial applications across Pakistan. The unit will be equipped with advanced extrusion, surface treatment, and anodizing technologies to ensure superior product quality while maintaining compliance with national environmental and industrial standards. The aluminum profiles produced will serve as essential materials for downstream applications, including doors and windows, curtain walls, building facades, and industrial structures. By establishing this manufacturing facility, M/s Standard Aluminum Industries (Pvt.) Ltd. intends to contribute to the local economy through import substitution, job creation, and industrial development, while ensuring sustainable and environmentally responsible operations within Sundar Industrial Estate.

In accordance with the legal obligations outlined in Section 12 of the Punjab Environmental Protection Act (Amended 2012), this Environmental Impact Assessment (EIA) report is being submitted to evaluate the potential environmental and socio-economic impacts of the proposed project. The report assesses possible effects on air quality, water resources, soil, occupational health, and public safety, while recommending mitigation strategies and environmental management measures to ensure compliance with sustainable and regulatory frameworks. The proposed Anodized Aluminum Profiles Manufacturing Unit is designed with modern anodizing technology, pollution control measures, energy-efficient practices, and waste management systems to minimize adverse impacts on the surrounding environment. With the effective implementation of the Environmental Management Plan (EMP), the project is expected to operate in an environmentally sustainable, economically viable, and socially responsible manner throughout its lifecycle.

i. Need of the Project

The main objective of the project is to establish a purpose-built, state-of-the-art Anodized Aluminum Profiles Manufacturing Unit that ensures the production of high-quality aluminum profiles to meet the growing demand in Pakistan's construction, architectural, and industrial sectors. The project is designed to operate in compliance with Punjab Environmental Quality Standards (PEQS), the Punjab Environmental Protection Act, and other relevant industrial regulations. The establishment of this facility aims to promote industrial growth, support local economic development through import substitution and job creation, and ensure environmentally sustainable operations by integrating modern anodizing technology, pollution control measures, and efficient resource management practices.

ii. Framework

The proposed Anodized Aluminum Profiles Manufacturing Unit is required to comply with all applicable environmental policies, laws, and guidelines of the Government of Pakistan and the Government of Punjab, as well as relevant international environmental standards. The key regulations governing the project include the Pakistan Environmental Protection Act, 1997, the Punjab Environmental Protection (Amendment) Act, 2012, and the Punjab Environmental Quality Standards (PEQS), along with rules, notifications, and guidelines issued by the Punjab Environmental Protection Agency (Punjab-EPA). In addition to environmental requirements, the project will adhere to the provisions of the Factories Act, 1934, and the Punjab Occupational Safety and Health Act, 2019 to ensure workplace safety, occupational health, and safe handling of materials and chemicals used in the anodizing process. Furthermore, the project is committed to aligning with international best practices in aluminum profile production, including energy-efficient extrusion and anodizing processes, advanced air pollution control measures, safe waste management systems, and robust occupational health and safety protocols.

By complying with these legal and regulatory frameworks, the project ensures environmentally sustainable operations, regulatory compliance, and social responsibility throughout its lifecycle

iii. Environment Category 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 B.

iv. TITLE AND LOCATION OF PROJECT:

Title: Establishment of Anodized Aluminum Profiles Manufacturing Unit by M/S Standard Aluminum Industries Private Limited.

Location : Plot No. 447 Sundar Industrial Estate, Lahore.

Google Coordinates : 31°16'50.06"N 74°10'11.92"E

v. PROJECT PROPONENT

Name of Proponent : Zulfiqar Hameed

Address: House No. 177, Block A-1 Valencia Town, Lahore.

vi. NAME OF ORGANIZATION PREPARING REPORT:

Organization: Integrated Environment Consultants Lahore.

Address: 218-Upper Mall Scheme Lahore.

vii. BRIEF OUTLINE OF PROJECT

The proposed project involves the establishment of an Anodized Aluminum Profiles Manufacturing Unit with a designed capacity of up to 300 tons per month for the extrusion and processing section, while the anodizing plant will have a processing capacity of approximately 165 tons per month. The process will primarily utilize aluminum billets and profiles, which will undergo extrusion, surface treatment, anodizing, sealing, polishing, and finishing to produce high-quality aluminum profiles for construction, architectural, and industrial applications. The facility will include an extrusion section, anodizing section, surface treatment and finishing units, quality control laboratory, and storage yard, along with pollution control measures to ensure compliance with Punjab Environmental Quality Standards (PEQS). The finished anodized aluminum profiles will be packed and transferred to supply chain stores for distribution to industrial and commercial users. The project aims to promote value addition in aluminum products, efficient resource utilization, and environmentally responsible production practices, supporting sustainable industrial development while reducing dependence on imported finished aluminum profiles.

viii. ENERGY AND WATER AVAILABILITY

The electricity supply is the usual 25 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.

ix. 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 0-1: Possible Impacts and their Mitigation Measures

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
A. CONSTRUCTION PHASE		
Dust emissions likely to occur during excavation, site leveling, and material handling. Vehicular emissions from construction machinery and trucks.	Minor / Short Term	• Water sprinkling on construction areas when necessary. • Cover all trucks hauling soil, sand, and scrap material; ensure freeboard. • Apply water or (non-toxic) soil stabilizers on unpaved roads and staging areas. • Cleaning of paved access roads and parking areas. • Provision of PPEs (masks) to workers.
Water quality degradation due to accidental spillage of fuels, lubricants, or construction wastewater.	Minor / Short Term	• Use impermeable sheets to avoid seepage. • Proper disposal of waste material at designated sites. • Avoid any discharge into nearby drains or water bodies.
Construction waste (scrap, packaging, debris) generation.	Minor / Short Term	• Separate collection of construction and domestic waste to promote reuse/recycling. • Disposal only at approved sites. • No waste or debris will be thrown in nearby canals, drains, or land areas.
Noise pollution due to heavy machinery, generators, and trucks.	Minor / Short Term	• Install temporary barriers around noisy equipment where needed. • Ensure proper maintenance of construction vehicles and machinery. • Minimize unnecessary use of drills and heavy equipment. • Provide PPEs (earplugs) to construction workers.
Workers' health & safety risks (accidents, injuries).	Minor / Long Term	• Provide training on handling of tools, welding, and safety practices. • Install firefighting equipment

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		(extinguishers, sand buckets). • Continuous monitoring of contractor's compliance with safety protocols.
B. OPERATIONAL PHASE		
Air emissions – Furnace operations can release particulates, CO, NOx, SOx, and metal fumes.	Moderate / Long Term	• Installation of air pollution control devices (bag filters, dust collectors). • Regular monitoring of air emissions as per PEQS. • Use of high-efficiency furnaces to minimize emissions.
Noise pollution – Continuous operation of furnaces, blowers, compressors, and material handling equipment.	Minor / Long Term	• Install silencers and mufflers on blowers/air compressors. • Build sound barriers or enclosures around noisy equipment. • Provide PPEs (ear protection) to workers.
Solid waste generation – Slag, furnace lining, dust, and scrap residues.	Moderate / Long Term	• Reuse/recycle slag in construction or road base where feasible. • Dispose of non-recyclable waste at approved landfill sites. • Maintain records of hazardous waste disposal.
Occupational health & safety – Exposure to heat, molten metal, fumes, risk of burns, accidents.	High / Long Term	• Provide PPEs (gloves, helmets, masks, face shields). • Training on safe handling of molten metal and emergency drills. • Install fire extinguishers, sprinklers, and emergency exits.
Fire & explosion hazards – From molten metal, furnace operations, and handling of fuels.	High / Long Term	• Routine inspection and preventive maintenance of furnaces and electrical systems. • Proper storage of fuels/chemicals away from heat sources. • Emergency Response Plan (ERP) in place with trained firefighting teams.
Resource consumption – High energy (electricity) and water use.	Moderate / Long Term	• Use of energy-efficient furnaces and motors.

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		• Recycling of cooling water in closed-loop systems. • Monitoring to minimize resource wastage.
Community disturbance – Complaints due to emissions, noise, and truck movement.	Minor / Long Term	• Plantation around the facility to act as a buffer. • Proper scheduling of raw material and product transport to reduce traffic nuisance. • Continuous grievance redressal mechanism for community.

x. 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 0-2: Environmental Monitoring

Sr. No	Monitoring Parameters	Monitoring Location	Monitoring Mechanism	Frequency / Remarks
A. Construction Phase				
1	Noise	Construction vehicles, machinery, generators, welding/cutting areas	Noise meter	Checked regularly by contractor to ensure compliance with PEQS.
2	Air Emissions (Dust, Smoke)	Vehicles, machinery, excavation & material handling sites	Ambient particulate matter (PM) monitoring, visual inspection	Regular checks; water sprinkling & emission control measures implemented.
3	Solid Waste	Construction site & storage areas	Visual inspection, waste logs	Monthly checks to ensure segregation, recycling, and proper disposal at authorized sites.
B. Operation Phase				
1	Air Emissions (PM, NOx, SOx, CO, Metal Fumes)	Furnace stacks/chimneys	Stack monitoring with analyzers & third-party lab testing	Quarterly monitoring to ensure compliance with PEQS.
2	Wastewater	Wastewater discharge	Testing for pH,	Quarterly monitoring

Sr. No	Monitoring Parameters	Monitoring Location	Monitoring Mechanism	Frequency / Remarks
	Quality (if generated from cooling/floor washing)	points	TSS, oil & grease, heavy metals	by EPA-approved laboratory.
3	Solid & Hazardous Waste (slag, furnace lining, scrap residues)	Slag yard & disposal sites	Record-keeping, inspections	Monthly monitoring to ensure recycling or authorized disposal.
4	Noise Levels	Furnace area, compressors, blowers, loading/unloading areas	Noise meter	Monthly monitoring to ensure compliance with PEQS.
5	Occupational Health & Safety	Furnace operation, casting section, storage yard	Safety audits, PPE checks, incident reporting	Daily checks by HSE officer; quarterly internal audits.

1 - INTRODUCTION

The proposed project titled "Establishment of Anodized Aluminum Profiles Manufacturing Unit by M/s Standard Aluminum Industries (Pvt.) Ltd." is planned to be set up at Plot No. 447, Sundar Industrial Estate, Lahore. The project aims to establish a modern and efficient facility for the production of high-quality anodized aluminum profiles to meet the growing demand in Pakistan's construction, architectural, and industrial sectors. The unit will be equipped with advanced extrusion, surface treatment, and anodizing technologies to ensure superior product quality while maintaining compliance with national environmental and industrial standards. The anodized aluminum profiles produced will serve as essential materials for downstream applications, including doors and windows, curtain walls, building facades, and industrial structures. By establishing this manufacturing facility, M/s Standard Aluminum Industries (Pvt.) Ltd. intends to contribute to the local economy through import substitution, job creation, and industrial development, while ensuring sustainable and environmentally responsible operations within Sundar Industrial Estate.

In accordance with the legal obligations outlined in Section 12 of the Punjab Environmental Protection Act (Amended 2012), this Environmental Impact Assessment (EIA) report is being submitted to evaluate the potential environmental and socio-economic impacts of the proposed project. The report assesses possible effects on air quality, water resources, soil, occupational health, and public safety, while recommending mitigation strategies and environmental management measures to ensure compliance with sustainable and regulatory frameworks. The proposed Anodized Aluminum Profiles Manufacturing Unit is designed with modern anodizing technology, pollution control measures, energy-efficient practices, and waste management systems to minimize any adverse impacts on the surrounding environment. With the effective implementation of the Environmental Management Plan (EMP), the project is expected to operate in an environmentally sustainable, economically viable, and socially responsible manner throughout its lifecycle. The project's objectives will be achieved through careful planning, construction, and operation in strict compliance with the legal and regulatory requirements specified under the Punjab Environmental Protection Act, 2012 (Section 12). This EIA has been prepared in accordance with these requirements to support environmentally responsible and sustainable industrial development.

1.1 - Purpose of the Report

In accordance with Section 12 of the Punjab Environmental Protection Act (PEPA), 1997 (Amended 2012), no project can commence construction or operation without prior environmental approval from the Environmental Protection and Climate Change Department, Government of Punjab. As the proposed Anodized Aluminum Profiles Manufacturing Unit may have potential environmental impacts, this Environmental Impact Assessment (EIA) reporthas been prepared to obtain the required approval.

The report provides comprehensive information on the project's environmental, social, and economic impacts and outlines mitigation and management measures to ensure compliance with the Punjab Environmental Protection Act, 2012, the Punjab Environmental Quality Standards (PEQS), and other applicable local and national regulations. The purpose of this report is to guide environmentally sustainable planning, design, and operation of the proposed facility while safeguarding public health and the surrounding environment.

1.2 - Identification of Project and Proponent

Title: Establishment of Anodized Aluminum Profiles Manufacturing Unit

Location: by M/S Standard Aluminum Industries Private Limited

Name of Proponent: Zulfiqar Hameed

Address: House No. 177, Block A-1 Valencia Town, Lahore.

1.3 - Name of Organization Preparing Report:

Name of consultant: Integrated Environment Consultants.

Address: 218-Upper Mall Scheme, Lahore.

1.4 - Brief Outline of Project

The proposed project involves the establishment of an Anodized Aluminum Profiles Manufacturing Unit with a designed capacity of up to 300 tons per month for the extrusion and processing section, while the anodizing plant will have a processing capacity of approximately 165 tons per month. The production process will primarily utilize aluminum billets and profiles, which will undergo extrusion, surface treatment, anodizing, sealing, polishing, and finishing to produce high-quality aluminum profiles for construction, architectural, and industrial applications. The facility will include an extrusion section, anodizing section, surface treatment and finishing units, quality control laboratory, and storage yard, along with pollution control measures to ensure compliance with Punjab Environmental Quality Standards (PEQS). The finished anodized aluminum profiles will be packed and transferred to supply chain stores for distribution to industrial and commercial users. The project aims to promote value addition in aluminum products, efficient utilization of resources, and environmentally responsible production practices, thereby supporting sustainable industrial development and reducing reliance on imported finished aluminum profiles.

Figure 1-1: Proposed Location

2 - SCREENING OF THE PROJECT

In accordance with the Punjab Environmental Protection Act (PEPA), 2012, and the IEE & EIA Regulations, 2022, the proposed Anodized Aluminum Profiles Manufacturing Unit has been classified under Schedule II, Class B for environmental assessment purposes. Class B projects typically include medium-scale manufacturing and processing units that may have localized environmental impacts, requiring preparation of an Initial Environmental Examination (IEE) and, depending on site-specific factors, a full Environmental Impact Assessment (EIA).

The proposed project involves extrusion, anodizing, surface treatment, finishing, and quality control operations. While the facility is not a large-scale industrial plant, its processes may generate emissions, wastewater, and solid waste, making it necessary to implement environmental management measures in compliance with national standards.

Screening under Schedule II, Class B ensures early identification of potential environmental and social impacts, facilitates proper regulatory review, and guides the development of mitigation strategies and the Environmental Management Plan (EMP). By categorizing the project appropriately, the proposed facility will adhere to the regulatory framework, ensuring environmentally responsible operations, compliance with Punjab Environmental Quality Standards (PEQS), and sustainable industrial development.

3 - SCOPING OF THE PROJECT

The scoping process identifies the key environmental, social, and economic concerns associated with the proposed project and establishes the framework for a detailed Environmental Impact Assessment (EIA). It defines the spatial and temporal boundaries, highlights issues raised during stakeholder consultations, and identifies significant factors and potential impacts that require thorough evaluation during the project's planning, construction, and operational phases.

3.1 - Spatial and Temporal Boundaries of Environmental Assessment

Defining spatial and temporal boundaries is essential for a comprehensive assessment of environmental impacts. Spatial boundaries determine the geographic area that may be affected by project activities, including the immediate project site, nearby communities, and surrounding ecosystems. Temporal boundaries evaluate both short-term and long-term effects of project activities, allowing an understanding of how environmental impacts may evolve over time and informing appropriate mitigation strategies. For the proposed Anodized Aluminum Profiles Manufacturing Unit, the project site is located at Plot No. 447, Sundar Industrial Estate, Lahore. The assessment will consider potential impacts during construction, initial commissioning, and routine operational phases, including both immediate and cumulative environmental effects.

3.2 - Important issues and concerns raised during consultation

The EIA for the proposed Anodized Aluminum Profiles Manufacturing Unit incorporated a two-stage stakeholder consultation process to identify potential environmental, social, and economic concerns and gather feedback from key stakeholders.

- Stage 1: Initial consultations were conducted through one-on-one meetings with local government authorities, affected individuals, and nearby communities. The primary objective was to evaluate potential short-term and long-term impacts of the proposed project during its planning and early construction phases. These consultations helped identify key issues related to air quality, noise, water use, occupational safety, and local socio-economic considerations.

- Stage 2: A broader public participation process will be conducted if required, involving wider community engagement. This stage allows for a more inclusive collection of feedback, concerns, and suggestions from a larger cross-section of stakeholders, ensuring that the EIA incorporates diverse perspectives and addresses public expectations.

This two-stage consultation approach ensures that the project is developed in a transparent, participatory, and socially responsible manner, helping to refine mitigation measures, strengthen the Environmental Management Plan (EMP), and align project operations with
Significant Impacts and Factors to be Determined

3.3 - Development of an Environmental Management Plan

The Environmental Management Plan (EMP) forms a key component of the EIA, providing a structured approach to mitigate potential environmental impacts, ensure regulatory compliance, and promote sustainable project operations.

Key components of the EMP include:

- Project Description: Detailed outline of activities, processes, and facilities.

- Identification of Environmental Impacts: Assessment of potential risks and adverse effects during construction and operation.
- Mitigation Measures: Specific actions to prevent, reduce, or control negative impacts.
- Monitoring and Reporting: Systems for tracking environmental performance indicators and compliance.
- Emergency Response and Contingency Planning: Protocols for addressing accidents or environmental incidents.
- Stakeholder Engagement: Communication strategies for involving affected communities and regulatory bodies.
- Review and Update Framework: Mechanisms to adapt the EMP over time based on monitoring results and evolving conditions.

Together, these components form a comprehensive EMP designed to minimize adverse impacts, enhance sustainability, and maintain compliance with environmental regulations and best practices throughout the lifecycle of the proposed Anodized Aluminum Profiles Manufacturing Unit.

4 - ALTERNATIVES OF THE PROJECT

For the proposed Anodized Aluminum Profiles Manufacturing Unit, various alternatives have been carefully evaluated to identify the most suitable and sustainable option. The purpose of this assessment is to ensure that the project is implemented in a manner that minimizes environmental and social impacts while achieving the intended economic and industrial benefits. The alternatives considered include :

i- No Project Option

ii- Location Alternatives

iii- Technology Alternatives

4.1 - No Project Option / Worst Scenario Option

If the project is not undertaken, the land at Plot No. 447, Sundar Industrial Estate, Lahore will remain unused, and the funds allocated for construction and operation could be diverted elsewhere. In this scenario, there would be no environmental disturbance from construction activities such as dust, noise, and waste generation, and no operational impacts like air emissions, energy consumption, or chemical waste disposal. The local community would also remain unaffected by industrial activity at the site.

However, this option has significant drawbacks. The absence of the project would mean that local anodized aluminum profile production would not be developed, maintaining reliance on imported or low-quality products. This could result in higher costs for construction, architectural, and industrial sectors, fewer employment opportunities for skilled and unskilled workers, and reduced contributions to the regional economy and industrial growth.

Conclusion : While the No Project Option avoids environmental impacts, it limits industrial progress, job creation, and self-reliance in aluminum profile production. Therefore, this option is not recommended.

4.2 - Location Alternatives

4.2.1 - Option 1: Construction on Government Land

Using government-owned land is a potential alternative. However, this option is associated with **lengthy approval processes, higher leasing costs, and design restrictions**. Government land-use policies may impose conditions that could **delay implementation or limit future expansion**, reducing the project's flexibility and efficiency.

4.2.2 - Option 2: Construction on Proponent's Land

The proponent has identified **privately-owned land at Plot No. 447, Sundar Industrial Estate** for the project. This site was selected due to its **accessibility to transport networks, proximity to utilities and workforce, and compliance with environmental and safety requirements**. Ownership of the land eliminates additional acquisition costs and bureaucratic hurdles, allowing **greater flexibility, faster execution, and better control over project planning**.

Conclusion: Construction on the proponent's land is the **preferred option**, as it minimizes administrative barriers, reduces costs, and ensures timely implementation.

4.3 - Technology Alternative

4.3.1 - Conventional Surface Treatment and Anodizing Technology

Traditional anodizing systems often use older chemical baths and manual processes. These methods are less energy-efficient, consume more chemicals, and generate higher wastewater volumes. Additionally, they present greater occupational health and safety risks due to less precise process control.

4.3.2 - Modern Automated Anodizing Technology

Modern anodizing plants use automated and controlled systems with optimized chemical baths, precise temperature control, and energy-efficient equipment. This technology reduces air emissions, chemical waste, and water consumption, improves product quality, and enhances worker safety. It also aligns with national environmental regulations and international best practices for anodized aluminum production.

Conclusion: Modern automated anodizing technology is the most suitable option for the project, as it minimizes environmental impacts, improves operational efficiency, ensures high-quality profiles, and provides a safer and more sustainable workplace compared to conventional methods.

Table 4-1: Alternatives of the Project Site

Alternative	Description	Advantages	Disadvantages / Limitations	Preferred Option
No Project Option	The project is not undertaken; land remains unused.	No environmental disturbance (no dust, noise, emissions, or waste); no operational impacts.	No industrial development; continued reliance on imported or low-quality aluminum profiles; missed job creation and economic benefits.	Not recommended
Location Alternatives	**Option 1:**Government land **Option 2:**Proponent-owned land	**Option 1:** Potential availability of land. **Option 2:** Already owned, accessible, near utilities and workforce; faster project execution.	**Option 1:** Lengthy approvals, higher costs, restrictions on design and expansion. **Option 2:** No major limitations.	Construction on proponent-owned land is preferred
Technology Alternatives	**Conventional Anodizing Technology** vs **Modern Automated Anodizing Technology**	**Modern Technology:** Reduces energy use, chemical waste, and water consumption; precise process control; better product quality; safer for workers.	**Conventional Technology:** Inefficient, higher emissions and chemical use, greater occupational risk.	Modern automated anodizing technology is preferred

4.4 - Environmental Alternatives, their selection and rejection criteria

Different environmental management alternatives were evaluated for the proposed **Anodized Aluminum Profiles Manufacturing Unit** to ensure minimum environmental impact and compliance with regulatory standards. The assessment focused on air emissions control, wastewater management, solid waste handling, energy efficiency, and occupational health and safety measures.

Alternative	Description	Advantages	Limitations	Decision
Alternative 1: Conventional Environmental Controls	Basic pollution control measures with minimal emission control and limited wastewater treatment.	Lower initial capital cost; simple installation.	Higher risk of air emissions, untreated effluent discharge, inefficient water use, possible regulatory non-compliance, and increased environmental liability.	Rejected due to environmental and compliance risks.
Alternative 2: Enhanced Environmental Management System (Selected Option)	Installation of proper ventilation and emission control systems, chemical storage with secondary containment, wastewater treatment and recycling, safe hazardous waste disposal through authorized contractors, water conservation practices, and strict OHS measures.	Ensures regulatory compliance, reduces pollution, improves resource efficiency, enhances worker safety, and promotes long-term sustainability.	Higher initial investment cost.	Selected as the preferred environmental alternative.

4.5 - Economic Alternatives, their selection and rejection criteria

The economic feasibility of the proposed Anodized Aluminum Profiles Manufacturing Unit was carefully evaluated by considering different investment and operational approaches. The objective of this assessment was to identify an alternative that ensures long-term financial sustainability, operational efficiency, regulatory compliance, and competitiveness in the market, while also contributing positively to employment generation and regional economic development. The alternatives were assessed on the basis of capital investment, operational cost, productivity, product quality, and long-term economic benefits.

Alternative	Description	Advantages	Limitations	Decision
Alternative 1: Low-Cost / Conventional Setup	Establishment of the unit with basic machinery, minimal automation, and limited environmental investment to reduce initial capital cost.	Lower initial investment; reduced short-term financial burden.	Higher operational costs, lower product quality, increased maintenance, greater environmental and safety risks, and reduced market competitiveness.	Rejected due to long-term economic inefficiency and sustainability concerns.
Alternative 2: Modern Automated and Environmentally Compliant Setup (Selected Option)	Installation of advanced extrusion and anodizing systems with energy-efficient equipment and proper environmental controls.	Higher product quality, improved efficiency, lower long-term operational costs, regulatory compliance, enhanced worker safety, stronger market competitiveness, and sustainable growth.	Higher initial capital investment.	Selected as the preferred economic alternative.

5 - DESCRIPTION OF THE PROJECT

5.1 - Type and Category of Project

The proposed Anodized Aluminum Profiles Manufacturing Unit is a medium-scale manufacturing and processing facility classified under Schedule II, Class B of the Punjab Environmental Protection Act, 2012. It requires an EIA due to potential localized environmental impacts from extrusion, anodizing, and finishing operations.

5.2 - Objective of the Project

The primary objective is to establish an Anodized Aluminum Profiles Manufacturing Unit to produce high-quality aluminum profiles through modern extrusion and anodizing technologies. The project aims to meet growing industrial and construction demand, ensure environmental compliance, promote resource efficiency, generate employment, and support sustainable industrial growth in the region.

5.3 - Location and Site Layout of the Project

The proposed project is located at Plot No. 447, Sundar Industrial Estate, Lahore. The site has been selected for its proximity to transport networks, utilities, and workforce, enabling efficient operations and compliance with environmental and safety requirements.

5.4 - Site alternatives, their selection and rejection criteria

For the proposed Anodized Aluminum Profiles Manufacturing Unit, several site options were evaluated based on environmental, technical, and economic considerations. Government-owned land was considered but rejected due to lengthy approval processes, higher costs, and restrictions on design and future expansion. The proponent-owned land at Plot No. 447, Sundar Industrial Estate, Lahore was selected as the preferred site due to its legal ownership, accessibility to transport and utilities, proximity to a skilled workforce, cost-effectiveness, and flexibility for project implementation and future growth. The selected site meets all technical, environmental, and operational requirements, ensuring efficient and timely development of the project.

5.5 - Design/Technology alternatives, their selection and rejection criteria

For the proposed Anodized Aluminum Profiles Manufacturing Unit, different technology options were evaluated to ensure efficiency, product quality, and environmental compliance. Conventional anodizing and manual extrusion processes were considered but rejected due to higher energy consumption, increased chemical and water usage, greater emissions, and higher occupational health risks. Modern automated extrusion and anodizing technology was selected as the preferred option because it provides precise process control, reduces energy and chemical consumption, minimizes environmental impacts, enhances product quality, and ensures safer working conditions. This choice aligns with national environmental standards, international best practices, and the project's sustainability objectives.

5.6 - Process, Raw material and product alternatives

The proposed **Anodized Aluminum Profiles Manufacturing Unit** at **Plot No. 447, Sundar Industrial Estate, Lahore**involves a systematic process of aluminum extrusion, heat treatment, anodizing, and finishing to produce high-quality aluminum profiles for windows,

doors, curtain walls, and other architectural and industrial applications. The process is designed to ensure quality, efficiency, and environmental compliance.

5.7 - 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.

5.8 - Road Access

The road access on the project site is shown in the Figure below. Sundar Raiwind Road is the nearest road from the project site. All roads around the project site are paved and well connected.

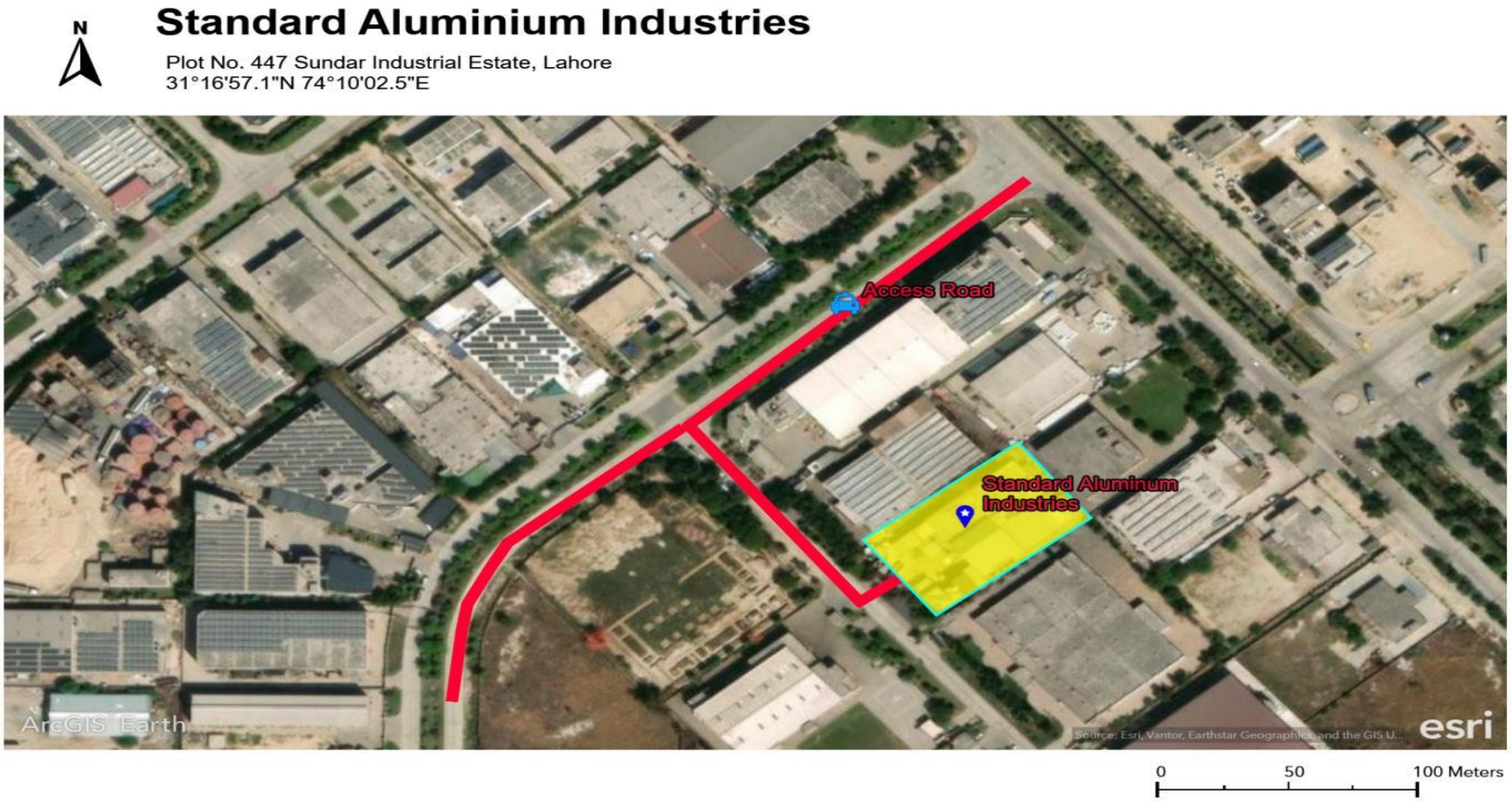


Figure 5-1: Road Connectivity around Project Area

5.9 - Vegetation Features of the Site

The proposed project site is located within Sundar Industrial Estate, Lahore, which is a designated industrial zone with developed infrastructure. The land within the estate has already been cleared and leveled for industrial use, and therefore, no significant natural vegetation exists at the site. Only sparse growth of grasses, shrubs, and seasonal weeds is observed along vacant plots and open spaces. Tree cover is limited to ornamental and roadside plantation maintained by the estate management along internal roads and boundaries. No agricultural activity or ecologically important plant species are present in or around the project site.

5.10 - Cost and Magnitude of Operation

The total cost of the project is PKR 100,000,000 (One Hundred Million Rupees). The time period for the completion of the project is proposed as 6 months.

5.11 - 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:

Stage 1: Site Preparation and Design Finalization

- Site survey, contouring, and soil investigations.
- Preparation and approval of detailed design for the alloy ingot production facility.

Stage 2: Civil and Structural Works

- Ground excavation and foundation laying.
- Construction of furnace foundations, production halls, and support structures.
- Development of essential infrastructure including internal roads, drainage, and storage areas.

Stage 3: Mechanical, Electrical, and Instrumentation Installation

- Installation of induction furnaces and associated equipment.
- Electrical, mechanical, and utility system works.
- Fitting of instrumentation, safety systems, and environmental control systems.

Stage 4: Commissioning and Operation

- Testing and trial runs of furnaces and production systems.
- Completion of utilities such as water and power supply connections.
- Commencement of regular alloy ingot production operations.

5.12 - Description of the Project

The primary raw material used is **aluminum billets**, sourced from local suppliers or manufactured from recycled aluminum at a nearby facility. These billets are transported to the processing site, where they are stored safely under controlled conditions. All chemicals

used in anodizing—such as dyes, sealing agents, and surface treatment compounds—are imported from Italy and stored in acid-resistant, secondary containment areas. Material Safety Data Sheets (MSDS) are maintained for all chemicals, and proper handling is ensured through SOPs, spill kits, eyewash stations, emergency showers, and mandatory PPE. No banned or ozone-depleting substances are used.

5.12.1 - Billet Heating and Extrusion

- The aluminum billets are charged into a **billet heating furnace**, powered by natural gas, and heated to approximately **500°C**.
- Once heated, the billets are cut into lengths of **1–2 feet** as per the extrusion requirements.
- Heated billets are fed into an **extrusion press**, where they are pressed through dies to form aluminum profiles in **customized shapes and designs** according to customer specifications.

5.12.2 - Aging / Heat Treatment

- Extruded profiles are transferred to the **aging oven**, where they undergo heat treatment at approximately **200°C** for a duration depending on profile size, alloy type, and thickness.
- This process enhances the **mechanical strength and durability** of the profiles.

5.12.3 - Buffing and Surface Preparation

- After aging, profiles are passed through **buffing machines** to remove surface marks, extrusion lines, and minor imperfections.
- Buffing ensures a smooth surface finish, preparing the profiles for the anodizing process.

5.12.4 - Anodizing Process

- Profiles are then processed in the **anodizing department** using chemical baths to achieve **corrosion-resistant coating**.
- Anodizing is carried out in **three standard colors**: dull natural silver, champagne, and light champagne, with a coating thickness maintained between **8–12 microns**.
- Proper sealing is applied to enhance corrosion resistance and durability.

5.12.5 - Quality Control and Inspection

- Post-anodizing, profiles are **dried in a standing position** to allow water drainage.
- Profiles undergo thorough **quality control checks** for coating thickness, surface finish, and color uniformity.
- Profiles are stamped with the **manufacturing date and color code**, packed with protective film and cartons, and then transferred to the **warehouse** for storage and dispatch.

5.12.6 - Operational Equipments and Machinery

The proposed Anodized Aluminum Profiles Manufacturing Unit will be equipped with modern and efficient machinery to ensure high-quality production, operational efficiency, and

compliance with environmental and safety standards. The operational equipment required for the facility includes the following major components:

- **Billet Heating Furnace (Natural Gas Fired):** Used to heat aluminum billets to the required temperature prior to extrusion.
- **Extrusion Press Machine:** Utilized to shape heated billets into customized aluminum profiles through precision dies.
- **Cooling System and Run-Out Table:** Facilitates controlled cooling and handling of extruded profiles.
- **Aging Oven (Heat Treatment Furnace):** Enhances mechanical strength and durability of extruded profiles through controlled heat treatment.
- **Buffing and Surface Finishing Machines:** Remove surface imperfections and prepare profiles for anodizing.
- **Anodizing Tanks and Chemical Treatment Baths:** Used for surface treatment, coating formation, coloring, and corrosion resistance enhancement.
- **Sealing Tanks:** Improve coating durability and corrosion resistance after anodizing.
- **Drying System:** Ensures proper drying of anodized profiles before inspection and packing.
- **Quality Control Equipment:** Includes coating thickness gauges, hardness testers, and inspection tools to maintain product standards.
- **Air Compression System:** Supplies compressed air for operational machinery.
- **Material Handling Equipment:** Includes overhead cranes, forklifts, and trolleys for safe movement of raw materials and finished goods.

All equipment will be installed in accordance with manufacturer specifications and relevant safety standards. Preventive maintenance schedules will be implemented to ensure operational efficiency, minimize breakdowns, and reduce environmental risks. The selected machinery is energy-efficient and designed to support sustainable industrial operations.

5.12.7 - Production Capacity

- The **extrusion and processing section** has a production capacity of up to **300 tons per month**.
- The **anodizing plant** has a processing capacity of approximately **165 tons per month**.

5.12.8 - Overall Process Flow

This process ensures that the aluminum profiles meet **high-quality standards**, maintain durability, and comply with **environmental and safety regulations**.

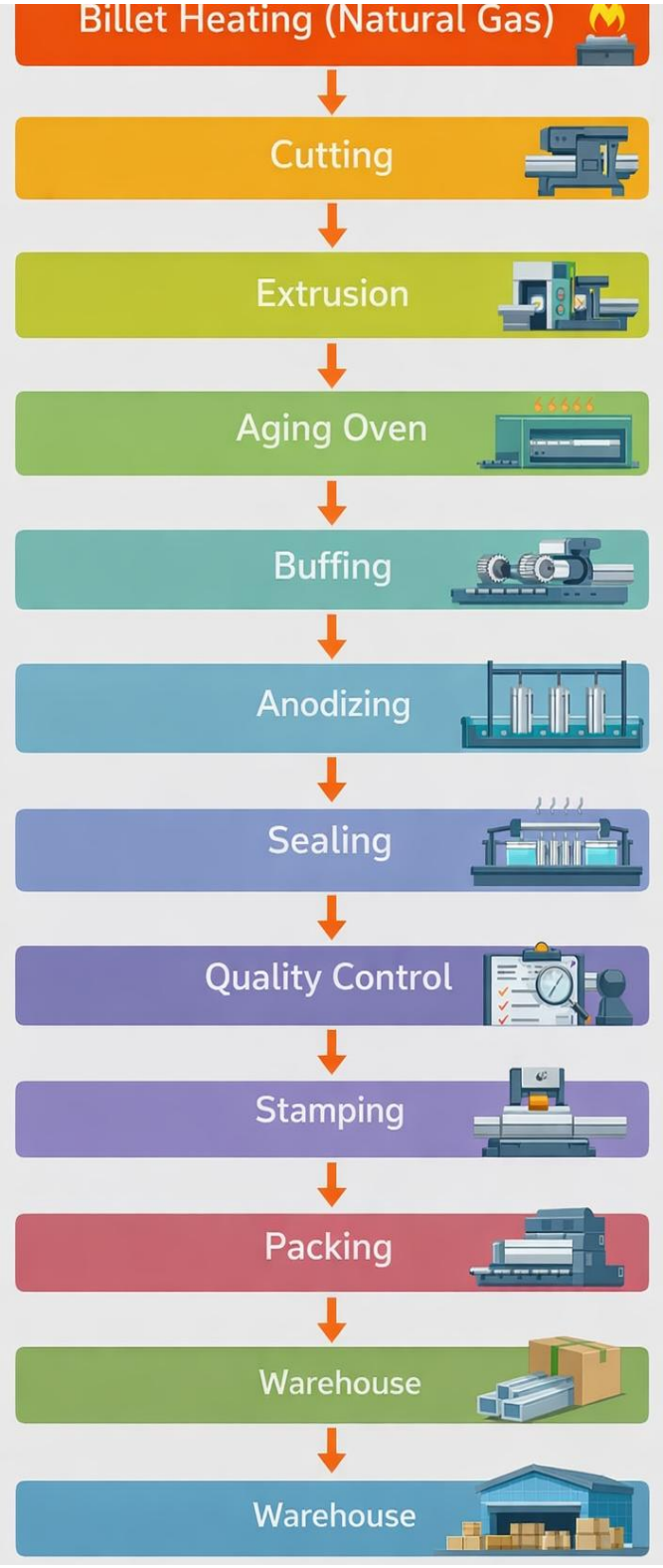


Figure 5-2 Flow Chart of Process

5.13 - Area of the Land

The total area of the plot is 3381.64 Square Meter.

5.14 - Land Acquisition

The proposed project is located within Sundar Industrial Estate, Lahore, which is a designated zone developed for industrial use. The land for the project has already been acquired by the proponent through legal allotment from the estate management. Therefore, no additional land acquisition is required, and there are no issues related to displacement of people, resettlement, or impacts on agricultural or residential areas. The site is specifically allocated for industrial activities, ensuring compliance with land use planning and zoning regulations.

5.15 - Water usage

The project does not utilize groundwater; all water requirements are met through the authorized municipal supply from Sundar Industrial Estate, Lahore. Water is primarily consumed in the anodizing process, rinsing baths, sealing operations, and for other ancillary purposes.

The estimated water consumption has been optimized through efficient process management, including:

- Use in anodizing tanks for surface treatment of aluminum profiles.
- Rinsing baths to remove residual chemicals after anodizing.
- Sealing operations to ensure corrosion resistance and product durability.

The project implements measures to ensure water conservation, including controlled flow systems, proper maintenance of process equipment, and potential reuse of treated rinse water where feasible. These practices aim to minimize overall water consumption while meeting operational requirements and environmental compliance standards.

5.16 - Wastewater generation (Quantity and quality) and disposal method

Wastewater from the proposed anodized aluminum profiles manufacturing unit is primarily generated from the anodizing process, which includes degreasing, etching, desmutting, anodizing baths, rinsing tanks, and sealing operations. Additional minor wastewater is produced from floor washing and routine housekeeping activities within the production area. The estimated wastewater generation from the facility is approximately **18–22 m³/day**, depending on production capacity and operational hours. Process effluent mainly contains acidic/alkaline residues, dissolved aluminum, and trace chemical constituents used during surface treatment. To manage this wastewater, an **Effluent Treatment Plant (ETP)** is installed at the site. The treatment process includes neutralization, chemical dosing, coagulation/flocculation, settling, and sludge dewatering to ensure that the treated effluent complies with the **Punjab Environmental Quality Standards (PEQS)** before discharge into the Sundar Industrial Estate drainage system. Sludge generated from the ETP is collected, properly stored, and disposed of through authorized waste contractors in accordance with applicable environmental regulations. Regular monitoring of pH and other relevant parameters is conducted through certified laboratories to ensure environmental compliance. Water conservation measures such as counter-current rinsing and partial reuse of treated water for non-process purposes (e.g., floor washing and greenbelt irrigation) are also implemented to minimize overall wastewater generation.

5.17 - Air emissions and control measures

Air emissions from the proposed anodized aluminum profiles manufacturing unit are primarily associated with the billet heating furnace, anodizing process tanks, and general industrial activities. The main air pollutants include combustion gases (NO_x, CO, CO_2), minor

particulate matter, and acid mist/fumes generated during anodizing and etching operations. The billet heating furnace operates on natural gas, which is a comparatively cleaner fuel. Emissions from the furnace are controlled through proper burner tuning, adequate stack height, and routine preventive maintenance to ensure efficient combustion and compliance with applicable Punjab Environmental Quality Standards (PEQS). The stack is designed in accordance with regulatory requirements to facilitate proper dispersion of flue gases. In the anodizing section, acid mist and process fumes are controlled through installation of local exhaust ventilation (LEV) systems and fume extraction hoods installed above process tanks. Extracted air passes through suitable scrubbing or mist elimination systems before discharge to the atmosphere. The ventilation system maintains safe indoor air quality for workers and minimizes environmental impacts. Dust generation within the facility is minimal; however, good housekeeping practices are adopted to prevent accumulation of particulate matter. Work areas are properly ventilated to maintain occupational health and safety standards. Regular monitoring of stack emissions and workplace air quality is conducted through certified laboratories to ensure compliance with PEQS and relevant environmental regulations. Preventive maintenance schedules are implemented to ensure the continuous efficiency of emission control systems

5.18 - Solid waste generation and disposal method

Solid waste generated from the proposed anodized aluminum profiles manufacturing unit is mainly industrial in nature and arises from extrusion, anodizing, finishing, and general housekeeping activities. The waste stream primarily includes aluminum scrap, rejected profiles, packaging materials (plastic wrapping, cardboard, wooden pallets), spent filters, and sludge from the Effluent Treatment Plant (ETP).

5.18.1 - Types of Solid Waste:

1. Aluminum Scrap:

- Generated from trimming, cutting, and rejected sections during extrusion and finishing processes. This waste is non-hazardous and recyclable.

2. Packaging Waste:

- Includes plastic sheets, strapping material, cardboard cartons, and wooden pallets used for product packing and raw material handling.

3. ETP Sludge (Hazardous Waste):

- Produced from the treatment of anodizing wastewater. The sludge may contain traces of aluminum hydroxide and other chemical residues and is categorized as hazardous waste.

4. Spent Filters and Maintenance Waste:

- Includes used filter media, oily rags, and minor maintenance residues.

5.18.2 - Disposal and Management Method

- **Aluminum scrap** is segregated at source and sold to authorized recyclers for re-melting and reuse.
- **Packaging waste** is collected separately; recyclable materials are handed over to licensed recycling vendors, while non-recyclable waste is disposed of through the approved waste collection system of Sundar Industrial Estate.

- **ETP sludge** is dewatered, stored in designated covered areas on an impervious floor, and disposed of through EPA-approved hazardous waste contractors in accordance with applicable environmental regulations.
- **Spent filters and maintenance waste** are properly stored and disposed of through authorized vendors.

No solid waste is dumped on open land or discharged into drains. Waste manifests and contractor approvals are maintained to ensure regulatory compliance.

Through proper segregation, recycling, and safe disposal practices, the project ensures environmentally sound solid waste management in compliance with Punjab Environmental Protection Agency requirements.

5.19 - Operational hours of the facility

The proposed anodized aluminum profiles manufacturing unit operates on a continuous production schedule to meet market demand and ensure efficient utilization of installed machinery. The facility is planned to operate 24 hours per day in three shifts of 8 hours each, depending upon production requirements and order volume. The extrusion and anodizing sections function on a regular shift system, with adequate manpower assigned to each shift. Administrative and office operations are carried out during standard daytime working hours, typically from 9:00 AM to 5:00 PM. Routine maintenance activities are scheduled during designated shutdown periods to minimize production disruption. In case of reduced demand or maintenance requirements, operational hours may be adjusted accordingly. The operational schedule complies with applicable labor laws and industrial regulations, ensuring proper worker safety, rest intervals, and occupational health standards.

5.20 - Energy requirements and sources

The proposed anodized aluminum profiles manufacturing unit requires approximately 1.5–2.0 MW of electrical load for extrusion presses, anodizing rectifiers, compressors, cooling systems, lighting, and ETP operations. Electricity is supplied by the Lahore Electric Supply Company, while thermal energy for billet heating and process baths is obtained through natural gas provided by Sui Northern Gas Pipelines Limited. A standby diesel generator is installed for emergency backup. Energy-efficient motors, proper insulation, LED lighting, and routine maintenance practices are adopted to ensure efficient energy utilization and reduced environmental impact.

5.21 - Fuel storage and handling

The proposed anodized aluminum profiles manufacturing unit primarily uses **natural gas** as fuel for billet heating furnaces and process heating, supplied through the industrial network of Sui Northern Gas Pipelines Limited; therefore, no large-scale on-site gas storage is required. A limited quantity of diesel is stored on-site for emergency backup generator use only. Diesel is kept in a designated, ventilated area in properly labeled, leak-proof storage tanks placed over an impervious concrete floor with secondary containment to prevent soil contamination. Proper safety measures, including fire extinguishers, spill kits, grounding arrangements, and restricted access, are ensured. Fuel handling is carried out by trained personnel following standard operating procedures to minimize the risk of spills, fire hazards, and environmental impacts.

5.22 - Emergency response and safety features

The proposed anodized aluminum profiles manufacturing unit will implement a comprehensive emergency response plan to address potential incidents such as fire,

chemical spills, gas leakage, and electrical hazards. Fire detection and firefighting systems, including fire extinguishers, hydrants, smoke detectors, and alarm systems, will be installed at designated locations throughout the facility. Clearly marked emergency exits, assembly points, and evacuation routes will be provided to ensure safe evacuation during emergencies. Chemical storage areas will be equipped with secondary containment, spill control kits, and proper ventilation systems. Personal Protective Equipment (PPE) such as gloves, goggles, face shields, and safety shoes will be mandatory for workers in operational areas. Regular safety training sessions, mock drills, and first-aid facilities will be arranged to enhance preparedness. The facility will comply with applicable occupational health, safety, and environmental regulations, ensuring a safe working environment and minimizing risks to workers and surrounding areas.

5.23 - Restoration and Rehabilitation Plan

Since the proposed project site is located within Sundar Industrial Estate, which is already designated for industrial development, the requirement for large-scale restoration is minimal. However, measures will be implemented to ensure that the site and surrounding environment remain safe, clean, and sustainable during and after construction. During the construction phase, disturbed areas will be restored through proper leveling, compaction, and disposal of excess construction material at designated sites approved by the estate management. Any temporary storage or laydown areas will be cleared and rehabilitated upon completion of works. In the operational phase, the project will implement environmental management practices including plantation of native and ornamental trees within and around the facility to enhance green cover, reduce dust, and improve aesthetics. In case of accidental spills or damage to soil and infrastructure, immediate remediation and cleanup will be carried out.

At the end of the project's lifecycle, if decommissioning is required, a structured rehabilitation plan will be followed involving safe dismantling of equipment, proper disposal/recycling of scrap and hazardous material through EPA-approved vendors, and restoration of the land to a stable and environmentally safe condition.

5.24 - Sustainable features

The proposed project incorporates several sustainable features to reduce environmental impact and promote long-term operational efficiency:

- **Energy Efficiency:** Use of energy-efficient motors, HVAC systems, and process equipment to minimize electricity consumption during production.
- **Backup Power:** Dedicated diesel generator system with optimized fuel management to ensure uninterrupted operation of critical machinery such as rod breakers, stranding, and tubular machines.
- **Green Belt Plantation:** Development of landscaped buffer zones around the facility to reduce dust, noise, and visual impact while enhancing carbon absorption.
- **Water Conservation:** Efficient water use for machinery cleaning, HVAC cooling, and sanitation, with treated water reused for landscaping and non-process requirements.
- **Solid Waste Management:** Proper segregation, collection, and disposal of metal off-cuts, packaging, and rejected materials, with recycling wherever feasible.
- **Occupational Safety:** Controlled access, safety signage, protective equipment, and emergency response plans to minimize workplace risks.
- **Local Resource Utilization:** Use of locally available construction materials, inputs, and labor to reduce transportation emissions and support the local economy.

- **Community Benefits:** Employment generation for skilled and semi-skilled workers, along with capacity-building opportunities for local personnel.

6 - DESCRIPTION OF THE ENVIRONMENT

6.1 - Introduction

This chapter describes the baseline conditions, which cover the existing physical, ecological, and socio-economic environment of the Study Area. Information on these aspects has been derived from the desk study of available data, field visits to the project area as well as information obtained through visits to the Government departments and other agencies namely Irrigation Department, Meteorological Department, Forest offices and prevailing environmental laws and environmental quality standards etc.

6.2 - Desk Studies

Project design data was collected from proponents. This data included the available documents, drawings, reports, etc related to the proposed project. The experts conducted a detailed desk study of the above available data before the field visit. Salient features of the Project were thoroughly reviewed to assess their environmental implications. The documents which were consulted and departments visited are Project Head Office, Project Site, Irrigation Department, Meteorological Department, Forest offices and other related officials.

6.3 - Site Visits

A team of experts visited the proposed site to collect baseline environmental data for ambient air, noise levels, drinking water and wastewater sampling, public consultation, baseline ecological environment data etc.

After the survey of the project area the environmental data regarding physical, ecological and socioeconomic aspects were collected for carrying out environmental assessment. Secondary data were also collected from various sources mainly studies carried out by project proponents and reports of other line Departments. A social survey of the proposed area was carried in which people living around the proposed unit site were interviewed to ascertain their views about the project commissioning and operational activities to perceive the impacts on the natural and socioeconomic environment around the proposed project site. This included information on land, surface water, groundwater, air, vegetation, animals and human.

6.4 - Physical Environment

Lahore, the vibrant heart of Pakistan, is a city where history meets modernity. Renowned for its rich cultural heritage, architectural splendor, and dynamic spirit, Lahore stands as a symbol of resilience and progress. The geography of Lahore Division comprises the various features relating to the land and climate. Lying between 31°15′—31°45′ N and 74°01′—74°39′ E, Lahore is bounded on the north and west by the Sheikhupura District, on the east by Wagha, and on the south by Kasur District. The Ravi River flows on the northern side of Lahore. Lahore city covers a total land area of 1014 km² and is still growing.

Lahore Division enjoys air, rail and road connections with rest of the country. The capital of the Punjab, Lahore has Allama Iqbal International Airport to cater the needs of District Lahore and its adjacent cities, as regular national and international flights run from here. Lahore Station is a major railway junction serving links to major cities. On the south of Lahore National Highway N-5 links Multan, on northwest and north runs Motorway M-1 and National Highway N-5 towards Gujranwala. On the west, it is linked with textile hub Faisalabad with a 4-lane highway, built on BOO (Built - Operate - Own) basis. A historical Grand Trunk Road which was a major artery during subcontinent era, originally built by Sher Shah Suri, the Afghan ruler, leads toward Indian border passing through the city. Lahore boasts a rich and storied history that spans over a millennium, making it one of the oldest

and most culturally significant cities in South Asia. Once the capital of several great empires—including the Ghaznavids, Mughals, and Sikhs—Lahore has long been a center of art, architecture, learning, and political power. The city flourished during the Mughal era, leaving behind iconic landmarks such as the Badshahi Mosque, Lahore Fort, and Shalimar Gardens. Under British colonial rule, Lahore evolved into a key administrative and educational center, home to institutions like Government College and the University of the Punjab. Today, the city's layered history is reflected in its vibrant streets, where ancient traditions and modern life coexist in harmony.

Lahore, a thriving industrial hub of Pakistan, stands as a beacon of industrial excellence, driving economic growth through its diverse and dynamic manufacturing sectors. Among its much industrial strength, the city has seen significant advancement in the production of wires and cables, supplying high-quality electrical components to meet both domestic and international demands. With state-of-the-art manufacturing units, skilled labor, and a focus on innovation, Lahore's wire and cable industry plays a crucial role in supporting the nation's infrastructure, energy, and construction sectors.

6.5 - Topography

Topographically, Lahore City District comprises of level, and nearly level, surfaces. These surfaces had been used for irrigated agriculture in the past. Currently, most of them are being urbanized at a rapid pace. The district is divided into 2 parts topographically:

- The low-lying areas along River Ravi (called hithar)
- The upland areas in the east of River Ravi (called uttar)

The lowlands, known as hithar are generally inundated by the waters of River Ravi which flows in the west of the district. The hithar areas are a part of the old bed of River Beas and, thus, usually receive inundation waters of the River Ravi during the Monsoons. The general height of the area is approximately 150-200 m above sea level. Uttar areas (upland) are situated in the north and form two-thirds of the entire land of the district, comprised mostly of fertile loamy soils.

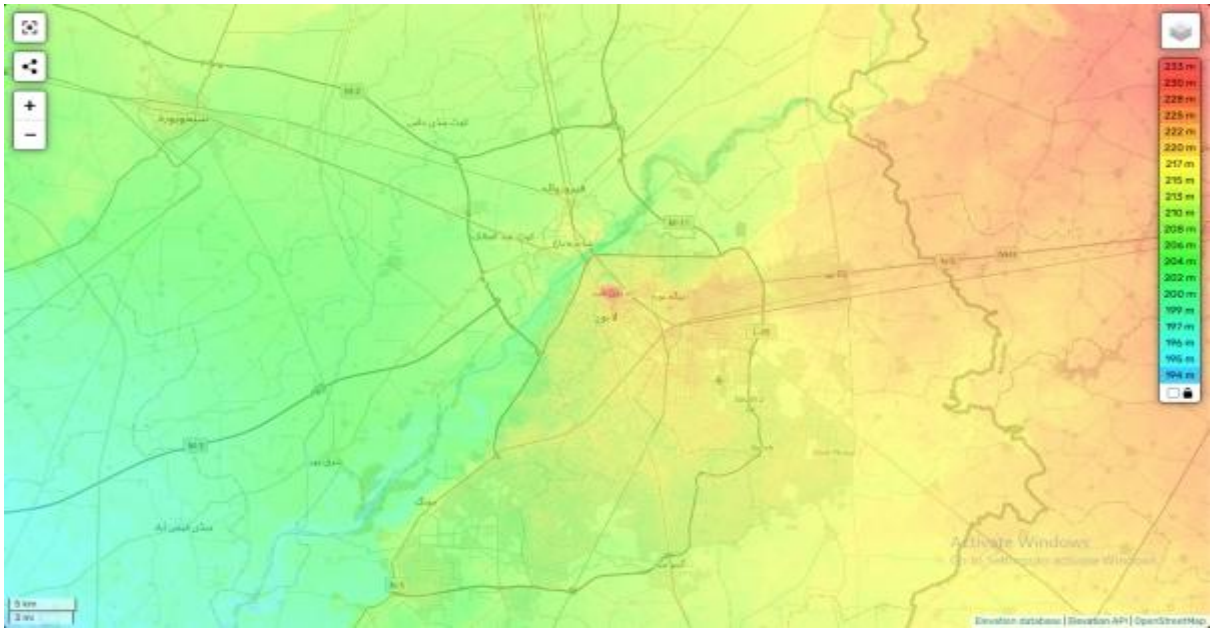


Figure 6-1: Topographic Map of the Project Area

6.6 - Soils

The soil of the district is entirely alluvial and rich in potential plant nutrients. The soils of the hithar areas are soft alluvial and loam, but in some places, the soils are too sandy to be fertile. The soils of Lahore District are deposited by the Ravi River and its tributaries. These soils are generally fertile, well-drained, and suitable for a variety of agricultural activities. They range from sandy loam to clay loam in texture, supporting crops such as wheat, rice, sugarcane, and vegetables. However, in some areas, soil fertility is affected by salinity and waterlogging, requiring proper management practices. Overall, the district's soil profile supports both agriculture and urban development due to its favourable composition and structure.

6.7 - Climate and Meteorology

Lahore experiences an extreme climate characterized by scorching summers and chilly winters. The summer season begins in April and lasts until September, with May, June, and July being particularly oppressive. June is the hottest month, with average maximum temperatures reaching up to 40°C and minimums around 27°C. Occasional dust storms and intense heat waves are common features of this period. The monsoon typically arrives toward the end of June, bringing intermittent rain spells through mid-September.

Winter spans from November to February, with January being the coldest month. During this time, average maximum and minimum temperatures are about 20°C and 6°C, respectively, though temperatures can drop as low as 0°C.

Lahore's semi-arid climate includes five distinct seasons:

- **Foggy winter** (Nov 15 – Feb 15), with cold temperatures and occasional western disturbances.
- **Pleasant spring** (Feb 15 – Apr 15).
- **Hot and dusty summer** (Apr – Jun), marked by intense heat and storms.
- **Rainy monsoon** (Jul – Sep 15), with heavy rainfall and thunderstorms.
- **Dry autumn** (Sep 16 – Nov 14).

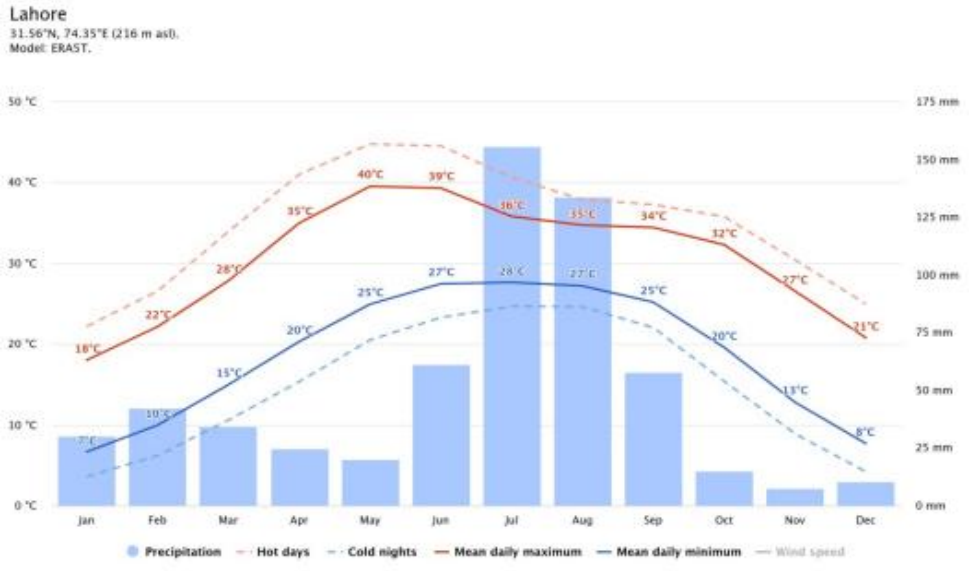


Figure 6-2: Average Temperature and Precipitation In Lahore

The average annual rainfall is approximately 630 mm, with July being the wettest month. Lahore has recorded extreme temperatures, including a high of 48.3°C on May 30, 1944, and a low of –1°C on January 13, 1967.

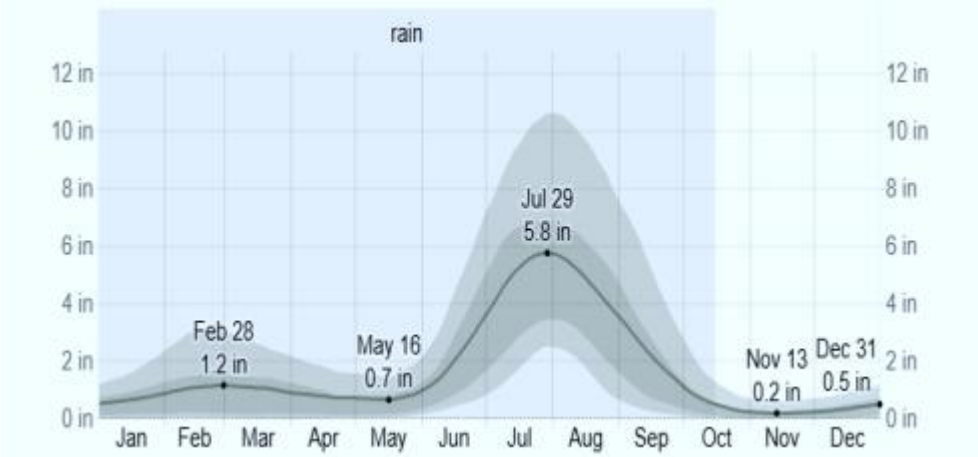


Figure 6-3: Average Monthly Rainfall in Lahore

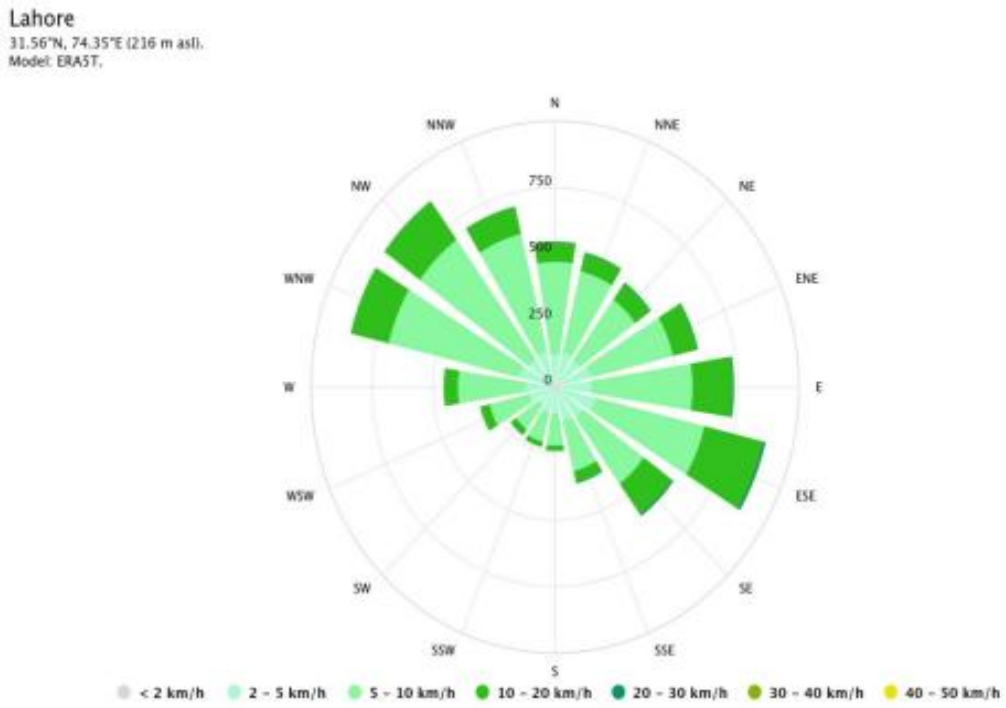


Figure 6-4: Wind Rose in Lahore

6.8 - Surface and Ground Water Resource

6.8.1 - Surface Water

- The **Ravi River** is Lahore's primary surface water source, yet its flow is heavily **seasonal** and often **contaminated** by untreated sewage and industrial effluents
- Upstream diversions have reduced the river flow in Pakistan to around 15% of its historic levels.

- Pollution in the Ravi not only degrades its own ecosystem but also leaches into urban aquifers, deteriorating groundwater quality

6.8.2 - Groundwater

- Lahore's groundwater, extracted through thousands of deep **WASA tube-wells,** is the city's primary water source
- Annual abstraction (~1161 MCM) exceeds recharge (~1013 MCM), causing the water table to drop by approximately 1 m per year
- Groundwater quality is being compromised by the river's polluted water percolating into aquifers.

6.8.3 - Main Recharge Sources

- Rainfall, the Ravi River during the monsoon, and irrigation canals provide limited natural recharge
- However, average precipitation is insufficient to offset heavy groundwater extraction.
- The river-based recharge is largely negligible outside the monsoon period

6.8.4 - Emerging Solutions

- Initiatives like **WWF-led rainwater harvesting a**nd **aquifer recharge schemes** aim to boost groundwater levels — targeting up to 331,000 m^3/yr recharge
- Sustainable management requires wastewater treatment, controlled extraction, and artificial recharge through rooftop capture or recharge wells.

Aspect	**Detail**
Surface water dependency	Ravi River — seasonal & polluted
Groundwater extraction	~1161 MCM/year
Annual recharge	~1013 MCM/year
Water table decline	~1 m/year
Pollution risk	Sewage and industrial effluent infiltrate aquifers
Recharge methods	Monsoon rain, canal flow, artificial recharge projects

6.9 - Seismology

Lahore lies in a region of **moderate seismic activity** and situated within **Seismic Zone 2B** as classified by the Pakistan Building Code (2007). This zone indicates a region with **low to moderate risk,** where seismic events are possible but generally not highly destructive.

The city is not located directly on any major active fault line, but it can be affected by distant seismic sources from northern and western Pakistan, including the **Main Boundary Thrust**

(MBT) and the **Salt Range Fault System**. Earthquakes originating from these zones can produce tremors felt in Lahore, especially from significant seismic events such as those in the Hindukush or Kashmir regions.

While Lahore is not highly prone to strong earthquakes, it remains vulnerable to secondary effects such as structural damage due to moderate tremors, especially in poorly constructed or unregulated buildings. Therefore, adherence to seismic-resistant construction codes and proper urban planning is essential for risk mitigation.

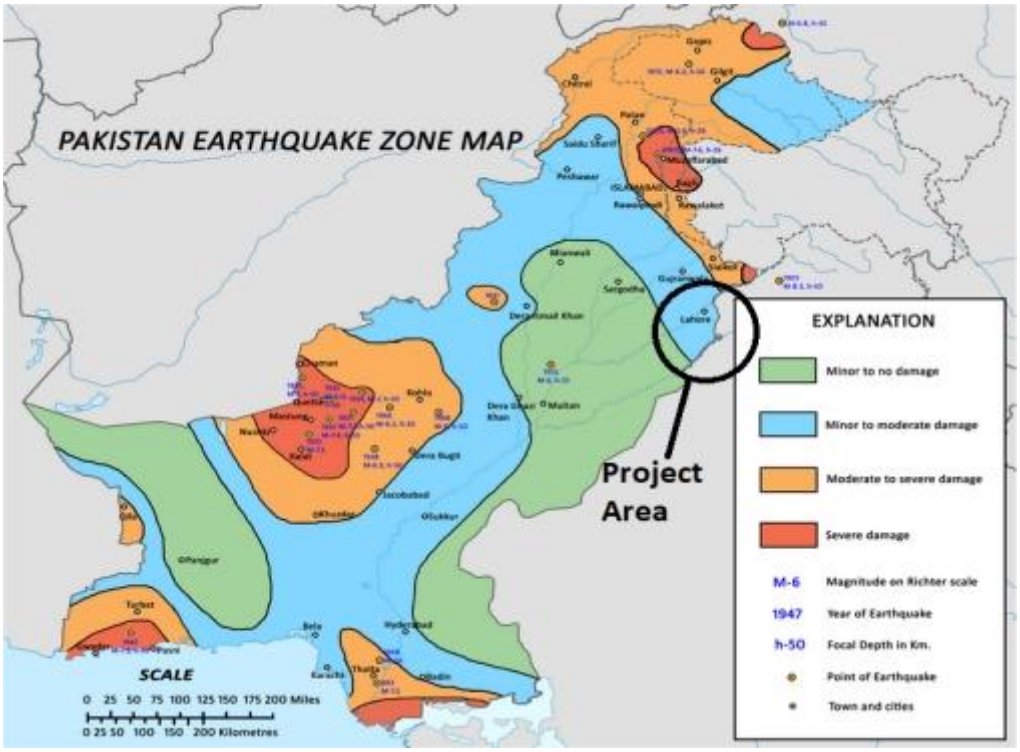


Figure 6-5: Seismic Zones Map of Pakistan

6.10 - Ecological Resources

Lahore's ecological resources, though challenged by rapid urbanization, remain vital for the city's environmental health and biodiversity. Green spaces such as parks, botanical gardens, canal banks, and urban forests support a variety of native flora and fauna, contributing to air purification, temperature regulation, and habitat preservation. Key ecological assets include the Lahore Canal greenbelt, Jallo Park, and the Lahore Botanical Garden, which serve as urban biodiversity hotspots. These resources play a crucial role in enhancing the city's resilience to climate change and improving the quality of life for its residents.

Flora

Table 6-1: Flora of the Project Area

Common Name	Scientific Name	Category
Neem	*Azadirachta indica*	Tree
Peepal	*Ficus religiosa*	Tree
Banyan	*Ficus benghalensis*	Tree
Eucalyptus	*Eucalyptus camaldulensis*	Tree (introduced)
Shisham (Indian Rosewood)	*Dalbergia sissoo*	Tree

Common Name	Scientific Name	Category
Amaltas (Golden Shower)	*Cassia fistula*	Tree
Gulmohar	*Delonix regia*	Ornamental tree
Bougainvillea	*Bougainvillea glabra*	Shrub/Climber
Marigold	*Tagetes erecta*	Flowering plant
Alstonia	*Alstonia scholaris*	Tree
Grass (Doob Grass)	*Cynodon dactylon*	Ground cover

Neem (*Azadirachta indica)*

Marigold (*Tagetes erecta)*

Alstonia (*Alstonia scholaris)*

Doob Grass (*Cynodon dactylon)*

Figure 6-6: Flora of the Project Area

Fauna

Table 6-2: Fauna of the Project Area

Common Name	Scientific name
Mammals	
Indian Palm Squirrel	*Funambulus palmarum*
Indian Grey Mongoose	*Herpestes edwardsii*
Fruit Bat	*Pteropus giganteus*
House Mouse	*Mus musculus*
Common Rat	*Rattus rattus*
Birds	
House Sparrow	*Passer domesticus*
Common Myna	*Acridotheres tristis*
Rock Pigeon	*Columba livia*
Red-wattled Lapwing	*Vanellus indicus*
Indian Peafowl (in parks)	*Pavo cristatus*

Common Name	**Scientific name**
Cattle Egret	*Bubulcus ibis*
Black Kite	*Milvus migrans*
Reptiles and Amphibians	
Common Name	**Scientific Name**
Garden Lizard	*Calotes versicolor*
House Gecko	*Hemidactylus frenatus*
Indian Cobra	*Naja naja*
Common Toad	*Duttaphrynus melanostictus*

Fruit Bat (***Pteropus giganteus)***

Indian Palm Squirrel (*Funambulus palmarum)*

House Sparrow (*Passer domesticus)*

Common Toad (*Duttaphrynus melanostictus)*

Figure 6-7: Fauna of the Project Area

6.10.1 - Protected Wildlife Areas and Endangered Wildlife

Following are the wildlife protected areas of the district

- Game Reserve, a part of 5-Mile Border Strip
- Jallo Wildlife Park
- Tehra Plantation Wildlife Sanctuary

Mammals found and protected in Jallo Park include Asian black bear, Bactrian camel, cheetal, chinkara, and sambar deer. Reptiles given sanctuary are Indian cobra, and mugger crocodile. Birds that are protected include Indian pea fowl and game birds.

6.11 - Socio-Economic Environment

Lahore, the second-largest city of Pakistan, is a dynamic socio-economic hub with a rapidly growing population exceeding 13 million. As the provincial capital of Punjab, it serves as a center for education, commerce, culture, and industry. The city boasts a high literacy rate of around 77%, supported by numerous universities, colleges, and technical institutions.

Economically, Lahore has a diversified base, with major contributions from the services sector, manufacturing industries (notably textiles, electronics, and cables), retail, and construction. Employment opportunities range from formal public and private sector jobs to informal labor markets. Despite its economic vibrancy, the city faces challenges such as income disparity, urban poverty, and housing shortages in peri-urban areas.

Healthcare facilities are relatively advanced, yet unevenly distributed. The city's robust infrastructure, cultural richness, and industrial activity make it a key driver of regional development, though rising population pressure continues to strain public services and environmental resources.

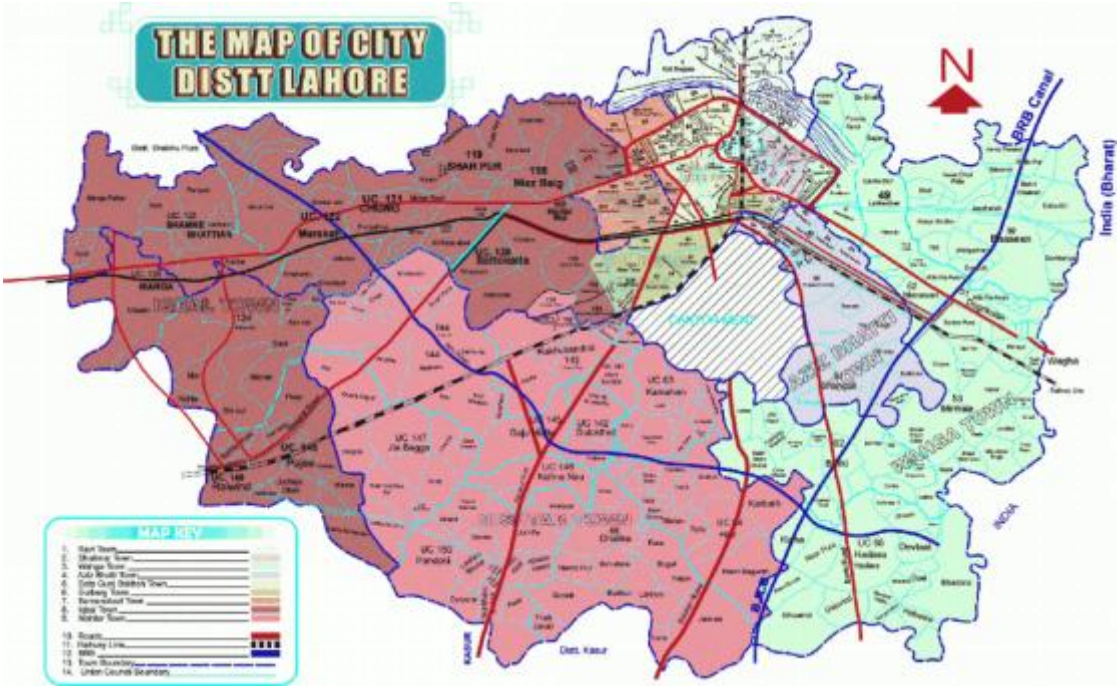


Figure 6-8: Map of Lahore city

6.12 - Population and Demographics

Lahore, the capital of Punjab province, is the **second-largest city in Pakistan** after Karachi. According to the 2023 census, the population of Lahore exceeds **13 million**, making it one of the fastest-growing urban centres in South Asia.

Total population	13,004,135	
Annual growth (2017–2023)	2.65%	
Gender split	Male	52.9%
	Female	47.1%

	Transgender	0.026
Population density	7,339 ppl/km²	
Age Distribution	0–9 years 10–19 20–29	3.23 M 2.67 M 2.30 M
Literacy Rate (age 10+)	Overall 79.6%	
	Male Female	81.4% 77.6%

6.13 - Eductaion and Literacy in Lahore

Lahore is often hailed as **Pakistan's educational capital**, home to a rich network of schools, colleges, and universities—both public and private. It boasts some of the country's most prestigious institutions, such as Government College University (est. 1864), University of the Punjab (est. 1882), University of Engineering & Technology (est. 1921), and Lahore University of Management Sciences (LUMS), the only AACSB-accredited business school in Pakistan.

6.14 - Literacy & Enrollment

- The **overall literacy rate** in Lahore is approximately **79.6%**, with male literacy at **81.4%** and female literacy at **77.6%**, ranking among the highest in the country
- **Enrollment is strong**, particularly at the primary and secondary levels, reflecting Punjab's provincial averages—**gross enrollment rates (GER) around 90% and net enrollment (NER) approximately 56%**
- **Youth literacy (15–24 years)** in Punjab—where Lahore is located—surpasses 92% for both males and females in urban areas

Total Schools	1120	
Total Colleges	63	
	26 boys	37 girls

6.15 - Higher Education & Institutions

Major universities in Lahore include:

- **Government College University (GCU)**: Over 10,600 students; long history and top performance
- **University of the Punjab**: More than 45,000 on-campus students; one of South Asia's oldest public universities
- **University of Lahore (UoL)**: Private university with ~ 45,000 students and strong program offerings.

There are also many reputable private schools (e.g., Lahore Grammar School, Beaconhouse) producing graduates who go on to top universities such as LUMS and abroad.

Government College university Lahore (GCU)

Punjab University Lahore (PU)

Figure 6-9: Educational Institutions in Lahore

6.16 - Health Facilities

Lahore hosts one of the most extensive and diverse healthcare systems in Pakistan, catering to its rapidly growing population through a combination of public, private, military, and charitable facilities. The public health sector includes major teaching and tertiary care hospitals such as Mayo Hospital, Jinnah Hospital, Services Hospital, and Punjab Institute of Cardiology. These institutions handle high patient loads and offer specialized services in cardiology, surgery, neurology, pediatrics, and emergency care, though they often face challenges like overcrowding, limited equipment, and long wait times.The private healthcare sector has seen significant growth and includes modern hospitals like Shaukat Khanum Memorial Cancer Hospital, Evercare Hospital, Doctors Hospital, Hameed Latif Hospital, and National Hospital. These facilities offer high-quality medical services, including advanced diagnostics, surgical procedures, intensive care, and maternity services, often in better environments but at a higher cost. Military hospitals such as CMH Lahore provide high-standard medical care and are accessible to both military personnel and civilians. Specialized institutions like Gulab Devi Hospital (for chest and respiratory diseases), Children's Hospital (for pediatric care), and the Punjab Institute of Mental Health (for psychiatric services) also serve critical health needs. Additionally, Lahore has a vast network of small private clinics, diagnostic laboratories, and outpatient services that improve access to healthcare across urban and semi-urban areas. Public health initiatives like the Sehat Sahulat Program (Sehat Card) have improved access for low-income populations by covering hospital expenses in many empaneled hospitals. While the city's healthcare infrastructure is advanced compared to other regions, disparities in quality, affordability, and access still persist, especially for vulnerable populations.

Table 6-3: Number of Hospitals in Lahore

Teaching Hospitals (Specialized Health	19
THQ Hospitals	01
Indus THQ Hospital	05
RHCs	05
BHUs	38
Rural Dispensaries	21
MCH Centers	50
Total	139

6.17 - Economic Activity

The economy of Lahore has a diversified base, including telecommunications, information technology, manufacturing industry, engineering, pharmaceuticals, steel, chemicals, and construction material. The economy of Lahore is prosperous, as it is a major urban center. Lahore is one of the more industrialized districts of Pakistan and is home to the largest IT Park. in the country, which is called the Arfa Software Technology Park. Lahore is the country's second largest economic hub and also the commercial capital of Punjab. The Lahore Stock Exchange is Pakistan's second largest stock exchange, with the Karachi Stock Exchange being the largest

Table 6-4: Economic activity of the area

Agriculture with its Allied Livestock Breeding, Fishing, Forestry	5.7%
Manufacture	9.6%
Construction	30%
Wholesale/ Retail, Hotel/ Restaurant	15.6%
Transport, Storage & Communication	6.7%
Community, Social & Personal Services	17.1%
Financing, Insurance, Real Estate	5.4%
Activities not adequately defined	9.4%
Electricity, Gas & Water	0.5%

6.18 - Industries

Major industries contributing to the economic activity are given below;

ICI Soda Ash	01
Pakistan Tobacco Company	01
Cement	02
Mari Petroleum	01
OGDCL	01
Brick Kilns	80
Flour Mills	16
Total	**102**

6.19 - Economic Infrastructure

The district is linked with Sheikhupura, Gujranwala, Okara, Kasur, and Narowal districts through metaled roads. The main Peshawar-Karachi railway line passes through Lahore District, and it is linked with Sheikhupura, Narowal, Gujranwala, and Kasur Districts through the railway network. District Amritsar of India is also connected by rail with Lahore for international traffic only. Lahore Transport Company (LTC) was established in 1984 to ease

the traffic congestion in Lahore and improve bus services. LTC was given all the transport responsibilities of Lahore in December 2009. A Bus Rapid Transit System (BRTS) fleet of 650 buses was introduced and named Trans Lahore. However, the BRTS did not have dedicated lanes and had to share the roads with regular traffic, with no right-of-way privileges. This resulted in a system that was a BRTS only in name. The Lahore Metro Bus Service was inaugurated on 10 February 2013. The first section consists of a 27 km road track, from Gajumata to Shahdara. It has 27 bus stations and incorporates e-ticketing.

Table 6-5: Lahore Road Statistics

Total Road length	1,309.93 km
National Highways	48.43 km
Provincial Highways	1261.5 km

6.20 - Religion

The religious composition of the district is as follows:

Muslims	93.9%
Christians	5.8%
Hindus	Negligible %
Ahmadis	0.2%
Scheduled Castes	Negligible %
Others	Negligible %

6.21 - Ethnic Structure

Cast	**Percentage**	**Numbers**
Kamboh	05	0.55 million
Rajput	05	0.55 million
Miscellaneous	20	2.23 million
Kashmiris	30	3.33 million
Arain	40	4.45 million

6.22 - language distribution

Urdu	2,742,020
Punjabi	9,549,169
Sindhi	27,074
Pushto	267,809

Balochi	4,266
Saraiki	62,016
Hindko	33,061
Brahvi	176

6.23 - Site Suitability

The selected site at Sundar Industrial Estate is highly suitable for the establishment of the alloy ingot production facility. The estate has been specifically developed for industrial operations and provides all essential infrastructures, including reliable electricity, natural gas supply, water, internal road networks, and wastewater management facilities. The site is well connected to major highways, ensuring easy transportation of raw materials (scrap metal) and finished ingots to industrial markets. The land is already leveled and allocated for industrial use, eliminating the need for agricultural land conversion or displacement of communities. The absence of ecologically sensitive areas, protected habitats, or residential clusters in the immediate surroundings minimizes potential environmental and social conflicts. Furthermore, the site is compliant with zoning regulations and falls under the jurisdiction of the Punjab Industrial Estates Development and Management Company (PIEDMC), ensuring planned industrial development with proper monitoring and environmental safeguards. Given these factors, the site is considered appropriate and sustainable for alloy ingot production, meeting both technical and environmental requirements.

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 - Location of Project

The proposed project will be established at Plot No. 447, Sundar Industrial Estate, Lahore, a strategic industrial area with well-developed infrastructure, providing easy access to major transportation routes and utilities.

7.3 - 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.

7.4 - 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.

7.5 - 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.

7.6 - 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

7.6.1 - Soil Erosion

Soil erosion may occur within the construction area due to surface runoff from equipment washing yards and poor construction management practices. This impact is negative but of minor magnitude.

Mitigation Measures

- Implement and maintain surface runoff controls to minimize erosion.
- Line main drainage courses within the project site to prevent erosion.
- Plant indigenous grasses on low embankments and disturbed surfaces to stabilize soil.

7.6.2 - Soil Contamination

Soil contamination may result from waste generated at contractor camps (garbage, putrescible waste, and discarded materials such as wires, plastics, fuel tins, packaging, paint, varnish, and other hazardous chemicals). This impact is negative of minor magnitude**.**

Mitigation Measures

- Store oil, paint, and chemicals in leak-proof containers under restricted access.
- Store hazardous materials in designated, well-ventilated areas with proper signage.
- Place fire extinguishers and warning signs near storage areas.
- Provide Material Safety Data Sheets (MSDS) to workers for safe handling.
- Implement a solid waste management plan with separate containers for organic and inorganic waste.
- Ensure regular waste collection and awareness among workers regarding waste segregation.

7.6.3 - Land Contamination

Construction machinery such as cranes, trucks, loaders, and batching plants may release lubricants, oil, and chemicals that contaminate the land. Paints and other construction materials may further threaten the environment and human health.

Mitigation Measures

- Conduct vehicle and equipment maintenance only in designated concrete-paved areas.
- Direct all machinery wash effluents to a mud pit to prevent contamination.
- Store fuels and hazardous substances with secondary containment and impervious linings.
- Label fuel tanks and provide proper dykes to control spills.
- Inspect chemical and fuel storage daily for leakages.
- Provide spill kits (shovels, sandbags, absorbent material) at storage sites.
- Maintain a spill/leak record for each vehicle and ensure timely repairs.
- Manage moderate spills (<200 liters) with sand and absorbent material.

7.6.4 - Dust Emissions

Excavation, material handling, and vehicular movement during construction may generate particulate matter (PM), dust, CO, and NOx. This impact is negative of minor magnitude**.**

Mitigation Measures

- Regularly sprinkle water on unpaved surfaces and construction areas.
- Cover trucks transporting soil, sand, and aggregates.
- Maintain and tune all vehicles, generators, and equipment for efficient combustion.
- Use concrete mixers and equipment meeting zero-emission standards.
- Reduce dust from traffic through speed control and traffic management.

7.6.5 - Noise Impacts

Construction machinery and transport vehicles may increase ambient noise levels, affecting workers and nearby receptors. This impact is negative of moderate magnitude**.**

Mitigation Measures

- Install temporary noise barriers or paneled fencing around high-noise zones.
- Use low-noise equipment and carry out noise assessments before installing new machinery.
- Provide PPEs such as earplugs and earmuffs to workers.
- Monitor noise levels monthly during construction.

7.6.6 - Solid Waste and Sewerage Generation

Contractor camps and construction works will generate solid waste. Improper disposal could cause land and water contamination. This impact is negative but minor**.**

Mitigation Measures

- Collect, segregate, and store waste properly.
- Send recyclable material to licensed vendors.
- Level the dumping areas after disposal to avoid landscape disruption.

7.6.7 - Impacts on Flora

The project site lies within Sundar Industrial Estate, where natural vegetation is already sparse. However, construction may disturb limited ground cover. To compensate, a tree plantation program will be implemented to offset impacts, enhance biodiversity, and improve the ecological balance.

Mitigation Measures

- Plantation of indigenous tree species within and around the site.
- Development of a greenbelt as part of the project's environmental management plan.
- Regular maintenance and survival monitoring of planted trees.

7.7 - 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
Soil Quality	Likely	Minor	Low
Safety Hazard	Likely	Moderate	Medium

7.7.1 - Air Pollution

During alloy ingot production, emissions may occur from furnaces, melting units, and material handling. Pollutants can include particulate matter (PM), oxides of nitrogen (NOx), carbon monoxide (CO), and trace metal vapors. If not controlled, these emissions may contribute to local air quality deterioration and respiratory health risks. The impact is negative, with moderate significance.

Mitigation Measures

- Install air pollution control devices such as bag filters, dust collectors, and scrubbers to capture particulate matter and fumes.
- Regular maintenance and calibration of pollution control equipment.
- Comply with PEQS for stack emissions and ambient air quality.
- Adopt cleaner fuel/energy-efficient technologies to minimize emissions.

7.7.2 - Water Pollution

Wastewater may be generated from cooling processes, equipment washing, and floor washing. If discharged untreated, it can contain suspended solids, oil, grease, and metal residues, contaminating surface or groundwater. The impact is negative, with moderate significance.

Mitigation Measures

- Establish an Effluent Treatment Plant (ETP) to treat wastewater before discharge.
- Recycle treated water within the plant for cooling and washing purposes where feasible.
- Ensure compliance with PEQS for wastewater discharge.
- Provide impervious flooring and spill containment in areas handling oils, chemicals, or metal residues.

7.7.3 - Soil Contamination

Soil contamination may occur due to improper disposal of solid waste, slag, ash, spent refractory material, or accidental leakage of oils and chemicals from machinery. This may degrade soil quality and pose ecological risks. The impact is negative, with minor to moderate significance.

Mitigation Measures

- Designate secure areas with **impervious lining** for solid waste storage.
- Ensure safe disposal of slag and non-recyclable residues at approved landfill sites.
- Reuse/recycle scrap and by-products where possible.
- Provide spill kits and secondary containment in oil and chemical storage areas.

7.7.4 - Noise Pollution

Noise will be generated from **furnaces, cutting/grinding machines, compressors, and transport vehicles**. Prolonged exposure may affect workers' hearing and cause disturbance in the surrounding industrial estate. The impact is negative, with **minor significance**.

Mitigation Measures

- Install silencers/mufflers on noise-generating equipment.
- Construct noise barriers or acoustic enclosures around high-noise machinery.
- Provide PPE (earplugs/earmuffs) to workers exposed to high noise levels.
- Schedule noisy operations during daytime hours.

7.7.5 - Safety Hazards

Alloy ingot production involves handling of molten metal, high-temperature furnaces, heavy machinery, and transport operations. Potential risks include **fire, burns, explosions, electrocution, and workplace accidents**. The impact is **significant** if unmitigated.

Mitigation Measures

- Provide comprehensive worker training on safe furnace operation, molten metal handling, and emergency response.
- Enforce PPE use, including heat-resistant gloves, face shields, safety boots, and helmets.
- Conduct regular safety inspections and preventive maintenance of machinery.
- Install fire detection and firefighting systems (CO_2 extinguishers, hydrants, sand buckets) near melting and storage areas.
- Implement strict compliance with Occupational Health & Safety (OHS) standards.
- Carry out periodic emergency drills for fire, chemical spill, and accident scenarios.

7.8 - Potential Environmental Enhancement Procedures

To minimize the environmental impacts associated with the Establishment of Alloy Ingot Production Unit by M/S Standard Aluminum (Private) Limited at Plot No. 447, Sundar Industrial Estate, Lahore*,* the following enhancement procedures will be implemented:

- **Dust Control:** Water sprinkling and the installation of dust collectors/bag filters will be carried out to control particulate emissions from melting, casting, and material handling operations.

- **Air Quality Management:** Proper ventilation and emission control devices will be installed to reduce smoke and gaseous emissions from furnaces, ensuring compliance with PEQS.
- **Wastewater & Stormwater Management:** Wastewater from cooling and washing processes will be managed through proper treatment systems. Rainwater will be drained through a separate system to avoid mixing with process wastewater.
- **Solid Waste Handling:** Scrap metal, slag, and other solid wastes will be collected, stored, and disposed of through authorized vendors, while recyclable material will be reused within the plant where feasible.
- **Energy Efficiency:** Energy-efficient furnaces, motors, and machinery will be installed to minimize fuel and electricity consumption, thereby reducing greenhouse gas emissions.
- **Noise Reduction:** Generators and heavy machinery will be housed in acoustic enclosures, and silencers will be installed to ensure that noise levels remain within permissible limits.
- **Green Belt Development:** Plantation of trees and shrubs around the project site will help in dust absorption, noise attenuation, and improving the overall aesthetics of the industrial estate.
- **Fire and Occupational Safety:** Adequate firefighting systems (extinguishers, hydrants, and safety alarms) will be installed. Workers will be provided with PPEs and regular safety training.
- **Hazardous Material Handling:** Oils, lubricants, and chemicals will be stored in properly contained areas with secondary containment to prevent soil and groundwater contamination.
- **Sewage Disposal:** Domestic wastewater from staff and sanitary facilities will be treated through septic tanks before final disposal into the Sundar Industrial Estate sewerage system, as per approval of 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 from excavation, material handling, and vehicle movement.	• Regular water sprinkling at construction site and access roads. • Proper maintenance of vehicles and machinery to minimize exhaust emissions. • Green belt development/tree plantation to absorb pollutants.	Contractor	Proponent and Contractor
2	**Water Quality** – Runoff and potential leakage from storage of fuels and construction material.	• Use impermeable liners/sheets under storage areas to prevent seepage. • Designated disposal of wastewater and sludge at approved sites. • No direct discharge into estate drains or surface water bodies.	Contractor	Proponent and Contractor
3	**Waste Generation** – Construction debris, scrap, and domestic	• Segregation of recyclable and non-recyclable waste. • Authorized disposal of inert and hazardous waste. • Prohibition of dumping in estate drains or open land.	Contractor	Proponent and Contractor

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
	solid waste from labor camp.			
4	**Noise** – Operation of construction machinery, generators, and transport vehicles.	• Ensure compliance with PEQS for noise. • Routine maintenance of machinery. • Restrict noisy activities to daytime hours. • Provide PPE (earplugs, earmuffs) to workers.	Contractor	Proponent and Contractor
5	**Soil Quality** – Contamination from accidental fuel/lubricant leaks.	• Store fuels, lubricants, and chemicals in leak-proof containers. • Immediate cleanup of accidental spills. • Implement waste management plan to prevent soil degradation.	Contractor	Proponent and Contractor
6	**Materials Management** – Improper handling/storage of raw construction material.	• Keep stockpiles below specified height. • Cover stockpiles with tarpaulin/plastic sheets during windy or rainy conditions. • Construct low brick boundaries to prevent material spread.	Contractor	Proponent and Contractor

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
7	**Workers' Health & Safety** – Risks from heavy equipment, chemicals, and unsafe practices.	• Provide PPE (helmets, gloves, safety shoes, masks). • First aid kits available at site. • Conduct safety training for workers. • Install firefighting equipment (extinguishers, hydrants). • Safe crane and lifting operations ensured. • Stagnant water prohibited to avoid mosquito breeding.	Contractor	Proponent
8	**Site Clearance & Housekeeping** – Leftover debris and unused equipment creating congestion.	• Regular collection and removal of excess material. • Separate collection and disposal of construction waste. • Maintain clean and organized worksite to avoid accidents.	Contractor	Proponent and Contractor

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 Quality** – Dust, fumes, and emissions from alloy melting, casting, and material handling.	• Install air pollution control devices (bag filters, scrubbers) to capture particulate matter and fumes. • Regular inspection and maintenance of furnaces, chimneys, and exhaust systems. • Strict compliance with Punjab Environmental Quality Standards (PEQS) for air emissions.	EHS Officer	Proponent/EHS Officer
2	**Noise Impact** – Noise generated from furnaces, blowers, compressors, and transport vehicles.	• Install silencers/mufflers on noisy equipment. • Build sound barriers or acoustic enclosures where feasible. • Limit high-noise activities to daytime. • Provide PPE (earplugs/earmuffs) to workers.	EHS Officer	Proponent/EHS Officer
3	**Soil Contamination** – Risk of contamination due to spillage of molten metal, slag, lubricants, and chemicals.	• Store fuels, oils, and chemicals in leak-proof containers over impervious flooring. • Recycle/reuse slag where possible; dispose at approved sites. • Prompt cleanup of accidental spills to prevent seepage.	EHS Officer	Proponent/ EHS Officer
4	**Water Quality** – Wastewater generated from cooling, cleaning,	• Install closed-loop water cooling system to minimize discharge. • Treat wastewater in sedimentation/septic tank system	EHS Officer	Proponent/ EHS Officer

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
		Operational Phase		
	and domestic use.	before disposal. • Obtain discharge approval from the Estate Authority. • Strict compliance with PEQS for wastewater.		
5	**Fire, Explosion & Workers' Safety** – Hazards from molten metal handling, high-temperature furnaces, and accidental equipment failures.	• Comprehensive training for workers on safe furnace operation, molten metal handling, and emergency response. • Regular maintenance and inspection of furnaces, cranes, and lifting devices. • Emergency response plan in place with fire extinguishers, hydrants, and PPE. • Install gas/heat detectors and flame arrestors in sensitive areas. • Clearly marked evacuation routes and drills conducted periodically.	EHS Officer	Proponent/ EHS Officer
6	**Accidental Leakages & Spills** – Unexpected release of molten metal, gases, or chemicals.	• Install advanced leak/gas detection and alarm systems. • Emergency shutdown systems for furnaces and equipment. • Ventilation systems to disperse fumes. • Emergency exits with clear signage for safe evacuation.	EHS Officer	Proponent/EHS Officer

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 alloy ingot production unit. 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	Frequency / Remarks
A. Construction Phase				
1	Noise	Construction vehicles, machinery, generators, welding/cutting areas	Noise meter	Checked regularly by contractor to ensure compliance with PEQS.
2	Air Emissions (Dust, Smoke)	Vehicles, machinery, excavation & material handling sites	Ambient particulate matter (PM) monitoring, visual inspection	Regular checks; water sprinkling & emission control measures implemented.
3	Solid Waste	Construction site & storage areas	Visual inspection, waste logs	Monthly checks to ensure segregation, recycling, and proper disposal at authorized sites.
B. Operation Phase				
1	Air Emissions (PM, NOx, SOx, CO, Metal Fumes)	Furnace stacks/chimneys	Stack monitoring with analyzers & third-party lab testing	Quarterly monitoring to ensure compliance with PEQS.
2	Wastewater Quality (if generated from cooling/floor washing)	Wastewater discharge points	Testing for pH, TSS, oil & grease, heavy metals	Quarterly monitoring by EPA-approved laboratory.
3	Solid & Hazardous Waste (slag, furnace lining, scrap residues)	Slag yard & disposal sites	Record-keeping, inspections	Monthly monitoring to ensure recycling or authorized disposal.
4	Noise Levels	Furnace area, compressors, blowers, loading/unloading areas	Noise meter	Monthly monitoring to ensure compliance with PEQS.
5	Occupational Health & Safety	Furnace operation, casting section, storage yard	Safety audits, PPE checks, incident reporting	Daily checks by HSE officer; quarterly internal audits.

8.8 - Environmental Budget

An environmental budget is a crucial aspect for the proposed project 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 precaution and 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 filter 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 Lahore.

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 framework that defines procedures, strategies, and responsibilities aimed at preventing, preparing for, and responding to fire-related emergencies at the alloy ingot production unit. The plan outlines preventive measures, emergency protocols, evacuation procedures, fire detection and suppression systems, worker training, and communication strategies. Clear roles and responsibilities are assigned to ensure that all employees know how to act in case of fire. Regular reviews and updates will be carried out to ensure compliance with fire safety standards and to maintain preparedness across the facility.

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 an alloy ingot production unit, hazard identification symbols are essential to communicate risks to employees and emergency responders. Common fire-related safety symbols used at the facility include:

- **Flammable Symbol:** Indicates the risk of fire from molten metal, lubricants, or fuels.

Figure 10-1: Symbol for Flammable Material

- **Explosive Symbol:** Warns of potential explosion risks from high-temperature furnaces or pressurized cylinders.

Figure 10-2: Symbol for Explosive Material

- **Electrical Hazard Symbol:** Indicates areas with high-voltage equipment and furnaces powered by electricity.

Figure 10-3: Symbol for Electrical Hazard

- **PPE Symbol:** Reminds workers to wear protective clothing, gloves, goggles, face shields, and safety shoes in operational areas.

Figure 10-4: Symbols of PPEs

- **Environmental Hazard Symbol:** Highlights risks of improper waste or chemical disposal affecting soil and water.

Figure 10-5: Environmental Hazard Symbol

These standardized symbols will be displayed throughout the unit with color codes and written warnings to ensure comprehensive hazard communication.

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 an alloy ingot production unit due to high flammability. 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 an alloy ingot production unit.

10.4.1 - Dry Chemical Powder Fire Extinguishers

Dry Chemical Powder (DCP) fire extinguishers are essential safety equipment in an alloy ingot production unit due to their effectiveness against multiple types of fires. They work by interrupting the chemical chain reaction of combustion, making them highly suitable for Class B (flammable liquids) and Class C (electrical) fires that may arise from furnace operations, molten metal handling, lubricants, or electrical systems. Their fast response capability allows for quick suppression of fire incidents, minimizing damage to machinery, raw materials, and finished products while ensuring the safety of workers. The versatility and reliability of DCP extinguishers make them a critical fire safety measure for addressing diverse fire hazards within the production environment.

Figure 10-6: DCP Fire Extinguisher

10.4.2 - Fire Extinguishers Foam Type

Foam-type fire extinguishers play a vital role in ensuring fire safety within an alloy ingot production unit. Operations involving molten metals, furnaces, fuel storage, and lubricants pose potential fire hazards, particularly those linked to flammable liquids. Foam extinguishers are specifically effective against such fires, as they create a protective blanket over the liquid surface, cutting off oxygen supply and suppressing the release of flammable vapors. This mechanism prevents the fire from spreading and allows for rapid control of hazardous situations. Their use provides an immediate and reliable first-response option to minimize risks to personnel, equipment, and the facility as a whole. Regular inspection, timely maintenance, and proper staff training in the use of foam extinguishers further

strengthen fire preparedness and enhance overall workplace safety in alloy ingot production operations.

Figure 10-7: Fire Extinguisher Foam Type

10.4.3 - Fire Hydrants

Fire hydrants in an alloy ingot production unit provide immediate access to a reliable water supply for firefighting during emergencies. They play a critical role in supporting fire suppression efforts by cooling structures, equipment, and surrounding areas, thereby reducing the risk of fire escalation. While water may not be effective against all types of industrial fires, hydrants remain an essential component of the facility's overall fire protection system, supplying water to firefighting equipment and emergency responders. Their presence not only enhances site safety but also ensures compliance with regulatory safety standards and strengthens preparedness for potential fire incidents.

Figure 10-8: Fire Hydrant

10.4.4 - Fire Alarm

Fire alarms are a vital safety feature in an alloy ingot production unit, providing early detection of fire hazards and ensuring timely warnings to workers and management. By facilitating prompt evacuation and alerting emergency response teams, fire alarms help prevent fire escalation and minimize potential risks to personnel, equipment, and surrounding areas. Their installation is not only a proactive measure to safeguard human life and assets but also a key requirement for compliance with industrial safety regulations. The integration of fire alarms across the facility ensures continuous monitoring and readiness, strengthening the overall emergency preparedness of the plant.

Figure 10-9 Fire Alarm

10.4.5 - Sand Buckets

Sand buckets are an essential part of fire safety in an alloy ingot production unit, providing a simple yet highly effective first response in case of small fires or minor chemical spills. Sand, being non-combustible, can quickly smother flames by cutting off the oxygen supply, making it suitable for controlling localized fire incidents where water or foam may not be appropriate. Additionally, sand can absorb and contain small liquid spills, preventing them from spreading and reducing potential hazards. To ensure readiness, sand buckets will be strategically placed across the facility in easily accessible locations. Regular worker training and awareness sessions on the proper use of sand buckets will be conducted to maximize their effectiveness as a frontline safety measure.

Figure 10-10: Sand Bucket

10.4.6 - Fire Pump

A fire pump is a vital component of the fire safety system in an alloy ingot production unit, ensuring a reliable and pressurized water supply during fire emergencies. In the event of a fire, the pump delivers water at high pressure to hydrants, hoses, and nozzles, enabling rapid and effective fire suppression. This capability is especially critical in large-scale industrial operations where quick response is essential to prevent escalation. The fire pump strengthens the unit's overall firefighting capacity, helping protect workers, equipment, and infrastructure from severe fire-related risks. To maintain effectiveness, the fire pump will undergo regular inspection, maintenance, and performance testing to ensure operational readiness at all times.

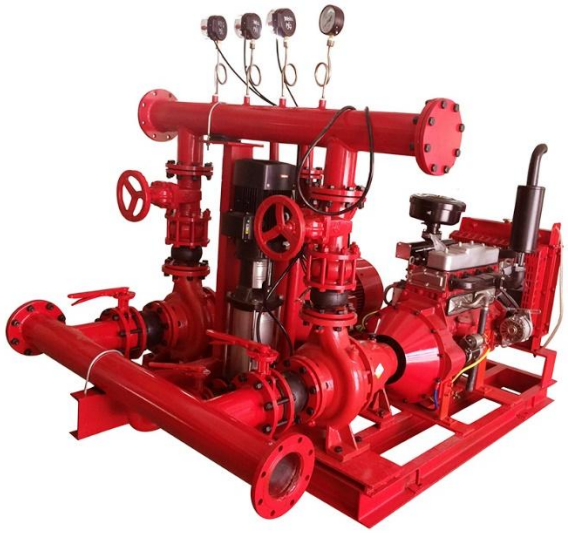


Figure 10-11: Fire Pump

10.4.7 - Jockey Pump

The jockey pump is an essential component of the fire protection system in an alloy ingot production unit. Its primary function is to maintain consistent pressure in the fire suppression system's piping, ensuring readiness at all times. By keeping the system pressurized, the jockey pump prevents unnecessary operation of the main fire pump, which activates only during actual fire emergencies. This not only conserves energy but also extends the service life of the primary pump by reducing wear and tear. The jockey pump enhances the facility's preparedness to respond swiftly to fire incidents, ensuring that water or suppression agents are immediately available when required. Routine monitoring and maintenance will be carried out to guarantee its reliability, making it a critical element of the overall fire safety infrastructure of the unit.

Figure 10-12: Jockey Pump

10.4.8 - Standby Pump

The standby pump is a vital component of the fire protection system in an alloy ingot production unit, ensuring reliability and uninterrupted functionality during emergencies. If the primary fire pump fails due to mechanical issues or is under maintenance, the standby pump automatically takes over to maintain the required water pressure for fire suppression. This built-in redundancy eliminates downtime and guarantees the system's ability to respond effectively to fire incidents. By providing a continuous and dependable water supply, the standby pump significantly strengthens the overall resilience of the fire safety infrastructure, safeguarding personnel, assets, and operations from potential fire hazards. Regular inspections, testing, and maintenance will be carried out to ensure the standby pump remains fully operational and ready when needed.

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 alloy ingot production unit 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 alloy ingot releases, explosions, fires, and other hazards.
- Minimize the environmental impact of alloy ingot. This includes preventing releases of alloy ingot 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 alloy ingot operations, including risks associated with handling, storage, transportation, and potential exposure to alloy ingot 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.

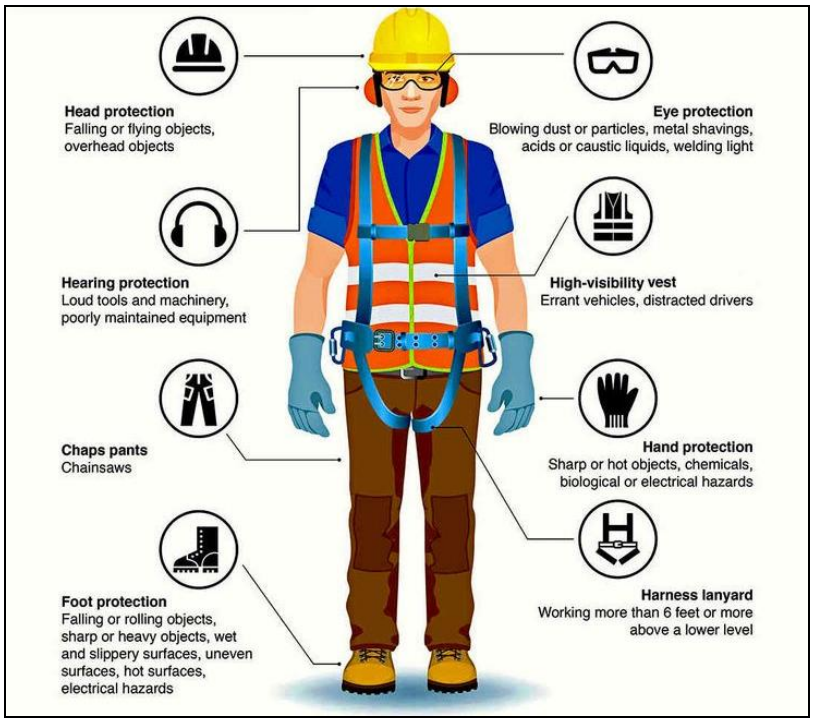


Figure 11-1: PPEs for Construction Phase

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 alloy ingot production unit PPE can help to protect employees from a variety of hazards, including:

- PPE can help to protect employees from exposure to alloy ingot, 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 Alloy ingot production unit

PPE is crucial in alloy ingot production unit 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 ingot, 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 alloy ingot production 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 alloy ingot production unit 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 alloy 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.
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.

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.

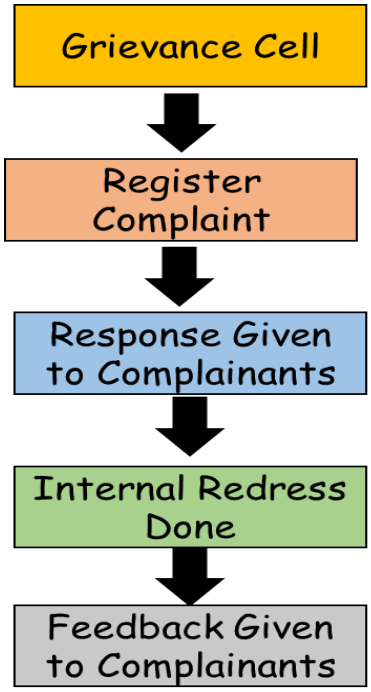


Figure 13-1: Grievance Redress Mechanism

14 - 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.

ANNEXURES

ANNEXURE – A: 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
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

ANNEXURE – B: 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

ANNEXURE – C: TERM OF REFERENCES

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.

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.

ANNEXURE – D: APPROVAL FROM OTHER DEPARTMENT

ALLOTMENT LETTER
(AMENDED)

PIE/SIE/NAME/10405
November 07, 2007

M/s Standard Aluminium
Industries (Pvt.) Limited,
447- Sundar Industrial Estate,
Lahore.

This is in furtherance of the Allotment Letter issued in favour of Mr. Hameed Ahmed on July 01, 2006 in respect of Plot No.447 measuring 3,381.64 Sq. M situated at Sundar Industrial Estate, Raiwind Road, Lahore, against which all the installments have been duly paid in full.

Now on the written request of the *supra*-referred Allotee dated November 05, 2007 which has been granted by competent authority on November 06, 2007 the name of the Allotee of said Plot has been changed to M/s Standard Aluminium Industries (Pvt.) Limited. There shall be no alteration in the terms and conditions of the allotment and all the time limitations shall be computed from the date of issue of initial Allotment Letter i.e. July 01, 2006 which forms part of the record.

PIE reserves its right to alter/amend/modify any condition(s) without prior notice which shall be binding on the Allotee.

Please take note that all conditions mentioned in the Application Form and Sundar Industrial Estate Bye-Laws or any other rules formulated by PIE shall be binding on all Allotees.

Javaid Iqbal
Company Secretary

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
Owned by: Govt. Of Punjab
1st Floor, Saudi Pak House, 14 - Egerton Road, Lahore, Pakistan
Tel: 042 - 920 3662 - 7 Fax: +92 - 42 - 920 3660
Website: www.pie.com.pk
E-mail: piedmc1@nexlinx.net.pk, info@pie.com.pk

ALLOTMENT LETTER
(AMENDED)

PIE/SIE/NAME/10405
November 07, 2007

M/s Standard Aluminium
Industries (Pvt.) Limited,
447- Sundar Industrial Estate,
Lahore.

This is in furtherance of the Allotment Letter issued in favour of Mr. Hameed Ahmed on July 01, 2006 in respect of Plot No.447 measuring 3,381.64 Sq. M situated at Sundar Industrial Estate, Raiwind Road, Lahore, against which all the installments have been duly paid in full.

Now on the written request of the *supra*-referred Allotee dated November 05, 2007 which has been granted by competent authority on November 06, 2007 the name of the Allotee of said Plot has been changed to M/s Standard Aluminium Industries (Pvt.) Limited. There shall be no alteration in the terms and conditions of the allotment and all the time limitations shall be computed from the date of issue of initial Allotment Letter i.e. July 01, 2006 which forms part of the record.

PIE reserves its right to alter/amend/modify any condition(s) without prior notice which shall be binding on the Allotee.

Please take note that all conditions mentioned in the Application Form and Sundar Industrial Estate Bye-Laws or any other rules formulated by PIE shall be binding on all Allotees.

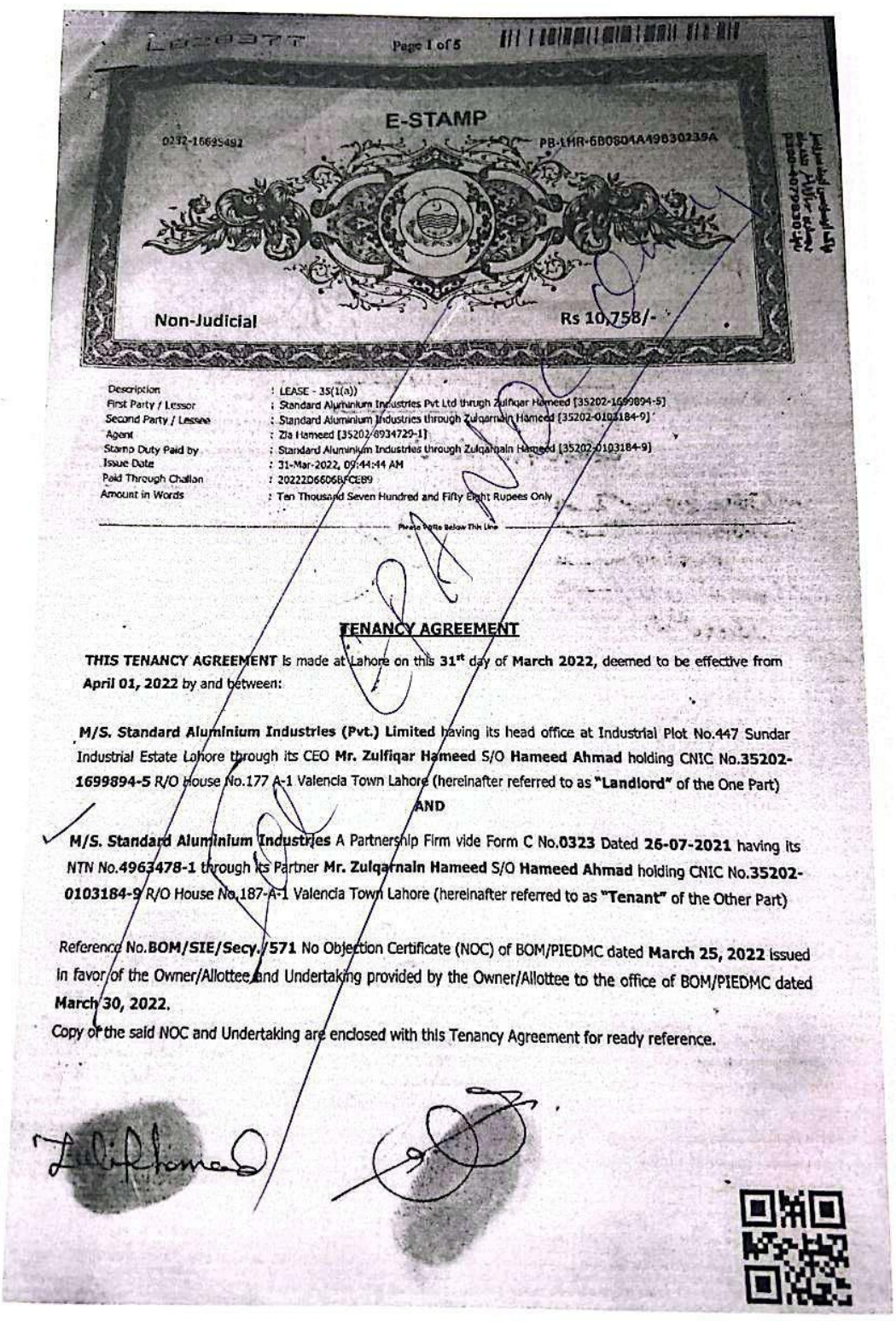
Javaid Iqbal
Company Secretary

ATTESTED TO BE TRUE COPY
25/7/13
PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB

Development and Management Co.
12/7/13

Received against
12/11/2007

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
Owned by: Govt. Of Punjab
1st Floor, Saudi Pak House, 14 - Egerton Road, Lahore, Pakistan
Tel: 042 - 920 3662 - 7 Fax: +92 - 42 - 920 3660
Website: www.pie.com.pk
E-mail: piedmc1@nexlinx.net.pk, info@pie.com.pk



Page 1 of 5

E-STAMP

0232-16695492

PB-LHR-6B0604A49B30239A

Non-Judicial

Rs 10,758/-

Description	: LEASE - 35(1(a))
First Party / Lessor	: Standard Aluminium Industries Pvt Ltd through Zulfiqar Hameed [35202-1699894-5]
Second Party / Lessee	: Standard Aluminium Industries through Zulqarnain Hameed [35202-0103184-9]
Agent	: Zia Hameed [35202-8934729-1]
Stamp Duty Paid by	: Standard Aluminium Industries through Zulqarnain Hameed [35202-0103184-9]
Issue Date	: 31-Mar-2022, 09:44:44 AM
Paid Through Challan	: 20222D6606BFCE89
Amount in Words	: Ten Thousand Seven Hundred and Fifty Eight Rupees Only

Please Refile Below This Line

TENANCY AGREEMENT

THIS TENANCY AGREEMENT is made at Lahore on this **31st** day of **March 2022,** deemed to be effective from **April 01, 2022** by and between:

M/S. Standard Aluminium Industries (Pvt.) Limited having its head office at Industrial Plot No.447 Sundar Industrial Estate Lahore through its CEO **Mr. Zulfiqar Hameed** S/O **Hameed Ahmad** holding CNIC No.**35202-1699894-5** R/O House No.177 A-1 Valencia Town Lahore (hereinafter referred to as **"Landlord"** of the One Part)

AND

M/S. Standard Aluminium Industries A Partnership Firm vide Form C No.**0323** Dated **26-07-2021** having its NTN No.**4963478-1** through its Partner **Mr. Zulqarnain Hameed** S/O **Hameed Ahmad** holding CNIC No.**35202-0103184-9** R/O House No.187-A-1 Valencia Town Lahore (hereinafter referred to as **"Tenant"** of the Other Part)

Reference No.**BOM/SIE/Secy./571** No Objection Certificate (NOC) of BOM/PIEDMC dated **March 25, 2022** issued in favor of the Owner/Allottee and Undertaking provided by the Owner/Allottee to the office of BOM/PIEDMC dated **March 30, 2022.**

Copy of the said NOC and Undertaking are enclosed with this Tenancy Agreement for ready reference.

viii. That the intimation to the concerned Police Station regarding the Tenancy Agreement of the Demised Premises shall be the exclusive liability of Landlord.

ix. That the Landlord shall not be under any liability whatsoever in any way to the Tenant or any other person if because of strike, lockouts, force majeure, acts of God, inability to obtain necessary power, fuel or water or any other reasons beyond the Landlord control it is unable to provide at any time of the services mentioned in above said paragraphs.

x. That either party agrees to indemnify, defend and hold harmless the other party and its parent, subsidiaries, affiliates, successors and assigns and their respective directors, officers, employees and agents from and against any and all liabilities, claims, suits, demands, settlements, losses, judgments, costs, damages and expenses, arising out of or resulting from any unintentional/involuntary act, error or omission by the Indemnifier or its officers, directors, employees or sub administrators related to or arising out of the business covered by this Tenancy Agreement.

THE "TENANT" HEREBY AGREES AND UNDERTAKE AS FOLLOWS

i. That the Tenant shall pay all the utility bills of the Demised Premises like electricity, sui gas, water, aquifer, operation & maintenance etc. or any other dues which will be levied/imposed by the office of BOM & PIEDMC from time to time.

ii. That all the utility bills shall be paid within due date of the bill by Tenant. Copy of the paid bills shall be handed over to the Landlord with three (03) days of due date for record purposes.

iii. That the Tenant shall not demand any sub meter or change in name of any utility bills of the Demised Premises from the office of BOM, PIEDMC. All the utility bills and meters shall remain in the name of Landlord.

iv. That the Tenant shall not claim any tax rebate, adjustment, claim, waiver etc. whatsoever in any way from any concerned departments regarding the Demised Premises except otherwise as provided by Law.

v. That the Tenant shall pay the said rent as well as the maintenance charges mentioned in above said paragraphs within the time and in the manner aforesaid.

vi. That the Tenant shall keep the interior of Demised Premises and the doors and window thereof and the fittings and fixtures therein in good and tenantable condition (reasonable wear and tear and damage by accidental fire or other damage not caused by any act, fault or negligence of the Tenant and its employees and visitors excepted)

vii. That the Tenant permit the Landlord and its agents and workmen during the tenancy at all reasonable hours in the day time to enter upon and view the condition of the Demised Premises and to do any necessary repairs to the exteriors or roof or other parts of the said factory/building.

viii. That the Tenant shall not assign, underlet, sublet or otherwise part with the physical or constructive possession of the Demised Premises or any part thereof or permit the use of the same under any license or otherwise except to any subsidiary, parent or associate company of the Tenant for whom prior written consent of the Landlord has been obtained.

ix. That the Tenant shall not without the consent in writing and approval of the Landlord through BOM make or permit or suffer any alternations or additions to the Demised Premises in terms of approval given by the Landlord.

x. That the Tenant will use the Demised Premises for Industrial/Commercial purposes only. The Tenant shall use the Demised Premises for lawful business or professional office only and in particular not to use or permit or cause to be used as residence or sleeping place or for illegal or immoral purposes.

xi. That the Tenant shall give to the Landlord at least **One Month** notice of its intention to vacate the Demised Premises.

xii. That the Tenant undertakes not to do or permit or suffer to be done in the Demised Premises anything whereby the insurance against fire, or other contingencies in respect of the said building may be rendered void or voidable or the premises increased or which may be or grow to be nuisance, annoyance or disturbance to the Landlord or the other Tenants or occupiers of other parts of the said building or their visitors.

E-STAMP
CONTINUATION SHEET

LANDLORD means Owner or Allottee of the Plot situated at Industrial Estates of Punjab Industrial Estates Development & Management Company (PIEDMC) who has obtained Completion Certificate from the office of Board of Management (BOM) having a Permission Letter from the office of BOM to rent out the factory/building of Industrial Plot No.**447** situated at Sundar Industrial Estate.

DEMISED PREMISES means a factory/building at Industrial Plot(s) No.**447** situated at Industrial Estate of PIEDMC.

WHEREAS Landlord is the Owner or Allottee of Demised Premises as defined herein and has the right/authority/license to give the same on rent through NOC of BOM/PIEDMC.

AND WHEREAS Landlord agrees to rent out and Tenant agrees to take on rent Demised Premises for the purpose set out herein below for the period at the rent and for the terms and conditions herein contained.

NOW THEREFORE, THIS TENANCY AGREEMENT WITNESSTH AS FOLLOWS

1. That the Landlord has agreed to rent out and Tenant has agreed to take on rent with effect from **April 01, 2022** the entire factory/building situated at **Sundar** Industrial Estate of PIEDMC comprising of **3,381.64 Sq. M.** (hereinafter referred to as **"Demised Premises"** together with the fixtures and fittings thereon specified in **Annexure-A.**
2. That the tenancy is for the period of **Three** year(s) commencing from **April 01, 2022** and expires on **March 31, 2025** renewable with mutual consent of both the parties.
3. That the rate of rent of Demised Premises is **Rs.25,000/-** per month.
4. That the rent shall be paid on **15th** of every month basis in advance i.e. on or before the day of the month when it becomes due.
5. That the Tenant shall be allowed to use Demised Premises for 365 days of the year for 24 hours and there shall be no restriction on the use of Demised Premises.
6. That the Tenant shall deduct the withholding tax and or any taxes payable on rental income at the time of disbursement of rent as per the prevailing applicable Law and shall hand over the challan/receipt of tax paid by the Tenant to the Landlord. Month aggregating **Rs.25,000/-** will be paid by the Tenant as maintenance charges to the Landlord alongwith the rent for the same period as given above.
7. That the Tenant is entitled to get his Name, NTN and STRN in all utility bills.
8. That the Landlord shall be entitled to Ten Percent Increase of rent after the expiry of **One year.**

THE "LANDLORD" HEREBY AGREES AND UNDERTAKE AS FOLLOWS

i. The Landlord shall have the premises whitewashed and affect the repair if any and shall be entitled to inspect the premises at all reasonable times.

ii. The Tenant shall keep all the fixtures and electric fittings, water connection in good running condition.

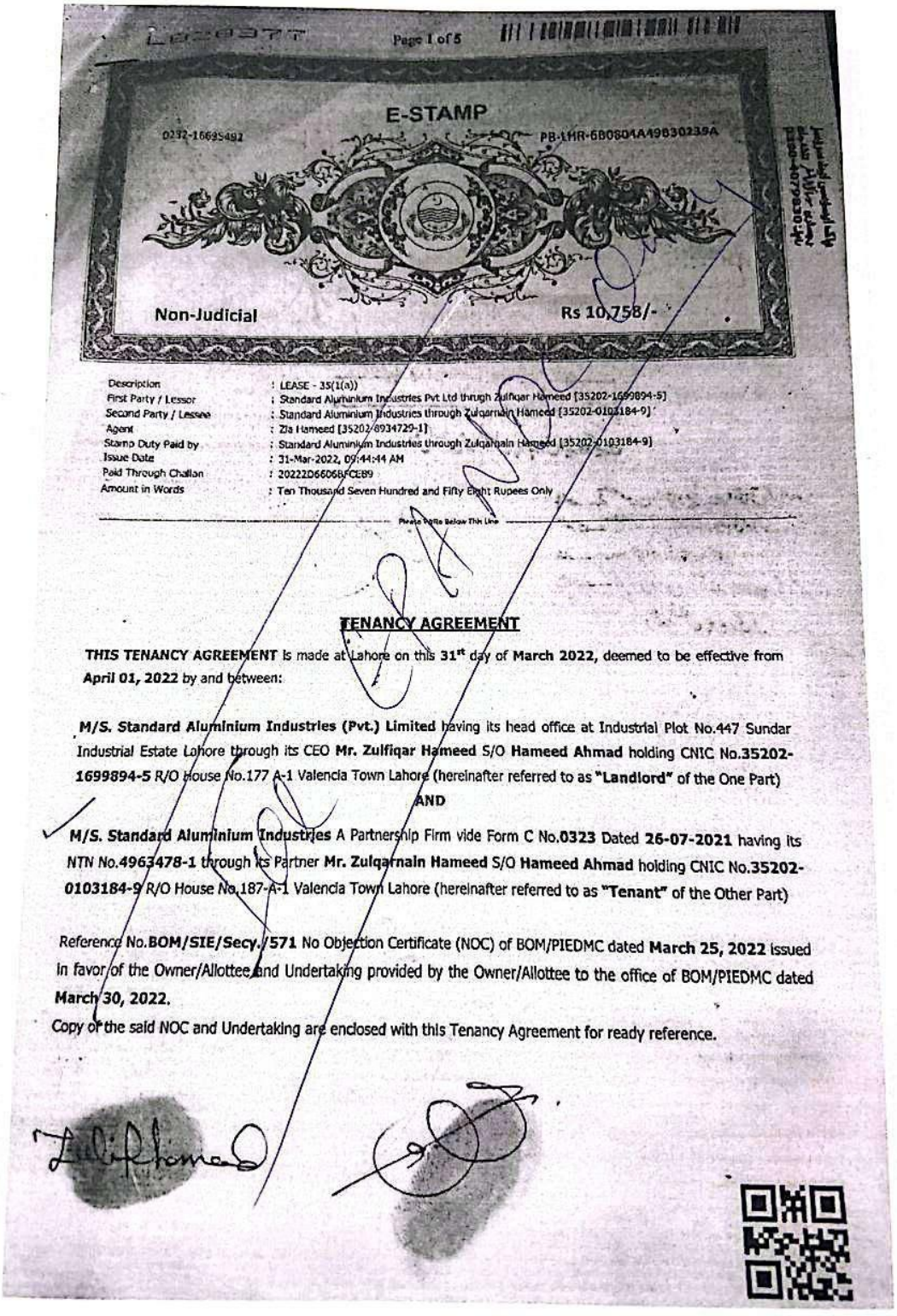
iii. That the Landlord shall pay all present and future rates, taxes, assessments and outgoing payments in respect of the Demised Premises except all utility bills. The Landlord is further liable to pay the property tax.

iv. That the Landlord hereby permits the Tenant to make such nonstructural, non-permanent internal alterations, declarations and construction in the Demised Premises as may be necessary for affecting carrying on and running of the office of the Tenant after obtaining in writing approval from the Landlord.

v. That the Landlord gives the Tenant at least **One Month** prior Notice of its intention to get the Demised Premises vacated.

vi. That the Landlord warrants that there are no restriction/impediments in the Landlord rights to rent out the Demised Premises to the Tenant for the purposes stipulated herein and all necessary permissions and approvals have been obtained before signing of this Tenancy Agreement.

vii. That the Tenant paying the said rent and performing and observing all covenants shall enjoy possession of the Demised Premises and the common parts and facilities in terms of this Tenancy Agreement during the tenancy without any interruption by the Landlord.



Page 1 of 5

E-STAMP

0232-16695492 PB-LHR-6B0604A49B30239A

Non-Judicial Rs 10,758/-

Description	: LEASE - 35(1(a))
First Party / Lessor	: Standard Aluminium Industries Pvt Ltd through Zulfiqar Hameed [35202-1699894-5]
Second Party / Lessee	: Standard Aluminium Industries through Zulqarnain Hameed [35202-0103184-9]
Agent	: Zia Hameed [35202-8934729-1]
Stamp Duty Paid by	: Standard Aluminium Industries through Zulqarnain Hameed [35202-0103184-9]
Issue Date	: 31-Mar-2022, 09:44:44 AM
Paid Through Challan	: 20222D6606BFCE89
Amount in Words	: Ten Thousand Seven Hundred and Fifty Eight Rupees Only

Please Refile Below This Line

TENANCY AGREEMENT

THIS TENANCY AGREEMENT is made at Lahore on this **31st** day of **March 2022,** deemed to be effective from **April 01, 2022** by and between:

M/S. Standard Aluminium Industries (Pvt.) Limited having its head office at Industrial Plot No.447 Sundar Industrial Estate Lahore through its CEO **Mr. Zulfiqar Hameed** S/O **Hameed Ahmad** holding CNIC No.**35202-1699894-5** R/O House No.177 A-1 Valencia Town Lahore (hereinafter referred to as **"Landlord"** of the One Part)

AND

M/S. Standard Aluminium Industries A Partnership Firm vide Form C No.**0323** Dated **26-07-2021** having its NTN No.**4963478-1** through its Partner **Mr. Zulqarnain Hameed** S/O **Hameed Ahmad** holding CNIC No.**35202-0103184-9** R/O House No.187-A-1 Valencia Town Lahore (hereinafter referred to as **"Tenant"** of the Other Part)

Reference No.**BOM/SIE/Secy./571** No Objection Certificate (NOC) of BOM/PIEDMC dated **March 25, 2022** issued in favor of the Owner/Allottee and Undertaking provided by the Owner/Allottee to the office of BOM/PIEDMC dated **March 30, 2022.**

Copy of the said NOC and Undertaking are enclosed with this Tenancy Agreement for ready reference.

ANNEXURE – E: KML FILE

ANNEXURE – F: EPA PUNJAB EIA CHECKLIST FOR PREPARATION AND REVIEW OF ENVIRONMENTAL REPORTS

M/S Standard Aluminium Industries Private Limited

Required Content	EIA Report		
	PAGE NO.	REMARKS (If Any)	LACKING
Executive summary: 1. Title and location of project with GPS Co-ordinates	Pg-B		
2. Name of the proponent along with contact number and email	Pg-B		
3. Name and details of the organization preparing the report	Pg-B		
4. A brief outline of the proposal (type, production capacity, process, technology and land requirement)	Pg-B		
5. The major impacts	Pg-C		
6. Recommendations for mitigation measures	Pg-D		
7. Proposed monitoring	Pg-E		
Screening: Whether the Project requires IEE or EIA as per Regulations	Pg-4		
Scoping			
1. Spatial and Temporal Boundaries of Environmental Assessment	Pg-5		
2. Important issues and concerns raised during consultation	Pg-5		
3. Significant impacts and factors to be determined	Pg-5,6		
Consideration of Alternatives			
1. Site alternatives, their selection and rejection criteria	Pg-7		
2. Design/Technology alternatives, their selection and rejection criteria	Pg-8,9		
3. Environmental Alternatives, their selection and rejection criteria	Pg-9		
4. Economic Alternatives, their selection and rejection criteria	Pg-10		
Description of the project:			
1. Type and Category of project	Pg-11		

2. Objectives of Project	Pg-11		
3. Location and Site Layout of the project	Pg-11		
4. Site alternatives, their selection and rejection criteria	Pg-11		
5. Design/Technology alternatives, their selection and rejection criteria	Pg-11		
6. Process, Raw material and product alternatives	Pg-12		

7. Pictures of project site and surroundings (East, west, north, south.)	Pg- 12		
8. Google earth map with coordinates	Pg-14		
9. Land use on the site	Pg-14		
10. Road access	Pg-14		
11. Vegetation / tree plantation features of the site	Pg-14		
12. Cost and Magnitude of operation	Pg-14		
13. Schedule of implementation	Pg-14		
14. Description of the project (Process flow chart/steps, Technology, Raw material and products, by-products):	Pg-15		
a) Detail of process/operations involved	Pg-15		
b) Source and quantity of raw materials	Pg-15		
c) Source and quantity of raw materials	Pg-15		
d) Collection, storage and transport of raw material	Pg-15		
e) Operational equipment and machinery to be used	Pg-16		
f) Production capacity of the unit for each product	Pg-17		
15. Water usage (also mention quantity) and source	Pg-18		
16. Wastewater generation (Quantity and quality) and disposal method	Pg-18		
17. Air emissions and control measures	Pg-19		
18. Solid waste generation and disposal method	Pg-19		
19. Operational hours of the facility	Pg-20		
20. Energy requirements and sources (e.g., `electricity, LPG)	Pg-20		

21. Fuel storage and handling (if applicable)	Pg-20		
22. Emergency response and safety features	Pg-21		
23. Restoration and rehabilitation plans	Pg-21		
24. Any green or sustainable features planned a. Rainwater Harvesting system b. Renewable Energy Production (Solar System) c. Tree plantation Plan	Pg-22		
Description of Environment: Clear-cut picture of existing environmental resources:			

1. Baseline Physical Environment (Land use, physical structures, human settlements etc.)	Pg-23-29		
2. Baseline Ecological Environment (Flora and Fauna etc.)	Pg-29-32		
3. Baseline Socioeconomic Environment (Gender, populations, income levels etc.)	Pg-32-37		
4. Lab reports of environmental analyses (Ambient air, water quality and quality of surface water body receiving the discharge of project) along with soil tests, geo-investigation in case of building projects and industries)	Pg-37		
5. Suitability of the site (not prohibited, environmentally sensitive, incompatible to surroundings and unsuitable)	Pg-37		
Impact Assessment 1. Methodologies for impact identifications (One/more)	Pg-38		
✓ Checklists	Pg-38		
✓ Matrices	Pg-38		
✓ Networks	Pg-38		
✓ Overlays	Pg-38		
✓ GIS and Computer expert systems	Pg-38		

2. Characteristics of impacts (nature, magnitude, extent and location, timing, duration, reversibility, risk)	Pg-38		
Screening of potential Environmental Impacts and mitigation measures on/during:			
1. Project location	Pg-39		
2. Design	Pg-40-44		
3. Construction phase	Pg-40-44		
4. Operational phase	Pg-40-44		
5. Potential Environmental Enhancement Measures	Pg-40-44		
Environmental management and monitoring program			
1. Description of proposed mitigation actions along with:	Pg-45		
2. Schedule for implementation and Environmental budget	Pg-46		
3. Environmental Management Team along with their Roles and responsibilities (by name or position)	Pg-47		

4. Proposed monitoring program to assess performance or output of EMP	Pg-48		
5. Proposed EMP reporting and reviewing procedures	Pg-48		
6. Any training needs required to ensure implementation of EMP and Monitoring plans	Pg-53		
Stakeholders Consultation: Communicate the possible impacts and concerns to the following to assist further analysis and decision making:			
1. Proponent's Environment Management Team	Pg-71		
2. The responsible authority	Pg-71		
3. Other departments and agencies	Pg-74		
4. Environmental practitioners and experts	Pg-76		
5. Affected and wider community	Pg-76		

Appendices				
i.	List of abbreviations	Pg-81-84		
ii.	Lists of individuals and organizations consulted along with their written feedback	Pg-85		
iii.	Sources of data and a full list of all reference material used	Pg-87		
iv.	Terms of references of environmental reports and those given to individual specialists	Pg-87		
v.	List of names, qualifications and roles of team members carrying out the EIA study	Pg-88		
vi.	Approvals from other concerned departments	Pg-89		
vii.	Approved Building layout map/ planning Permission	Pg-90		
viii.	KML file of project site	Pg-94		