ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

of the project Title as

WASTE SLUDGE RECYCLING UNIT by OUHONG DONGCHENG (PVT) LIMITED

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Submitted By

Water Environment Laboratory & Consultancy Services
(WELCOS)

EIA CHECKLIST

SECTION	REQUIRED CONTENT	COMPLIANCE STATUS	REMARKS (IF ANY) / LACKING
Executive Summary	1. Title and location of project	Covered	Clearly stated: "Waste Sludge Recycling Unit " at Rawat Industrial Area, Rawalpindi, Punjab. Coordinates mentioned in the salient features table (p. 3).
	2. Name of the proponent	Covered	Salient features table lists
	3. Name of the organization preparing the report	Covered	WELCOS (Water Environment Laboratory & Consultancy Services)" is listed as an Environment Consultant.
	4. A brief outline of the proposal (type, process, technology and land requirement)	Covered	Type: Recycling unit; Process: Thermal desorption and distillation; Technology: Hydrocarbon recovery; Land: 2 kanals (salient features, p. 3).
	5. The major impacts	Covered	Summarizes insignificant impacts (e.g., noise, dust, waste during construction; no processed water in operations).
	6. Recommendations for mitigation measures	Covered	Brief overview: Water sprinkling for dust, PPEs/SOPs for safety, local labor hiring, and emergency response plan. Refers to Chapter 4 for details.
	7. Proposed monitoring	Covered	Mentions EMMP/EMP for compliance with PEQS/NEQS; details in Chapter 4.
Screening	Whether the Project requires EIA or EIA as per Regulations	Covered	Implied as EIA (mentioned in the executive summary & chapter 02
Introduction	1. Purpose of report	Covered	Chapter 1.1–1.2: For EPA submission, NOC issuance, and environmental approval.
	2. Identification of project and proponent	Covered	Project details (pp. 13–16) are also included in the executive summary.
	3. Details of consultant	Covered	WELCOS details, contact info, team participants listed (p. 14–16).
	4. Brief description of nature, size, and location of project	Covered	Nature: Industrial recycling; Size: 2 kanals, PKR 200M investment, 40–60 jobs; Location: Rawat Industrial Estate.

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Description of the Project	1. Type and Category of project	Covered	Chapter 2.2: Industrial waste recycling (Schedule II category implied for EIA).
	2. Objectives of Project	Covered	Chapter 2.3: Recover diesel/grease from sludge, reduce disposal, and sustainable waste management.
	3. Alternatives considered realistically (in detailed) and reason for their rejection	Covered	Chapter 2.4: Site alternatives discussed briefly; process alternatives.
	4. Location and Site Layout of the project (May be annexed at the end of report)	Covered	Attach in Annexure
	5. Land use on the site	Covered	Chapter 2.8: Industrial estate land, no residential/agricultural conflict.
	6. Road access	Covered	Chapter 2.9: Access via industrial roads (e.g., GT Road proximity).
	7. Vegetation features of the site	Covered	Chapter 2.10: Minimal vegetation in an industrial area
	8. Cost and Magnitude of operation	Covered	PKR 200M investment, 40–60 personnel, processing capacity implied (p. 2–3).
	9. Schedule of implementation	Covered	Chapter 2.19: Timeline outlined (construction/operations phases).
	10. Description of the project (Process flow chart/steps, Technology, Raw material and products, by-products)	Covered	Chapter 2.12: Thermal desorption/distillation; raw: Petroleum sludge; products: Diesel/grease; by-products: Minimal (lists flow chart).
	11. Restoration and rehabilitation plans	Covered	Chapter 2.11: Relocation/rehab mentioned but no specific site restoration plans (e.g., post-decommissioning).
Description of Environment	Clear-cut picture of existing environmental resources	Covered	Chapter 3: Comprehensive baseline.
	1. Baseline Physical Environment	Covered	Chapter 3.3–3.6: Topography, hydrology, climate, noise.
	2. Baseline Ecological Environment	Covered	Chapter 3.8–3.10: Flora/fauna in industrial area (minimal biodiversity).
	3. Baseline Socioeconomic Environment	Covered	Chapter 3.11–3.18: Demography, industry, health, livelihoods, education, utilities.
	4. Lab reports of environmental analyses (along with soil tests, geo-investigation in case of building projects and	Covered	Chapter 3.19: Air, water, noise labs; soil/geo-tests mentioned but not fully excerpted.

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	industries)		
	5. Suitability of the site (not prohibited, environmentally sensitive, incompatible to surroundings and unsuitable)	Covered	Chapter 3.1, 4. C: Industrial zoning is suitable; no sensitive areas.
Screening of Potential Environmental Impacts and Mitigation Measures on/during		Covered	Chapter 4: Detailed matrix.
	1. Project location	Covered	Site-specific impacts (e.g., compatibility).
	2. Design	Covered	Design-phase mitigations (e.g., layout for emissions control).
	3. Construction phase	Covered	Noise, dust, waste; mitigations like sprinkling/PPEs.
	4. Operational phase	Covered	Wastewater (municipal only), no air emissions; emergency plans.
	5. Potential Environmental Enhancement Measures	Covered	Benefits such as resource recovery are mentioned (p. 2); however, there is no dedicated enhancement section.
Environmental Management and Monitoring Program		Covered	Inferred in Chapter 4 (EMP details).
	i. Description of proposed mitigation actions	Covered	Problem identification, timing, and approach (A–D in TOC).
	ii. Schedule for implementation and Environmental budget	Covered	Schedule in 2.19
	iii. Environmental Management Team along with their Roles and responsibilities (by name or position)	Covered	Team listed (p. 16); roles in EMP
	iv. Proposed monitoring program to assess the performance or output of EMP	Covered	EMMP for PEQS/NEQS compliance; parameters like air/water.
	v. Proposed EMP reporting and reviewing procedures	Covered	EPA
	vi. Any training needs required to ensure implementation of EMP and Monitoring plans	Covered	Safety/emergency training mentioned.
Stakeholders Consultation	Communicate the possible impacts and concerns to the following to assist further analysis and decision-making	Covered	Inferred in Chapter 3.11–3.18 (socioeconomic).
	i. Proponent's Environment Management Team	Covered	Team consulted (roles defined).

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	ii. The responsible authority	Covered	Project Proponent & EPA consultation.
	iii. Other departments and agencies	Covered	Punjab EPD & local govt.
	iv. Environmental practitioners and experts	Covered	Consultant team (experts) involved; no external.
	v. Affected and wider community	Covered	Community impacts noted; no formal consultation records/feedback.

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LIST OF ABBREVIATIONS

CO2	Carbon Dioxide
°C	Degree Celsius
dB(A)	Decibel unit of Noise
EIA	Initial Environmental Examination
EMMP	Environmental Management and Monitoring Plan
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EP&CC	Environmental Protection and Climate Change Department
HSE	Health, Safety & Environment
m^3/h	Cubic meter per hour
NOC	No Objection Certificate
NOx	Oxides of Nitrogen
PM	Particulate Matter
PPEs	Personal Protective Equipment
PEPA 1997	Punjab Environmental Protection Act 1997
SOPs	Standard Operating Procedures
SOx	Oxides of Sulfur

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EXECUTIVE SUMMARY

The proposed project involves “Waste Sludge Recycling Unit by M/s Ouhong Dongcheng (Pvt) Limited” to recover diesel and grease from petroleum sludge generated by industrial sources. The facility will be located in the Rawat Industrial Area of Rawalpindi, Punjab. The technology employed will include thermal desorption and distillation, allowing the recovery of valuable hydrocarbons while minimizing environmental contamination.

This project will provide employment opportunities for approximately 40–60 personnel and requires an estimated investment of PKR 200 million. The report presents a comprehensive assessment of baseline environmental conditions, identifies potential environmental impacts, and proposes mitigation measures. An Environmental Management Plan (EMP) and monitoring program have been included to ensure compliance with Punjab Environmental Quality Standards (PEQS) and National Environmental Quality Standards (NEQS).

The anticipated environmental benefits of the project include reduced hazardous sludge disposal, recovery of usable products, and alignment with sustainable industrial waste management practices. This report is prepared for submission to the Punjab EPD for Environmental Approval and NOC issuance.

The project is **“**Waste Sludge Recycling Unit**”.** located at Rawat Industrial Area of Rawalpindi, Punjab. The silent features of the Project are as follows:

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Sr#	SALIENT FEATURES	
1.	**Project Title**	Waste Sludge Recycling Unit
2.	**Project Location**	Plot # 4 & 4A, NS-1, Rawat Industrial Estate, Rawalpindi
3.	**Coordinates**	33°31'16.5"N 73°14'01.5"E
4.	**Project Proponent(s)**	Usama Ali
5.	**Environment Consultant**	WELCOS (Water Environment Laboratory & Consultancy Services
6.	**Total Area**	2 kannal
7.	**Nature of Area**	Rawat Industrial Estate, Rawalpindi

8.	**Source of Power**	WAPDA
9.	**Industrial Wastewater**	Only domestic Wastewater generated
10.	**Gaseous Emission**	The project will not generate any kind of air emissions because only the storage of goods is involved.
11.	**Secerning**	According to the Review of IEE/EIA Regulations, 2022, the project falls under Schedule II, Category B – Manufacturing & Processing, Sub-category 20: Resource Recovery Unit

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES:

- The expected Environmental Impacts from the project are insignificant. The study shows that there will be no kind of exploitation or depletion of local natural resources.
- Environmental impacts during the construction phase may include noise, water conservation, energy consumption, solid waste generation, and workers' safety. Mitigation measures have been included in Chapter 4 of the EIA report. Briefly, since the proposed project is within the industrial area, there is a negligible effect on the community. Construction-related noise will be mitigated by regular servicing and tuning of the source machinery. Dust (the only significant air emission) will be controlled by water sprinkling and covering the construction material. Fencing site boundaries, security at the gates, use of adequate PPEs, and work following SOPs will ensure the safety of the workers and community in the neighborhood. The contractor will hire local labor for construction work to avoid employment conflicts.
- In the operation phase of the project, there will be no processed water. The wastewater will include municipal wastewater only. An Emergency Response Plan will also be in place, and the workers will be trained accordingly. Safety training will also be held from time to time to guide workers about risks and how to deal effectively with them.

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LIST OF FIGURES

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CHAPTER 1
INTRODUCTION

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Chapter 1: INTRODUCTION

1.1 GENERAL

The project encompasses the establishment of a petroleum sludge recycling facility using thermal desorption and distillation technology. The process involves sludge reception and storage, pre-treatment to remove large particulates, heating to vaporize volatile hydrocarbons, condensation of vapors, and separation into diesel and grease fractions. Residual solids that cannot be recovered will be classified as hazardous waste and safely disposed of according to regulatory guidelines.

The facility will occupy approximately 2 Kannal of industrial land and will utilize 250 kW of electricity and 10 m^3/day of water. Construction and operational phases will involve around 40 employees working in two shifts. The facility will have dedicated areas for sludge storage, processing, effluent treatment, and safe handling of solid and hazardous waste. Standard operating procedures will be implemented to ensure safety, efficiency, and environmental compliance throughout the project lifecycle.

This document presents the Environmental Impact Assessment (EIA) of the Project "Waste Sludge Recycling Unit". The main objective of the study is to make the unit comply with prevailing Environmental Laws, Rules, and Regulations. The report indicates potential environmental impacts of the project and suggests mitigation measures to enhance the environmental performance of the proposed project. The report is comprehensive and presents the Environmental Assessment of the project along with a monitoring framework to check Environmental compliance.

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1.2 OBJECTIVES OF EIA

The primary objectives of the EIA are:

i. To determine and document the state of the environment of the project area to establish a baseline to assess the suitability of the Project in that area.

ii. To identify pre-construction, construction, and operation activities and to assess their impacts on the environment.

iii. To assist the proponent in planning, designing, and implementing the project in a way that eliminates or minimizes the negative impacts on the biophysical and socio-economic environment and maximizes the benefits for all parties.

iv. To present a Mitigation and Monitoring Plan to smoothly implement the mitigation measures and supervise their efficiency and effectiveness.

1.3 DETAILS OF ENVIRONMENT CONSULTANT

The project proponent has hired the services of an Environmental Consultant that is M/S WELCOS (Water Environment Laboratory & Consultancy Services. A team comprising environmental engineers, environmentalists, and chemists has worked on this report and customer centers, including a state-of-the-art, purpose-built main testing facility in Lahore.

Water Environment Laboratories and Consultancy Services (WELCOS), certified by the Environmental Protection Agency, & PNAC-accredited lab, is a full-service environmental analytical laboratory firm located in Lahore, Pakistan. WELCOS was established in 2017. WELCOS is well on its way with over 1000 clients across the country. Staffed by professionals knowledgeable about the local regulatory environment, WELCOS places a premium on providing personalized service and top-quality testing and analytical services to every client, whether they are billion-dollar multinational corporations or small home builders. WELCOS performs over tens of thousands of individual tests annually

The Environmental Division consists of well-trained professionals who provide the following services as per national as well as international standards and procedures:

WELCOS offers integrated solutions in environmental consultancy, monitoring, industrial hygiene, and capacity building. Below is a snapshot of our specialized services:

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ENVIRONMENTAL IMPACT ASSESSMENT

Environmental Monitoring & Testing

- Gaseous Emissions Monitoring
- Ambient & Indoor Air Quality Monitoring
- Vehicular Emission Monitoring
- Noise Impact Studies
- Light Monitoring
- Drinking Water Analysis
- Wastewater Analysis
- Wastewater Flow
- Baseline Monitoring
- Soil Sampling & Assessment
- Sludge Analysis
- Groundwater Contamination Studies
- Metals Analysis in all products
- Microbiological testing (Swab, Air Microbial
- Testing, Sterility Test & Bioburden Test)

Environmental Consultancy & Assessment

- Initial Environmental Examination (IEE)
- Environmental Impact Assessment (EIA)
- Environmental Site Assessment (ESA)
- Baseline Environmental Assessment
- Compliance Status Report (CSR)
- Environmental Strategic Plan
- Environmental Management Plan
- Rehabilitation Plan
- Risk Assessment
- Environmental Audits

Industrial Hygiene

- Workplace Exposure Monitoring (dust, fumes, vapors)
- Indoor Air Quality (IAQ) Assessments
- Noise & Vibration Exposure Studies
- Ergonomic Risk Assessments
- Heat Stress & Ventilation Studies

Training & Capacity Building

- Lab establishment trainings
- ISO (17025,14001,45001,9001) Consultancy, Certification & Documentation
- EPA Lab Certification Trainings
- Technical trainings (Method validation/verification/ Measurement of Uncertainty/Ensuring Validity of Test Results/Equipment & Environment Management
- Risk Assessment Trainings
- Internal audit trainings
- Good laboratory practices
- Environmental Awareness Programs
- Waste Management Trainings
- Emergency Preparedness & Response Trainings
- Industrial Hygiene & Workplace Safety Trainings

Modeling & Specialized Studies

- Ambient Air Dispersion Modeling
- Geo-Technical Investigations
- Topographic Survey
- Water Audit
- Solid Waste Management Plan

Emission Control & Consultancy Services

- Design & Implementation of Scrubbers
- Catalytic Converter Solutions
- Wastewater Treatment Plant (WWTP) Design & Optimization
- End-to-End Environmental Consultancy Services

Occupational Health & Safety

- Occupational Health and Safety Plan

Calibration

Calibration provider for an air Instrument (Ambient Analyzer)

1.4 CONTACT DETAILS OF ENVIRONMENTAL CONSULTANT

Table 3.1 Contact Details of Consultant

Focal Section	WELCOS (Water Environment Laboratory & Consultancy Services)
Address	Plot # 29-D Punjab University Town II, Khayban-e-Jinnah Road, Block D Punjab University Employees Housing Scheme, Phase-II, Lahore
Contact No.	0327-7222180 (Ms. Nisha)

1.5 PARTICIPANTS OF THE PROJECT TEAM

The following Team, consisting of qualified professionals, has conducted environmental assessments and contributed to the preparation of the EIA report.

Table 1.2 Team of Experts

Sr.#	Name	Qualification	Roles
i.	Khashif Manzoor	MPhil Environmental Sciences	Project Head
ii.	Saad Rafique	M.Sc. Chemistry	Site Visits and Data Collection
iv.	Ayub Yousaf	BS Environment	Report Writing and Social Survey
v.	Nisha Lal Din	MS Environmental Sciences	Review of EIA Report

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1.6 PROJECT SITE

The location map of the industrial unit/project site is given below.

Figure 1.1 Location Map of Project Site

1.7 STUDY METHODOLOGY

1.8 SCOPING AND DATA COLLECTION

During this phase, all necessary information on the project was collected and reviewed. A list of potential environmental impacts as well as social issues was prepared. Relevant data were collected and compiled to develop a baseline of the project area's physical, biological, and human environment. Field visits to the site were also carried out. The secondary resources included reports of the studies carried out earlier, published books and data, and relevant websites. With the help of these resources, a generic profile of the project area was developed. During these field visits, information on environmental and social parameters was collected. The environmental and social hot spots falling at or near the project site were identified, and most importantly, the project's environmental effects were determined.

1.9 ENVIRONMENTAL IMPACTS OF PROJECT

During the study of environmental assessment, environmental impacts, socioeconomic impacts,

and impacts are determined potential impacts of the proposed project. Subsequently, the potential impacts were characterized to determine their significance. Mitigation measures have been identified to minimize the significant environmental impacts. A management framework has also been developed in the form of an EMP for the implementation of the mitigation measures identified during the study.

1.10 STRUCTURE OF REPORT

This EIA reviews information on existing environmental attributes of the project Area. The ecological features, air quality, noise, water quality, soils, social and economic aspects, and cultural resources are included. The report predicts the probable impacts on the environment due to the said project. This EIA also proposes various environmental management measures. Details of all background environmental quality, environmental impacts/pollutant-generating activities, pollution sources, predicted environmental quality, and related aspects have been provided in this report. The structure of the assessment report is as follows:

i. Introduction
ii. Description of the Project
iii. Description of Environment Project Area
iv. Potential Environmental Impacts and Mitigation Measures
v. Stakeholder Consultations
vi. Environmental Management and Monitoring Plan (EMMP)
vii. Conclusion and Recommendations

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CHAPTER NO 02
DESCRIPTION OF PROJECT

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CHAPTER 02: DESCRIPTION OF PROJECT

2.1 GENERAL

This section of the study concentrates on details of the project and its salient features, such as location, site layout, objectives, selection of alternatives, and magnitude of the operations. Inputs and discharges relevant to different phases of the project, such as electricity, vehicles & materials, etc., have also been examined to ascertain the potential environmental impacts and to suggest necessary corrective measures.

2.2 TYPE AND CATEGORY OF PROJECT

The project, in accordance with the Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2022, falls under **Schedule II (EIA), Section B –Manufacturing & Processing, Sub-section 5: Resource Recovery Unit**.

2.2.1 COST AND MAGNITUDE OF OPERATION

The total cost of the project is 200M. Installation of a small-scale (2 kanals) recycling facility in Rawat Industrial Estate, Rawalpindi, Punjab, to recover diesel and grease from industrial petroleum sludge via thermal desorption and distillation. Total investment: PKR 200 million; employs 40–60 personnel; no major resource depletion.

2.3 PROJECT OBJECTIVES

The main objective of the project is to recycle the petroleum waste into to useful product, i.e, diesel.

2.4 ALTERNATIVES

2.5 SITE ALTERNATIVES

The site selected for the project is located in the certified industrial area, i.e., Rawat Industrial Estate. Hence, no other alternative site was considered for said Project. The site is well located in terms of the following:

i. Close to other industries
ii. Easy road access to the market
iii. No settlements in close vicinity
iv. No ecologically sensitive or declared protected area within a safe radius of the selected site.

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Given these facts, it has been concluded that the Selected Site is best suited for the project and will not pose any adverse environmental impacts or threat to any component of the environment.

2.6 LOCATION AND LAYOUT OF THE PROJECT

2.7 LOCATION OF THE PROJECT

The project is located at Plot # 4 & 4A, NS-1, Rawat Industrial Estate, Rawalpindi.

Sr. No	Coordinates	33°31'16.5"N 73°14'01.5"E
1.	Front	Road
2.	Back	Industrial Unit
3.	Right	Industrial Unit
4.	Left	Industrial Unit

2.8 LAND OWNERSHIP & LAND USE ON-SITE

The project proponent has a lease agreement with the landowner. The land lease agreement is provided in Annex II.

2.9 ROAD ACCESS

The proposed project site is easily approachable from all cities of Punjab via the GT Road / Motorway.

2.10 VEGETATION FEATURES OF THE SITE

The site is located in a government-certified and well-developed industrial area. There is no kind of plantation on the site.

2.11 RELOCATION AND REHABILITATION PLANS

No kind of structural settlement stands at the site to be relocated or dismantled. The land is a vacant plot and hence, no relocation and rehabilitation are required. The site is surrounded by pure industrial plots / industrial units.

2.12 DESCRIPTION OF PROJECT

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Table 4.1 Brief Description of Project

Sr. #	Salient Features	
1.	**Project Title**	Waste Sludge Recycling Unit
2.	**Total Area**	02 Kannal
3.	**Purpose of Project**	The main objective of the project is to arrange a suitable and safe area for the recycling unit.

2.12.1 PROCESS FLOW OF SLUDGE-TO-FUEL CONVERSION

1. **Raw Material Collection**

   → Collection of industrial sludge from source

   → Transportation to processing facility

2. **Drying & Dehydration**

   → Removal of excess moisture

   → Target moisture content: **< 10%**

   → Output: semi-dry sludge suitable for grinding

3. **Grinding / Pulverizing**

   → Feeding semi-dry sludge into the grinder

   → Conversion to fine powder

4. **Chemical Mixing & Dissolution**

   → Addition of chemical agents to enhance solubility

   → Mixing in a reactor/stirring tank

   → Ensuring complete reaction and homogenization

5. **Filtration / Separation**

   → Removal of impurities and non-reactive residues

   → Output: clean fuel precursor

6. **Fuel Conversion Process**

   → Thermal treatment and/or catalytic reaction

   → pH / ORP adjustment, if required

   → Conversion to fuel-grade material

7. **Storage & Utilization**

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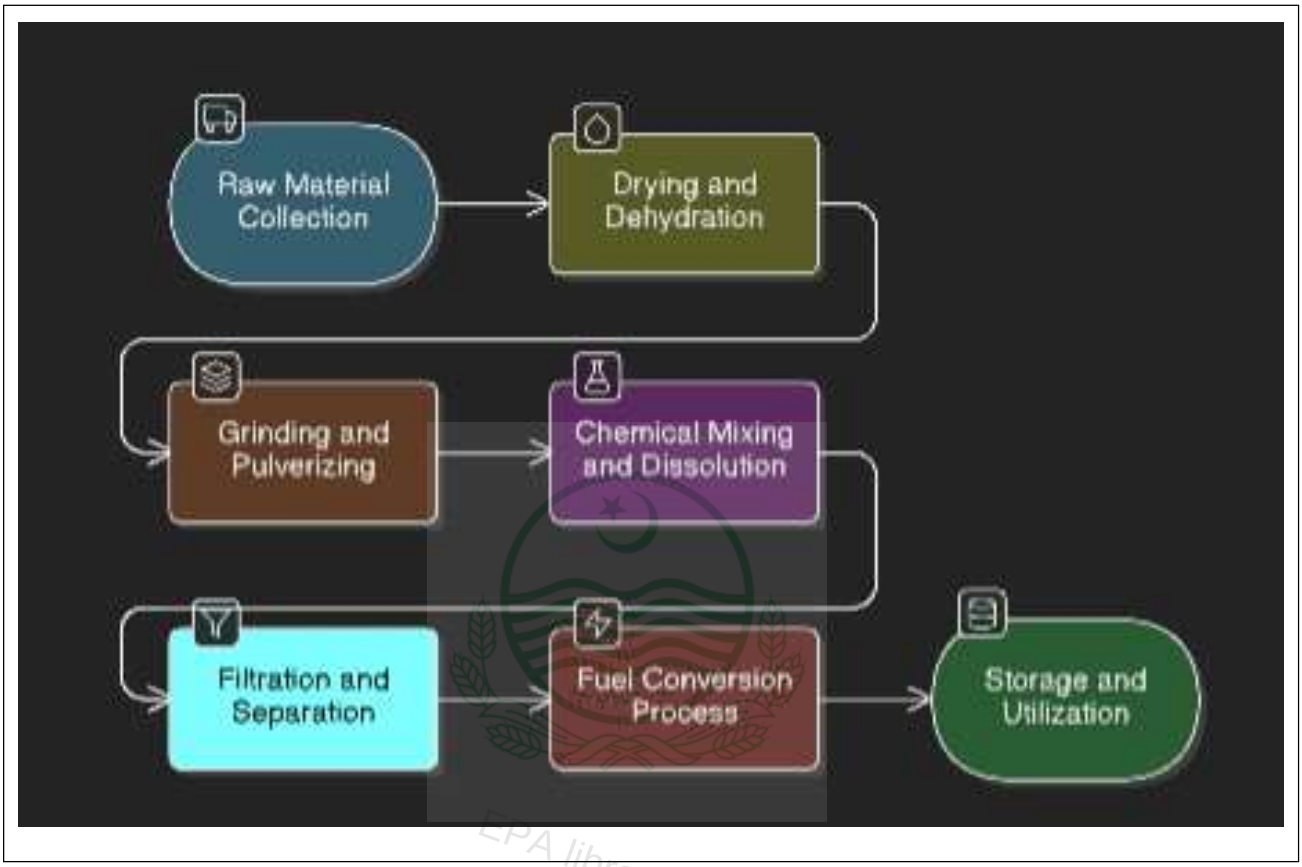
→ Safe storage of processed fuel

→ Utilization as industrial fuel / for energy recovery

Figure 2.1 Flow Process Diagram of Sludge Recovery Unit



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2.13 FIREFIGHTING / EMERGENCY EVACUATION PLAN/HEALTH & SAFETY PLAN

Management of the Project has planned a proper Firefighting Plan, which includes fire extinguishers, fire buckets, fire hydrants, fire alarms, a first-aid box, and an emergency exit.

2.14 WASTES

2.15 WASTEWATER

The proposed installation of a Sludge Recycling Unit is not expected to generate significant quantities of process wastewater, as the reprocessing operations will primarily be based on controlled mechanical, thermal, and separation processes. Limited quantities of wastewater may be generated from equipment washing, floor washing, and domestic use by plant staff.

All domestic wastewater will be routed to a septic tank and soak pit system / confined sewer line, while any process-related wastewater (if generated) will be collected, treated through an oil–water separator and appropriate treatment unit (e.g., settling and filtration) before reuse or disposal in accordance with applicable EPA regulations.

2.16 AIR EMISSIONS

Air emissions from the Project will mainly arise from:

i. Operation of fuel-fired heaters/boilers used in the sludge drying/recovery process;
ii. Volatile organic compound (VOC) emissions from handling, transfer, and storage of petroleum sludge;
iii. Exhaust from standby generators and vehicles;
iv. Minor dust and exhaust emissions during construction and installation works.

2.17 SOLID AND HAZARDOUS WASTE GENERATION

The primary solid waste from the Project will include:

i. Residual inert solids and non-recoverable sludge fraction after fuel recovery;
ii. Used filters, oily rags, spent PPE, and packaging materials;
iii. General domestic waste from staff

Hazardous/oily residues will be stored in designated, impervious, covered areas and handed over to EPA-approved hazardous waste management facilities or disposed of in accordance with relevant environmental regulations and guidelines. Recovered fuel will be stored and utilized/sold as product, thereby significantly reducing the volume of petroleum sludge requiring final disposal. Domestic solid waste will be segregated and handed over to the local municipal or authorized waste contractor as per local practice.

2.18 NOISE

During the installation and commissioning phase, noise will be generated from construction machinery, material handling equipment, and installation activities. This noise will be temporary and confined to daytime hours. During the operational phase, noise sources will include pumps, blowers, separators, generators, and material handling equipment.

Noise levels will be controlled through:

i. Use of well-maintained equipment and silencers;
ii. Provision of acoustic enclosures for major noise-generating equipment where required;
iii. Scheduling high-noise activities during daytime;
iv. Use of appropriate PPE (earplugs/ear muffs) for workers in high-noise areas.

Operational noise will be monitored and managed to remain within the limits prescribed by the National Environmental Quality Standards (NEQS).

2.19 SCHEDULE OF IMPLEMENTATION

The installation and commissioning of the installing Petroleum Sludge Recycling Unit of is planned to be completed within **12 months** from start to finish.

Table 2.2 Schedule of Implementation

Sr. #	Activities	3 Months	3 Months	3 Months	3 Months
1	Detailed Engineering Design & Approvals				
2	Procurement of Equipment & Materials				
3	Mobilization of Contractor & Site Preparation				
4	Civil Works & Structural Installation				
5	Mechanical & Electrical Installation				
6	Testing, Commissioning & Trial Runs				

M = Month

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CHAPTER 3
DESCRIPTION OF THE ENVIRONMENT

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CHAPTER 3: DESCRIPTION OF THE ENVIRONMENT

3.1 GENERAL

This section describes the existing baseline conditions of the physical, biological, and socio-economic environment in and around the Project Area located at Rawat Industrial Estate, Rawalpindi. Information on these aspects has been compiled through:

i. Desk review of available secondary data and published reports

ii. Field visits to the project site and surrounding areas

iii. Consultations and visits to relevant Government departments and other concerned agencies

Where appropriate, baseline information has been presented in the form of **tables, graphs, maps**, and **pictorial evidence** (site photographs) to provide a clearer understanding of the environmental setting.

3.2 DATA COLLECTION

Primary data was collected through site reconnaissance surveys of the Project Area and its immediate surroundings in Rawat Industrial Estate. Observations were recorded regarding land use, access routes, surrounding industries, utilities, flora and fauna, and local settlements.

Secondary data regarding physical parameters such as topography, geology, seismology, hydrology, and climatology were obtained from relevant departments, published literature, and official websites. Biological parameters (flora and fauna) were studied through field observation and available literature related to the Rawalpindi region.

i. Vegetation of the project area was assessed by preparing a floristic list based on visual observation and local knowledge.

ii. Information on wildlife fauna (mammals, reptiles, amphibians, birds, etc.) in the assessment area was gathered through opportunistic observation, consultation with residents, experts, and relevant Government/Non-Governmental Organizations (NGOs).

iii. Socio-economic aspects were assessed using field surveys, informal interviews with local workers, community members, and a review of available demographic and socio-economic

data for the Rawalpindi district.

3.3 PHYSICAL ENVIRONMENT

This section examines the physical resources, such as topography, soil, climate, surface and groundwater resources, ambient air quality, and geology of the Project Area and its immediate surroundings, to assess whether the proposed Establishment of a Petroleum Sludge Reprocessing and Fuel Recovery Plant may have any significant impacts on these parameters.

3.4 TOPOGRAPHY

Rawat Industrial Estate is located in the southern part of Rawalpindi District, characterized by gently undulating terrain typical of the Potohar Plateau. The area comprises:

i. Gently rolling to slightly hilly topography

ii. Elevation generally ranging between 450–550 meters above mean sea level

iii. Mixed land use with developed industrial plots, warehouses, and some open patches of land

The project site itself is largely levelled and already disturbed due to existing industrial development, with no significant natural drainage channels or steep slopes within the immediate plot.

3.5 HYDROLOGY AND GROUNDWATER

Groundwater in Rawat Industrial Estate and its surroundings is generally accessed through **tube wells and boreholes**. The depth to groundwater typically ranges from **approximately 150–250 ft** (to be confirmed through the latest bore data or site investigation). Groundwater is used for:

i. Domestic purposes (drinking, washing, sanitation)

ii. Industrial processes and utility use

iii. Limited irrigation in nearby peri-urban/agricultural lands

Groundwater quality in the area is generally suitable for domestic and industrial use after basic treatment; however, **localized variability** may occur.

- A **groundwater quality analysis** of samples collected from the Project Area has been carried out by an **EPA-certified laboratory** (WELCOS).

3.6 CLIMATE AND METEOROLOGY

Rawalpindi District experiences a subtropical climate with hot summers and cool winters. The climate of the Rawat Industrial Estate area is influenced by monsoon systems and western disturbances.

i. **Summer Season:** Approximately from April to October.
ii. **Maximum temperatures** can reach 40–45°C during peak summer months (May–June).
iii. **Winter Season:** Approximately from November to March.
iv. **Minimum temperatures** may fall to around 3–7°C in December–January.
v. **Monsoon Rains**: Mainly occur in July–September, contributing a significant portion of the annual rainfall.
vi. **Average Annual Rainfall:** Approximately 900–1,000 mm (to be confirmed as per latest data).

Climatic trends such as monthly average maximum and minimum temperatures, rainfall, and relative humidity are presented graphically for better understanding.

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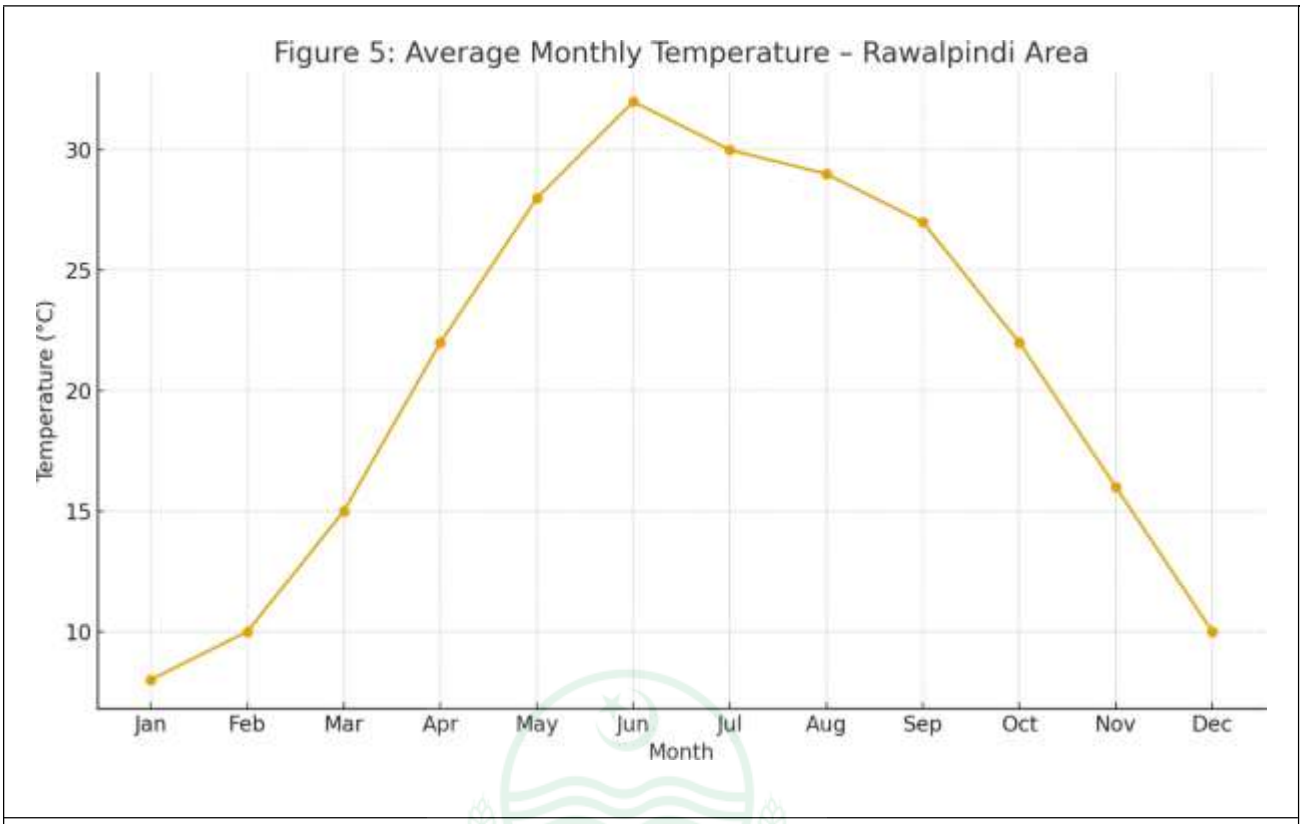

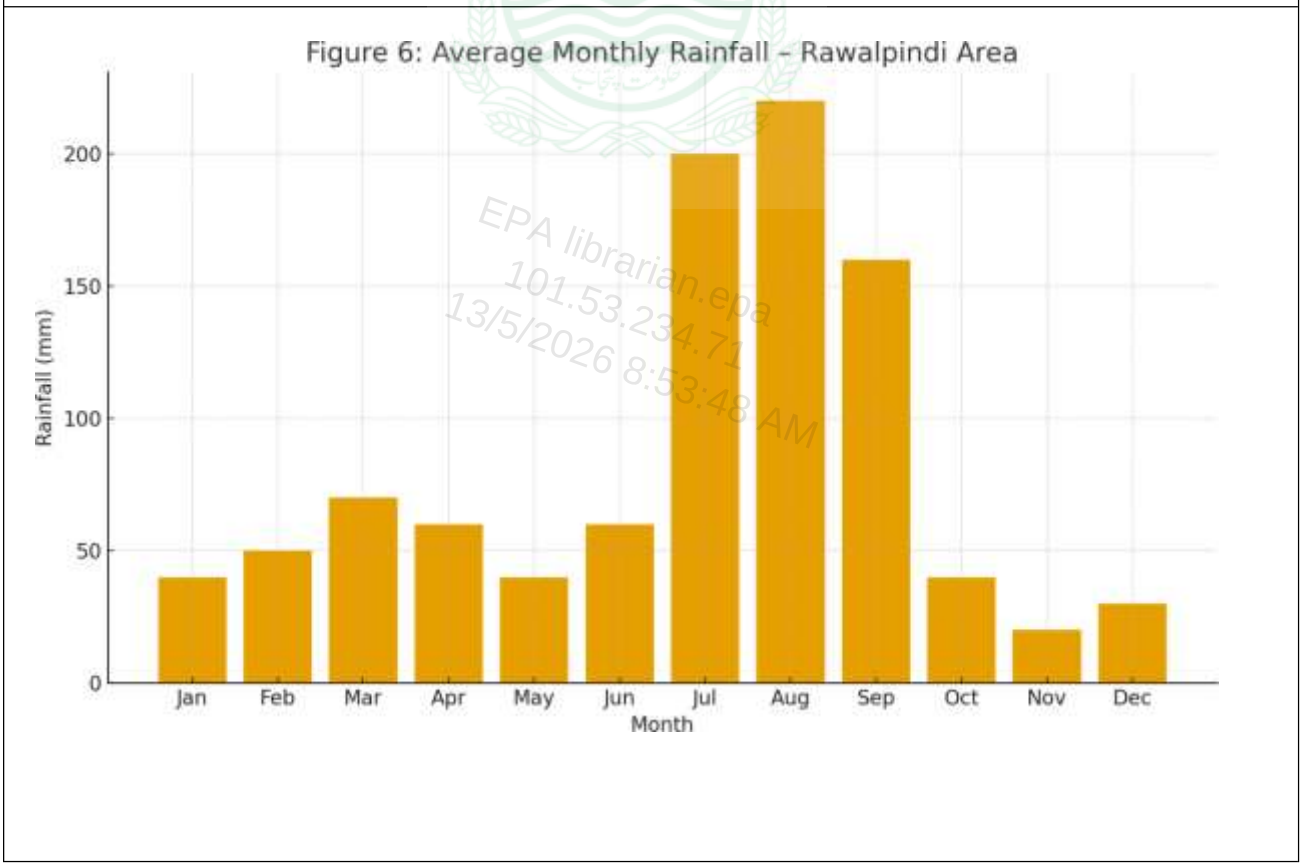

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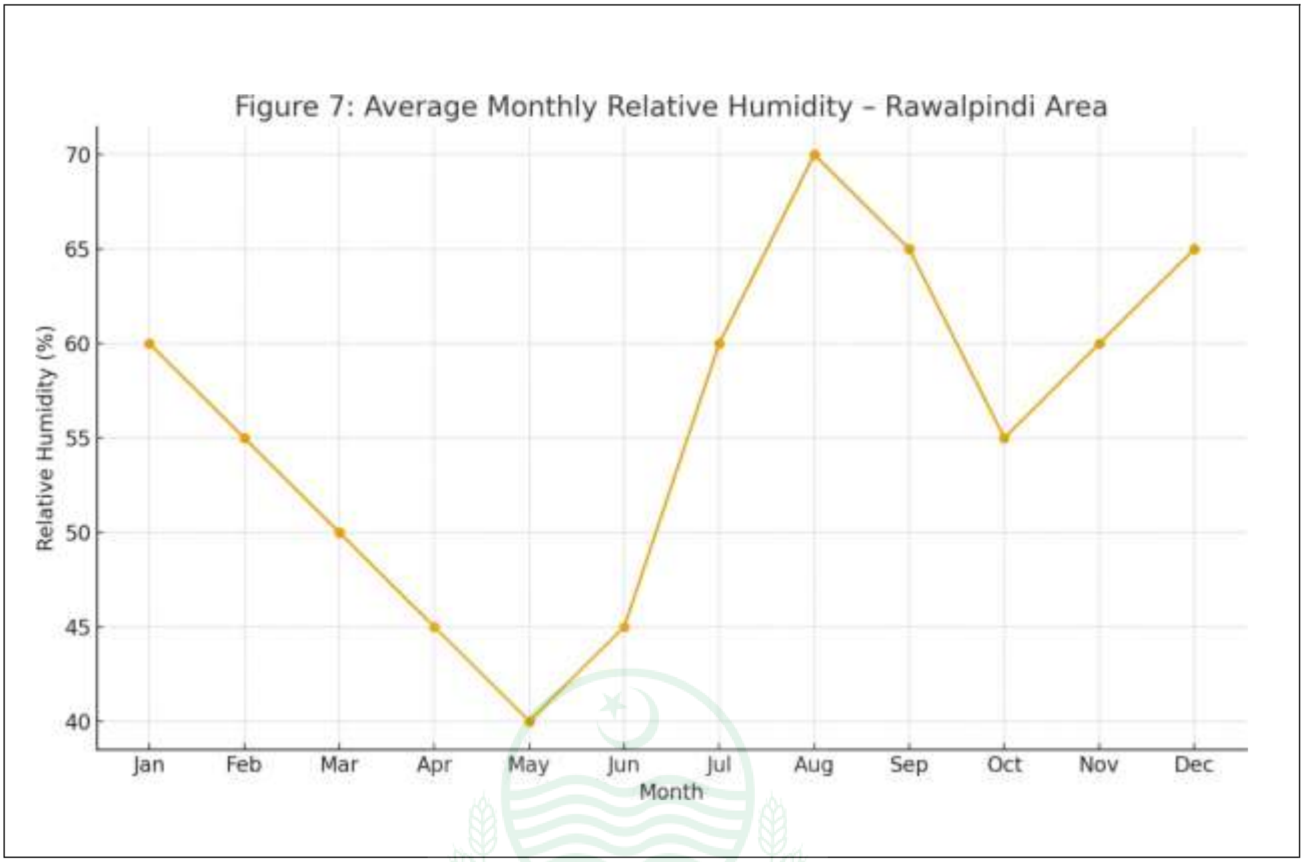

3.7 NOISE LEVELS

Baseline noise levels were measured at and around the project site in Rawat Industrial Estate using a calibrated **sound level meter**. Measurements were taken at selected locations during **daytime and nighttime**, particularly:

i. Within the project site

ii. At the nearest industrial plots

iii. At the nearest sensitive receptors (such as nearby residential/settlement areas, if any)

The measured noise levels are generally influenced by industrial activities, traffic on GT Road/access routes, and local machinery operations.

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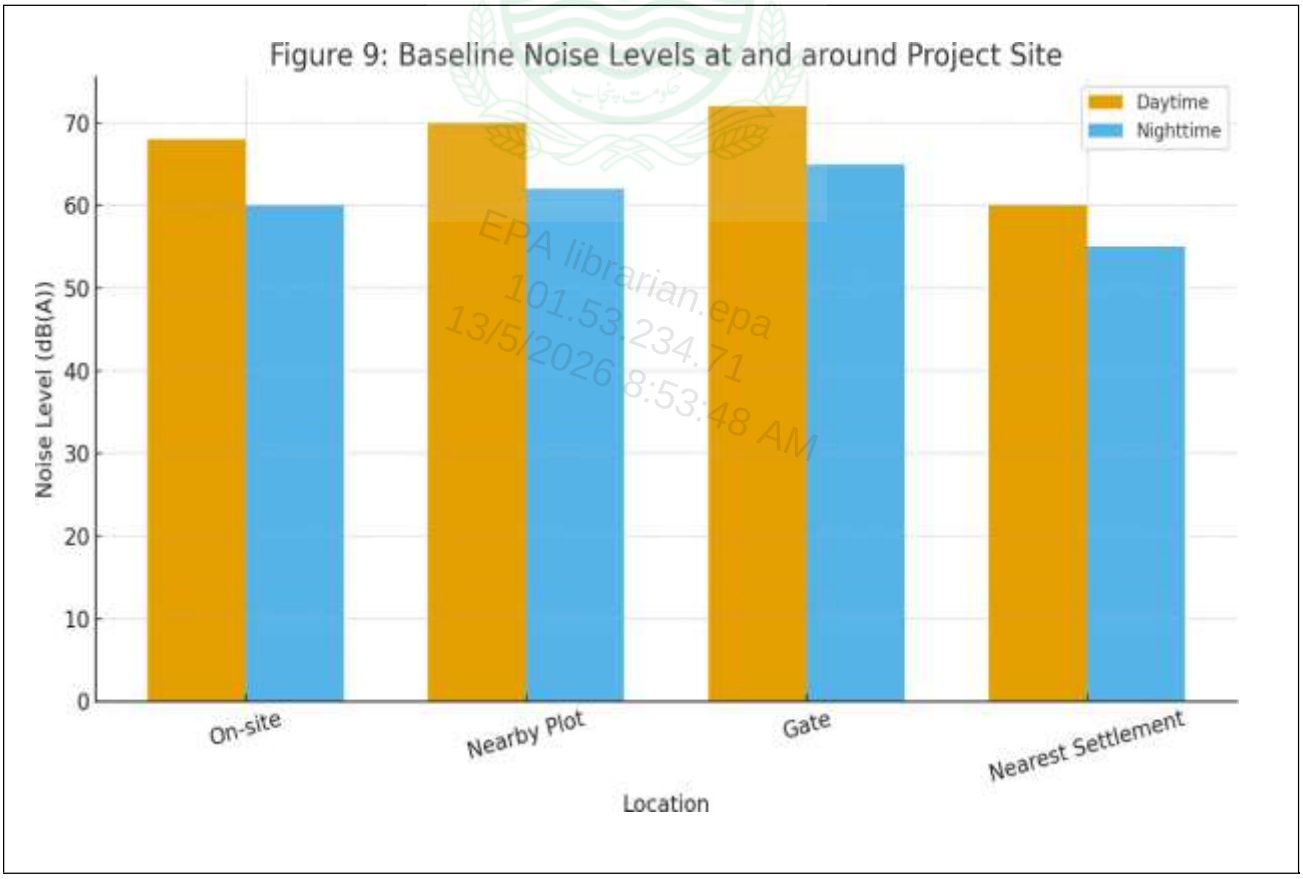
Table 3.1 Baseline Noise Level Measurements (dB(A)) at Different Locations

Sr. No.	Location	Time Period	Measured Noise Level dB(A)	NEQS Limit dB(A)*	Compliance (Yes/No)
1	Within Project Site (Process Area)	Daytime	68	75 (Industrial)	Yes
2	Main Gate / Entry Point	Daytime	70	75 (Industrial)	Yes
3	Adjacent Industrial Plot	Daytime	72	75 (Industrial)	Yes
4	Nearest Settlement / Sensitive Receptor	Daytime	60	65 (Residential)	Yes
5	Within Project Site (Process Area)	Nighttime	60	65 (Industrial)	Yes
6	Main Gate / Entry Point	Nighttime	62	65 (Industrial)	Yes
7	Adjacent Industrial Plot	Nighttime	65	65 (Industrial)	Yes
8	Nearest Settlement / Sensitive Receptor	Nighttime	55	55 (Residential)	Yes



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3.8 BIOLOGICAL ENVIRONMENT

3.9 FLORA

The Project Area is located within an already developed industrial estate, where natural vegetation has largely been modified. Existing flora mainly consists of planted avenue trees, boundary plantation, ornamental plants, and scattered shrubs and grasses.

Common plant species observed in and around the Project site at Rawat Industrial Estate are given in the table below.

Table 3.2 Common Tree, Shrub, and Ground-Cover Species Observed in and around Rawat Industrial Estate, Rawalpindi

Sr. No.	Local Name	Scientific Name	Type	Abundance*
1	Kikar	Acacia nilotica	Tree	Common
2	Sufaida	Eucalyptus spp.	Tree	Common
3	Sheesham	Dalbergia sissoo	Tree	Occasional
4	Neem	Azadirachta indica	Tree	Occasional
5	Dekh / Bakain	Melia azedarach	Tree	Occasional
6	Bottle Brush	Callistemon citrinus	Ornamental Tree	Occasional
7	Rose / Other Ornamental Shrubs	Various ornamental spp.	Shrub	Occasional
8	Grasses	Various spp.	Grass / Ground cover	Common
9	Weeds (e.g. Bathu etc.)	Various spp.	Herb / Weed	Common

*Abundance: Common / Occasional / Rare – based on field observations.

Shrub and ground-cover species include various grasses, weeds, and small shrubs commonly found in disturbed and industrial areas.

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Figure 10 Photographs of Flora in the Project Area

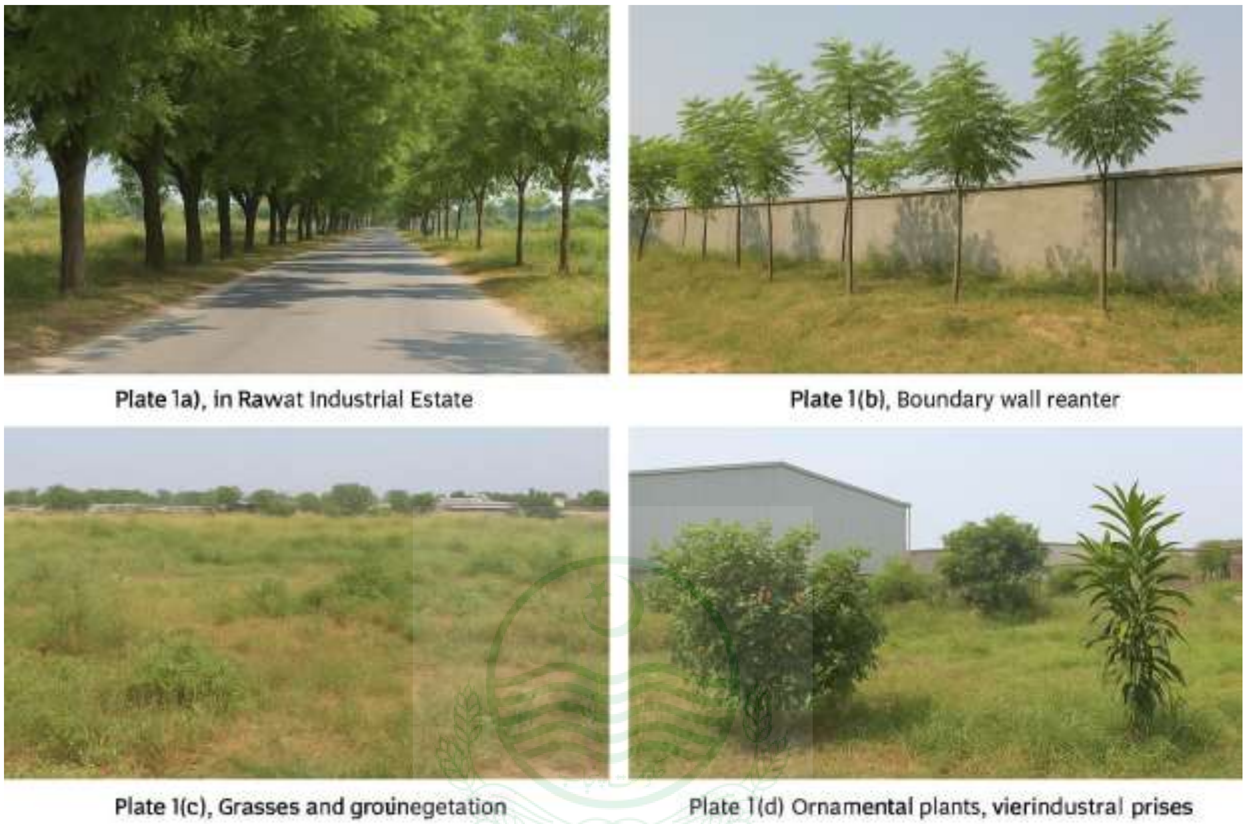

Plate 1a), in Rawat Industrial Estate

Plate 1(b), Boundary wall reanter

Plate 1(c), Grasses and groinegetation

Plate 1(d) Ornamental plants, vierindustral prises

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3.10 FAUNA

The fauna in and around Rawat Industrial Estate is typical of a disturbed industrial and peri-urban environment, with species that are generally tolerant of human activity. The commonly observed and reported species are summarized below.

Table 3.3 Common Faunal Species Recorded in and around the Project Area

Sr. No.	Group	Local Name	Scientific Name	Status / Occurrence
1	Mammal	House Rat	Rattus rattus	Common
2	Mammal	Domestic Dog	Canis familiaris	Common
3	Mammal	Domestic Cat	Felis catus	Common
4	Mammal	Bats (small spp.)	Various insectivorous spp.	Occasional (at dusk)
5	Reptile	Common Garden	Calotes versicolor (or	Common

		Lizard	similar spp.)	
6	Reptile	House Gecko	Hemidactylus spp.	Common
7	Reptile	Non-venomous Snakes (general)	Various spp.	Rare / Occasional
8	Amphibian	Common Frog	Rana tigrina (or similar spp.)	Seasonal (monsoon)
9	Amphibian	Toads	Various spp.	Seasonal (monsoon)
10	Bird	House Sparrow	Passer domesticus	Common
11	Bird	House Crow	Corvus splendens	Very Common
12	Bird	Common Myna	Acridotheres tristis	Common
13	Bird	Rock Pigeon	Columba livia	Common
14	Bird	Black Drongo	Dicrurus macrocercus	Occasional
15	Bird	Other small passerines	Various spp.	Occasional

Plate 2(a). Common Bird Species (House Sparrow, Common Myna, House Crow) Observed near Industrial Structures in Rawat Indust-Estate, Rawalpindi

3.11 SOCIOECONOMIC ENVIRONMENT

The socio-economic environment reflects the human, economic, and quality of life conditions in and around the Project Area, which is located in Rawat Industrial Estate, Rawalpindi. For this study, field surveys were conducted, and informal interviews were held with local workers, nearby residents, shopkeepers, and stakeholders. Relevant secondary data for Rawalpindi District was also reviewed.

The following sub-sections describe the key socio-economic characteristics relevant to the proposed Petroleum Sludge Reprocessing and Fuel Recovery Plant.

3.12 DEMOGRAPHY

Rawat Industrial Estate lies within the administrative jurisdiction of Rawalpindi District, in the Potohar region of Punjab. The broader area is characterized by:

i. A mix of industrial workers, transporters, small business owners, and local residents from nearby villages and settlements.
ii. Population comprising multiple ethnic and caste groups commonly found in the region, such as Rajput, Awan, Jat, Mughal, Gujar, and other local communities, along with migrant workers from various districts of Punjab and other provinces.

The settlements around Rawat comprise semi-urban and peri-urban communities, where population density is moderate and is primarily linked to industrial activity along the GT Road/ Islamabad Expressway corridor.

Population data and trends for Rawalpindi District (or the relevant Tehsil) may be presented in tabular form, based on the latest census, in the main report or annexure.

3.13 INDUSTRIAL PROFILE

Rawat Industrial Estate is a planned industrial zone, hosting a variety of industrial and commercial activities. Typical units include:

i. Light engineering and fabrication workshops
ii. Warehousing and logistics facilities
iii. Food and beverage units
iv. Chemical and allied industries
v. Service and support facilities (transport, workshops, etc.)

The proposed Petroleum Sludge Reprocessing and Fuel Recovery Plant is compatible with the existing industrial land use and will be established within an already notified industrial estate, thereby avoiding encroachment on agricultural or residential land.

This map may include the project location, adjacent industrial plots, main access roads, and nearby settlements.

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3.14 HEALTH FACILITIES

Residents and workers in and around Rawat Industrial Estate have access to health services through:

i. Local clinics and basic health units in nearby settlements along GT Road / Rawat area.
ii. Private clinics and small hospitals within driving distance.
iii. Major public and private hospitals located in Rawalpindi and Islamabad, accessible via the main road network.

The nearest primary health facility/clinic is at a reasonable distance from the Project Area, while secondary and tertiary care hospitals are available in Rawalpindi City and Islamabad, reachable within a typical commuting time by road.

This figure may present a simple location map showing the project site and the nearest clinics/hospitals with approximate distances.

3.15 QUALITY OF LIFE AND SOCIO-ECONOMIC CONDITIONS

The quality of life in the surrounding area is closely linked to industrial employment and associated

services. Key observations from field surveys and interviews include:

3.16 LIVELIHOODS

A significant proportion of the local population and in-migrant workers are engaged in industrial jobs (factory workers, machine operators, technicians, helpers). Other common occupations include drivers, mechanics, shopkeepers, daily wage laborers, and service providers (tea stalls, small hotels, workshops, etc.).

3.17 EDUCATION

Educational attainment varies from illiterate to graduate level. Many younger workers have at least basic or secondary-level education, while children from nearby settlements generally have access to primary and middle schools in the area or along GT Road.

3.18 BASIC SERVICES AND UTILITIES

i. The industrial estate is connected by paved roads and has access to electricity and telecommunication networks.
ii. Water is mainly obtained through tube wells/boreholes within industrial plots or nearby settlements.
iii. Sanitation conditions vary by unit and settlement; industries typically have on-site sanitation facilities for their workforce.
iv. Where socio-economic survey data is available, indicators such as educational status, occupation distribution, and income levels may be presented through tables and graphs (e.g. bar charts or pie charts) for clarity.

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3.19 LABORATORY REPORTS OF ENVIRONMENTAL ANALYSIS

To establish the baseline environmental conditions prior to the installation and operation of the Petroleum Sludge Reprocessing and Fuel Recovery Plant, testing of key environmental parameters was carried out by an EPA-certified laboratory (WELCOS). The following baseline analyses were conducted in and around the Project Area:

3.19.1 AMBIENT AIR QUALITY

Parameters such as PM_{10}, $PM_{2.5}$, SO_2, NOx, CO, and other relevant pollutants (as per PEQS) were measured.

3.19.2 WATER QUALITY

Groundwater/bore water samples were tested for physicochemical and bacteriological parameters to assess suitability for domestic and industrial use.

3.19.3 NOISE LEVELS

Daytime and nighttime noise measurements were taken at selected locations within the project site, at the main gate, nearby industrial plots, and the nearest sensitive receptors (if any).A copy of the laboratory reports for ambient air analysis, water quality analysis, and noise level monitoring is provided in the Annexure titled "**Environmental Baseline Laboratory Reports**".

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CHAPTER 4

POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

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CHAPTER 04: POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 GENERAL

The assessment of potential environmental impacts depends on the nature and scale of activities associated with the proposed Petroleum Recycling Unit, as well as the environmental control measures incorporated into the project design. The impacts from the project have been identified and evaluated based on the operations involved, including the collection, processing, and storage of petroleum waste.

This section discusses potential environmental impacts on the area's geomorphology, soil, water resources, air quality, biological resources, and socio-economic conditions. Where applicable, mitigation measures are identified to reduce or eliminate adverse effects. The assessment considers the overall environmental receptors in the project vicinity.

4.2 OBJECTIVES

The objectives of identifying potential impacts and proposing mitigation measures are to:

i. Explore alternative methods for carrying out project activities.
ii. Enhance the environmental and social benefits of the project.
iii. Avoid, minimize, or remediate adverse environmental impacts.
iv. Ensure that residual impacts remain within acceptable limits.

4.3 PURPOSE OF MITIGATION MEASURES

A. IDENTIFICATION OF THE PROBLEM

Potential issues may arise from the construction and operation of the petroleum recycling unit. These include:

i. Air emissions (dust and volatile organic compounds)
ii. Noise from machinery
iii. Liquid and solid waste generation

B. TIMING OF THE PROBLEM

Environmental problems may occur during both construction and operational phases. Immediate attention is required to prevent residual or long-term adverse impacts.

C. LOCATION OF THE PROBLEM

Impacts should be addressed at their source, i.e., at the site of the petroleum recycling unit.

D. APPROACH TO ADDRESS THE PROBLEM

Mitigation measures will be implemented based on the nature of each impact:

i. Dust emissions will be controlled through water sprinkling and covered storage of raw materials.
ii. Solid waste will be segregated and disposed of safely.
iii. Liquid waste will be treated before discharge into the receiving body, following regulatory standards.
iv. Noise emissions will be controlled through the use of silencers and restricted operating hours.

4.4 WAYS OF ACHIEVING MITIGATION MEASURES

A. CHANGES IN PLANNING AND DESIGN

The project is located within a designated industrial area with no sensitive receptors nearby. Therefore, major design changes are not required.

B. IMPROVED MANAGEMENT AND MONITORING PRACTICES

Operational and construction activities will follow strict environmental management practices, including regular monitoring of air, water, and noise quality.

C. COMPENSATION IN MONETARY TERMS

Since the project does not affect flora, fauna, or any protected resources, monetary compensation is not necessary.

D. REPLACEMENT/RELOCATION/REHABILITATION

The project site is free from human settlements and ecologically sensitive areas; hence, no relocation, replacement, or rehabilitation measures are required.

4.5 IMPACTS ASSOCIATED WITH PROJECT LOCATION

The project site was selected based on the following factors:

i. The site is undisputed and fully under the control of the proponent.
ii. There are no human settlements within the immediate vicinity.
iii. No endangered flora or fauna are present within a 2 km radius.

iv. Major road networks are easily accessible for material transport.
v. No ecologically sensitive areas, protected areas, historical, archaeological, or religious sites are located nearby.

Conclusion: The site is suitable for the Petroleum Recycling Unit and will not cause significant adverse impacts on the environment.

4.6 IMPACTS ASSOCIATED WITH DESIGN PHASE

During the design phase, it was determined that no significant impacts are anticipated on soil, land, groundwater, or the local population. Nevertheless, proper environmental management systems will be integrated at the design stage to minimize potential risks. The design of the recycling unit will comply with all technical and environmental standards to ensure minimal disruption to the surrounding environment.

4.7 MITIGATION MEASURES AT DESIGN PHASE

The facility has been designed to minimize environmental impacts, including proper containment of petroleum residues, controlled effluent discharge, and efficient layout to reduce operational hazards.

4.8 IMPACTS ASSOCIATED WITH CONSTRUCTION PHASE

The key environmental and socio-economic impacts during the construction of the Petroleum Recycling Unit include:

i. Noise generation from construction machinery and equipment.
ii. Dust emissions from material handling and site preparation.
iii. Soil contamination from accidental spillage of petroleum or chemicals.
iv. Safety risks to workers and nearby communities.
v. Conflicts related to temporary employment or labor issues.
vi. Wastewater generation from construction activities.
vii. Solid waste generation from construction materials and packaging.

Mitigation measures for these impacts will include:

i. Noise barriers and limiting construction hours.
ii. Dust suppression through water spraying and covering of materials.
iii. Containment systems for petroleum spills.

iv. Implementation of safety protocols for workers.
v. Proper segregation, collection, and disposal of solid and liquid waste.

4.9 IMPACTS ON PHYSICAL AND SOCIAL ENVIRONMENT

4.10 POTENTIAL IMPACTS

Spills or leaks of petroleum sludge, fuel, and lubricants during handling, storage, and processing at the recycling unit may lead to soil contamination at the site. The severity of impact depends on the type and quantity of the material spilled and the location of the incident. Likely impacts include:

i. Physical scarring of the land
ii. Potential soil contamination
iii. Risk of localized erosion or minor land disturbance

4.11 IMPACT ASSESSMENT

The area's most vulnerable to soil contamination include storage zones, processing equipment areas, and fuel handling or maintenance zones. With proper mitigation measures in place, significant soil degradation is unlikely.

4.12 MITIGATION MEASURES

i. A Spill Prevention and Response Plan (SPRP) will be prepared and strictly followed for all sludge, fuel, and lubricant handling.
ii. Workers will be trained on spill prevention, containment, and clean-up procedures.
iii. Maintenance and cleaning of machinery and vehicles will be conducted only in designated areas.
iv. Impermeable surfaces or tarpaulins will be used in high-risk areas to prevent soil contamination.
v. Regular inspections of equipment and storage tanks will be carried out to detect leaks.
vi. Spill containment trays will be installed at refueling and transfer points.

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4.12.1 RESIDUAL IMPACTS

If mitigation measures are properly implemented, no residual soil contamination is expected.

4.12.2 MONITORING REQUIREMENTS

All spill incidents will be documented along with corrective actions taken.

4.13 WATER USE

4.13.1 POTENTIAL IMPACTS

Water will be required for domestic consumption at the site, dust suppression, and certain processing steps. The volume required is small and is not expected to significantly affect local groundwater or water availability.

4.13.2 MITIGATION MEASURES

Wastewater generated from domestic and process activities will be treated using a septic tank system or other approved treatment methods before discharge.

Coordination with Rawat Industrial Estate management will ensure proper disposal of wastewater in compliance with local regulations.

4.14 DUST EMISSIONS

4.14.1 POTENTIAL IMPACTS

Dust or particulate matter (PM) may be generated during site preparation, material handling, vehicle movement, and sludge transfer. Particles smaller than 10 microns (PM10) can be inhaled, posing health risks to workers. Dust may also be a nuisance to nearby communities.

4.14.2 IMPACT ASSESSMENT

Major sources of dust include unpaved areas, storage piles, trucks, and sludge handling activities. Dust emission will depend on daily activity levels and weather conditions.

4.14.3 MITIGATION MEASURES

i. Wet suppression of exposed surfaces through regular water sprinkling.
ii. Covering sludge and construction materials with tarpaulins or plastic sheets.
iii. Using low-sulfur fuel in vehicles and machinery to reduce particulate emissions.
iv. Transporting sludge in securely covered containers.
v. Providing dust respirators to workers exposed to high dust levels.

4.14.4 RESIDUAL IMPACT

Dust impacts are temporary and expected to diminish upon completion of construction and proper operation of the facility.

4.14.5 MONITORING REQUIREMENTS

i. Visual monitoring of dust generation.
ii. Periodic ambient air quality monitoring at the site boundary.

4.15 NOISE

4.15.1 POTENTIAL IMPACTS

Noise from machinery, sludge handling equipment, and vehicle movement may cause temporary disturbances to workers and nearby communities.

4.15.2 IMPACT ASSESSMENT

Maximum noise levels will occur during peak operational or construction activity periods.

4.15.3 MITIGATION MEASURES

i. Proper design, maintenance, and repair of machinery to reduce noise at the source.
ii. Use of silencers and mufflers on vehicles and equipment.
iii. Restricting vehicle movement during nighttime hours.
iv. Providing workers with appropriate hearing protection.
v. Planting trees and using barriers as sound buffers around the facility.

4.16 SOCIAL ENVIRONMENT

4.17 EMPLOYMENT & INDUCTION OF LABOR

4.17.1 POTENTIAL ISSUES

Local communities may be concerned about job allocation and employment opportunities.

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4.17.2 IMPACT ASSESSMENT

Personnel required for construction and operation phases will be primarily hired from the local community, reducing the likelihood of employment-related conflicts.

4.17.3 RESIDUAL IMPACTS

As local hiring is prioritized, no significant employment conflicts are anticipated.

Monitoring Requirements: Maintain records of total jobs offered, including the name and residence of employed staff.

4.18 COMMUNITY HEALTH

4..18.1 POTENTIAL ISSUES

Workers may carry communicable diseases, and improper handling of sludge could pose minor health risks to workers and surrounding communities.

4.18.2 MITIGATION MEASURES

i. Pre-employment medical examinations for all workers.
ii. Regular health check-ups and ongoing medical supervision.
iii. Conduct periodic free medical clinics for nearby residents.

4.19 SAFETY

4.19.1 POTENTIAL ISSUES

Safety hazards include traffic-related risks, operational machinery accidents, and occupational exposure to petroleum sludge.

4.19.2 MITIGATION MEASURES

i. Develop and enforce Standard Operating Procedures (SOPs) for all operations.
ii. Provide personal protective equipment (PPE) to all workers.
iii. Implement traffic management measures, including signage and speed restrictions.
iv. Restrict nighttime vehicle movement and machinery operation.
v. Train drivers and workers in safety procedures.
vi. Display public safety plans prominently around the facility.

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4.19.3 RESIDUAL IMPACTS

Long-term safety risks are minimal if mitigation measures are properly observed.

4.20 ENVIRONMENTAL IMPACTS ASSOCIATED WITH OPERATION PHASE

During the operational phase of the Petroleum Sludge Recycling Unit, potential environmental and socio-economic impacts include:

i. **Air Emissions:** Volatile organic compounds (VOCs) and particulate matter from sludge processing.
ii. **Noise:** From recycling machinery, pumps, and transport vehicles.
iii. **Wastewater:** Effluent from sludge washing, treatment processes, and domestic usage.

iv. **Occupational Health & Safety:** Risks associated with handling petroleum sludge and machinery operation.

Mitigation measures for these impacts will include:

i. Installation of scrubbers, filters, and proper ventilation for air emissions control.
ii. Routine noise monitoring and use of sound barriers.
iii. Treatment of process wastewater before discharge, in compliance with environmental standards.
iv. Continuous worker training on health and safety, and provision of PPE.

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CHAPTER NO 5: STAKEHOLDERS CONSULTATION

5.1 GENERAL

Public consultation refers to the process by which the concerns of local affected persons and others who have a plausible stake in the environmental impacts of the project or activity are ascertained to take into account all the material concerns in the project or activity design as appropriate. According to the EIA and EIA Review Regulations, public consultation is mandatory for any socio-environmental study.

Impact assessment surveys and public consultation sessions were held with different stakeholder groups that may be impacted by the project's commencement. The consultation process was carried out in accordance with the guidelines laid by the Punjab EPA. The objectives of this process were to:

i. Share information with stakeholders on the said project installation and operation
ii. Access the impacts on the physical, biological, and socioeconomic environment
iii. Understand stakeholder concerns regarding various aspects of the project commencement
iv. Find out valuable suggestions from the stakeholders to improve the said project design
v. Understand the perceptions, assessment of social impacts, and concerns of the affected people/communities of the project area
vi. Find out the awareness level and situation of acceptability to identify any issues for the implementation of the said project
vii. Invite people to express their views about the positive/negative impacts on their lifestyles and environment
viii. Disclose information about contact offices/officers for any complaints/queries

5.2 OBJECTIVES OF CONSULTATION

Public consultation plays a vital role in studying the impacts of the said project on stakeholders in the successful implementation and execution of the project. It provides an opportunity to exchange knowledge with the beneficiaries and affected parties. Referring particularly to a project related to

environmental assessment, involvement of the public is all the more essential, as it leads to better and more acceptable decision-making. The overall objective of the consultation with the stakeholders is to help verify the environmental and social issues, besides technical ones, that have been presumed to arise, and to identify those that are not known or are specific to the project. Discourse with many who have thoroughly observed the site conditions in the pre-development phase goes a long way in updating the knowledge and understanding.

5.3 IDENTIFICATION OF STAKEHOLDERS

All the people who are directly or indirectly affected or concerned with the project are stakeholders. Besides the living population of the surrounding areas, some other stakeholders were identified and contacted, which are listed below. They are the key players, including shops, public and government offices, schools, hospitals, hotels, and NGOs. Not only were published material, brief, or other literature obtained on request, but also noted their views and concerns, in an official capacity as well as on a personal basis.

The following stakeholders are identified for this project.

5.3.1 DIRECT STAKEHOLDERS

As no disturbance in the local community is being foreseen due to the installation of the said project, as the project is located at a designated industrial area. No property loss is being envisaged due to the construction of the warehouse.

5.3.2 INDIRECT STAKEHOLDERS

The indirect impact will occur on those who are living or doing business within a Project Area of Influence (AOI). In the case of the said project, the residents around the project area will get an opportunity to be employed. So, in the early development stages and during the operational phase, people will benefit. Indirect respondents include;

i. Government agencies responsible for dealing with the project-related activities
ii. Government Agencies are directly, indirectly, or widely involved in the execution and monitoring of the said project
iii. Government departments such as TMA and the Planning & Development Department, working on other development activities, are considered indirect stakeholders
iv. Workers of political, cultural, religious, or social scientific bodies, directly or indirectly related

to the project

5.4 CONSULTATION PROCESS

Information disclosure, public consultation, and discussion regarding the various aspects of the project with the people of the area are necessary. This process is intensified during the EIA Studies, and separate rounds of public consultations were held. Surveys were carried out to investigate physical, biological, and socioeconomic resources falling within the immediate AOI of the project. Primary data collection included:

i. Data collection regarding the socio-economic condition of the study area
ii. Pre-testing of socioeconomic survey tools in the field
iii. To consult the locals for the collection of information on the biological environment
iv. Various meetings with the stakeholders have held the following objectives:
v. Share information with stakeholders on the said project and expected impacts on the community in the vicinity of the project
vi. Understand stakeholders' concerns regarding various aspects of the project, including the existing condition of the upgrading requirements, and the likely impact of construction and operation activities
vii. Provide an opportunity to the public to influence the project design in a positive manner
viii. Obtain local and traditional knowledge before decision-making
ix. Increase public confidence in the proponent, reviewers, and decision-makers
x. Reduce conflict through the early identification of controversial issues, and work through them to find acceptable solutions
xi. Dissemination of information through discussions, education, and liaison
xii. Documentation of information narrated by the stakeholders and mitigation measures said by the stakeholders
xiii. Incorporation of public concerns and their address in the EIA, and eliciting their comments and feedback
xiv. Create a sense of ownership of the proposal in the minds of the stakeholders

5.5 CONSULTATION WITH LOCAL COMMUNITY

In addition, the use of direct methods to elicit the response of the various stakeholders in the population

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of the study area was ascertained by conducting a sample survey through specially formatted questionnaires. Questions posed to the public were related to the creation of possible impacts, adverse impacts, and beneficial impacts, including employment opportunities, income generation activities, change in living standards, and provision of amenities. The various rounds of public meetings and consultations were arranged in the project and study area

5.6 VIEWS, CONCERNS, AND SUGGESTIONS

The major socio-economic concerns and problems of the affected persons of various communities have been given in the tabulated form below, along with their main concerns and remarks. The community showed a lot of concerns; a few are being mentioned here:

i. Removal of shrubs and trees should be avoided to the extent possible
ii. The project will become the source of income for locals to earn their livelihood easily and honorably
iii. The area will become further industrialized
iv. Employment opportunities will be generated, and locals should be hired on a priority basis
v. Water spraying/sprinkling should be done regularly during the construction phase to avoid dust emissions
vi. Good relations with the local communities will be promoted by encouraging the Contractor to provide opportunities for skilled and unskilled employees to the locals, as well as on-the-job training
vii. The contractor should prefer hiring local labor from the adjacent villages
viii. Indigenous trees around the facility should be planted to control air pollution and as compensation

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CHAPTER 06

ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

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CHAPTER 06: ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

6.1 GENERAL

The Initial Environmental Examination (EIA) provides the Environmental Management Plan (EMP) for the proposed installation and operation of a petroleum sludge recycling unit located at Rawat Industrial Estate, Rawalpindi, Punjab. The EMP covers both construction (installation) and operational phases, with the aim of ensuring that project activities are conducted in an environmentally sound and compliant manner.

In accordance with the environmental legislation in Pakistan, the EMP for the operational phase, along with other required documents, will be submitted to the Punjab Environmental Protection Agency (EPD/Pak-EPA, as applicable) to obtain Environmental Approval and confirmation of compliance for project operation.

Even after implementation of the proposed mitigation measures, some impacts may remain and therefore require regular monitoring. This section also presents the Environmental Monitoring framework for both the construction and operation phases to:

I. Verify compliance with the EMP
II. Ensure that environmental performance remains within acceptable limits; and
III. Enable timely corrective action if any exceedance of regulatory criteria, environmental requirements, or project environmental goals is observed

6.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The primary objectives of the EMP for the petroleum sludge recycling unit are to:

I. Facilitate the implementation of the mitigation measures identified in the EIA.
II. Define and clarify the roles and responsibilities of the project proponent and contractors, and establish effective communication channels on environmental and social issues.
III. Identify monitoring parameters and frequencies to verify the effectiveness of the mitigation measures.
IV. Provide a mechanism for taking timely corrective action in case of unanticipated

environmental situations or non-compliance events.

V. Identify training needs at various levels (management, operational staff, workers) to ensure competent implementation of the EMP.

6.3 MANAGEMENT APPROACH

The organizational framework for EMP implementation is described below:

A) Proponent (Project Owner)

i. The project proponent will have overall responsibility for ensuring compliance with the EMP and applicable environmental legislation.

ii. The proponent will carry out periodic verification checks and internal audits to confirm that the contractors and plant staff are effectively implementing the environmental and social requirements.

B) Contractors (Construction / Installation Phase)

i. Contractors will implement most of the environmental and social mitigation measures during the construction/installation phase.

ii. Contractors will be responsible for ensuring that their field activities comply with national environmental laws, rules, and regulations, and with the contractual conditions and EMP provisions agreed with the proponent.

C) Operational Management Team

i. During the operational phase, the plant management/environment officer will be responsible for day-to-day implementation of the EMP, routine monitoring, record-keeping, and reporting.

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6.4 COMPONENTS OF THE EMP

The Environmental Management Plan for the petroleum sludge recycling unit consists of the following key components:

iv. Management Plan (Construction and Operation Phases)

v. Environmental Monitoring Plan

vi. Communication and Documentation System

vii. Institutional Capacity and Responsibilities

viii. Environmental Training and Awareness

Table 4.1 Impacts Evaluation Matrix / Summary of Impacts

Environmental Parameters	Risk Assessment	
	Construction Phase	Operational Phase
Location	-1t	+1p
Design	+2p	+2p
A: Physical		
Air Emissions	-1p	-2p
Noise	-1t	-2p
Water Resources & Wastewater Management	-1p	-1p
B: Ecological		
Flora & Fauna	-1p	+1p
C: Socio-Economic		
Finished Product Transportation	0	-2p
HSE	-1t	-2p
First Aid	NA	-1p
Fire Hazards	NA	-2p
Employment	+1p	+2p

Legends:
1 = Low; 2 = Medium; 3 = High; 4 = Extremely High;
NA = Not Applicable; t = Temporary; p = Permanent; 0 = Negligible

6.5 Summary of Key Impacts and Mitigation Measures

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6.5 SOLID WASTE GENERATION

6.5.1 POTENTIAL IMPACT

Generation of solid waste such as packaging materials, used PPEs, office waste, and inert residues of treated sludge (if any).

6.5.2 MITIGATION MEASURES

i. Provide adequate solid waste handling facilities, such as labeled waste bins and skips, in all sections of the facility.
ii. Ensure regular collection and appropriate disposal of solid waste in accordance with municipal/industrial estate regulations.

iii. Non-biodegradable and recyclable materials (e.g., plastic/metal containers, packaging material) will be segregated and sold/given to licensed local contractors/recyclers.
iv. Maintain records of quantities of waste generated and disposal/recycling routes.

6.6 WASTEWATER GENERATION

6.6.1 POTENTIAL IMPACT

Generation of domestic wastewater from washrooms, canteen, and floor washing; potential contamination if not properly managed.

6.6.2 MITIGATION MEASURES

i. Wastewater from the unit will primarily be domestic in nature; no process wastewater is expected from the closed-loop petroleum sludge recycling system (except controlled washings, if any, handled as per design).
ii. Domestic wastewater will be treated through a septic tank and soak pit / small treatment unit, as per design, before discharge.
iii. As the project site is located within Rawat Industrial Estate, wastewater disposal will be as per the Board of Management/estate management provisions and applicable regulations.
iv. Ensure no untreated hazardous effluents are discharged into the environment or storm drains.

6.7 AIR POLLUTION

6.7.1 POTENTIAL IMPACT

Emissions from diesel generators, vehicles, material handling, and fugitive emissions from handling of petroleum sludge, if not properly contained.

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6.7.2 MITIGATION MEASURES

i. Carry out regular maintenance and servicing of all motorized vehicles, generators, and process equipment to minimize exhaust emissions.
ii. Install appropriate air pollution control devices such as dust/fume collectors, vapor capture systems, and ensure closed/covered handling of petroleum sludge to minimize VOC emissions and odors.
iii. Regular water sprinkling on katcha/earthen internal roads (if any) to reduce dust emissions.
iv. Ensure proper ventilation and, where required, vapor extraction/filtration systems in areas where sludge is handled.

6.8 NOISE & VIBRATION

6.8.1 POTENTIAL IMPACT

Noise from machinery, generators, pumps, and sludge handling equipment affects workers and nearby receptors.

6.8.2 MITIGATION MEASURES

i. Provide proper acoustic insulation and encasement around noise-generating equipment where feasible.
ii. Generators will be placed in acoustically treated rooms and fitted with silencers on exhausts.
iii. Provide ear muffs/earplugs to workers operating in high-noise areas and enforce their use.
iv. Schedule high-noise activities during the daytime and maintain the equipment to avoid abnormal noise.

6.9 ENVIRONMENTAL MANAGEMENT PLAN

The EMP lists all mitigation measures identified in the EIA and links them with the corresponding environmental aspects during both construction and operation phases. It also defines the responsible entities and the timeframe for implementation.

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Table 4.2 Environmental Management Plan – Construction / Installation Phase

Activity (Summary of Impacts)	Mitigation Measures	Timeframe	Responsibility
Air Pollution / Dust	• Utilize well-maintained machinery and vehicles on site and ensure regular monitoring and servicing. • Use water sprays to minimize dust generation from excavation, unloading, and internal traffic. • Provide workers with PPE such as dust masks and goggles.	Throughout the construction/installation phase	Proponent / Contractor
Water Resources	• Assess the availability of water to avoid undue pressure on community resources. • Obtain water from approved and sustainable sources. • Establish guidelines to minimize water wastage during construction (e.g., controlled use, leak detection). • Protect groundwater resources from contamination by ensuring proper storage and handling of fuels, lubricants, and chemicals.	**-do-**	Proponent / Contractor
Wastewater	• Sanitary wastewater from workers' facilities to be managed as per the wastewater management plan (septic tank/soak pit or estate sewer). • No hazardous untreated effluents to be discharged into the environment. • Prevent the washing away of construction materials, soil, or debris into drains by providing silt traps where required. • Ensure all machinery is regularly checked to avoid oil leaks.	**-do-**	Proponent / Contractor
Soil Erosion & Contamination	• Avoid creating excessive or unstable slopes. • Preserve topsoil removed during leveling and use it for landscaping or site restoration.	**-do-**	Proponent / Contractor

	• Designate specific areas for fuel and lubricant storage with secondary containment.		
Noise	• All major machinery to be fitted with silencers/acoustic insulation where applicable. • Provide suitable hearing protection (earmuffs/earplugs) to workers exposed to high noise levels and train them in their proper use.	**-do-**	Proponent / Contractor
Workers' and Public Safety	• Ensure safe working conditions through the implementation of a site-specific HSE plan. • Provide safe access and thoroughfare; display warning signs at hazardous locations. • Provide PPEs such as helmets, safety shoes, gloves, and high-visibility vests to all workers and enforce their use. • Conduct toolbox talks and safety orientations before initiation of tasks.	**-do-**	Proponent / Contractor
Social Impacts	• Prefer hiring local labor for manual work where possible. • Engage local educated persons for clerical and support roles where feasible. • Restrict the contractor's activities to designated construction areas. • Keep the site clean and orderly to reduce visual and nuisance impacts. • Maintain machinery in good order to minimize noise and emissions impacting nearby receptors.	**-do-**	Proponent / Contractor

Table 4.3 Environmental Management Plan – Operational Phase

Aspect / Impact	Mitigation Measures	Timeframe	Responsibility
Solid Waste	• Only domestic and process-related solid waste will be generated. • Solid waste will not be burnt within the premises. • Provide labeled waste bins at appropriate locations. • Segregate recyclable waste (metal, plastic, paper) and provide it to approved recyclers. • Dispose of non-recyclable waste through approved municipal/industrial estate arrangements.	Entire operational phase	Proponent / Plant Management
Wastewater	• No continuous process wastewater is expected; any intermittent wash water will be handled as per design. • Only domestic wastewater will be generated from toilets and washing areas; it will be treated in a septic tank/onsite treatment system before discharge. • Since the project is located within Rawat Industrial Estate, final disposal will follow Board of Management/estate guidelines and PEQS.	**-do-**	**-do-**
Air Emissions	• Maintain all generators, burners (if any), and process equipment to control emissions. • Implement vapor control measures for handling of petroleum sludge (closed systems, covered storage tanks, use of vents with filters where needed). • Regular inspection of valves, flanges, and transfer lines to minimize fugitive emissions.	**-do-**	**-do-**
Noise	• Regularly service handling equipment, pumps, generators, and other machinery. • Keep noisy operations within enclosed areas where possible. • Ensure workers in high-noise areas use PPE (earplugs/earmuffs).	**-do-**	**-do-**
Fire & Explosion Hazard	• Install appropriate fire-fighting equipment (fire extinguishers, hydrants, sand buckets) at strategic locations in sludge handling and storage areas.	**-do-**	**-do-**

	• Provide clearly marked fire exits and emergency escape routes, integrated at the design stage. • Conduct regular fire drills and train employees in emergency response and proper use of fire-fighting equipment. • Implement a hot-work permit system and a strict "No Smoking" policy in hazardous areas.		
Occupational Health & Safety (HSE)	• Orient workers to specific hazards of petroleum sludge handling and recycling operations (flammability, VOC exposure, slips, chemical contact). • Provide regular training in safe work practices, use of PPE, basic first aid, and emergency procedures. • Ensure adequate lighting and ventilation in all work areas. • Segregate pedestrian and vehicle movement routes within the facility. • Provide first aid kits and trained first aiders on site.	**-do-**	**-do-**
Equipment Maintenance	• Prepare and maintain equipment maintenance logs. • Develop maintenance schedules for critical machinery and vehicles. • Use properly tuned and calibrated equipment to ensure energy efficiency and lower emissions.	**-do-**	**-do-**

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6.10 ENVIRONMENTAL MONITORING PLAN

Environmental monitoring is a key component of the EMP. It is the primary mechanism for assessing whether the environmental mitigation measures are effective and whether the project is operating within legal and environmental limits. Monitoring results will be used to:

Identify trends and potential issues at an early stage.

i. Take corrective and preventive actions; and
ii. Demonstrate compliance with the regulatory agencies.

Table 4.5 Environmental Monitoring Plan

Environmental Component	Project Stage	Parameters	Instrument / Method	Standards	Location	Frequency	Duration / Method	In
Noise Levels	Operation	Noise levels in dB(A)	Digital Sound Level Meter (as per EPA-approved method)	PEQS for Noise	Sensitive locations within the project site (near main equipment, boundary)	Quarterly	As per EPA-approved testing methodology	T E m H
Health & Safety	Operation	Record of injuries, near misses, and accidents	Incident/accident reporting and registers	OSHA / National HSE guidelines	Entire plant area	Daily	Continuous reporting and monthly review	P H
Wastewater Quality	Operation	pH, BOD, COD, TSS, TDS, Oil & Grease, etc.	Sampling and analysis as per EPA-approved methods	PEQS for Industrial / Domestic Effluent (as applicable)	Discharge point from septic/onsite treatment system	Monthly or as required by the EPA	Grab samples, analyzed at a certified lab	E m t P
Solid Waste Management	Operation	Waste generation, segregation, storage, and disposal practices	Visual inspection and record review	Good industry practice / municipal guidelines	Within plant premises (storage areas, bins)	Daily inspection; formal review monthly	Checklists and site inspections	P M /

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6.11 LAB REPORTS OF ENVIRONMENTAL ANALYSIS

Baseline and operational monitoring of environmental parameters will be carried out through an EPA-certified laboratory to confirm compliance with relevant PEQS. Copies of the lab reports for air quality, wastewater quality, and noise levels will be attached in the Annexures of this EIA.

6.11.1 AIR QUALITY MONITORING

Air quality at and around the petroleum sludge recycling unit will be monitored for parameters as per Punjab Environmental Quality Standards (PEQS).

Monitoring reports from EPA-certified laboratories will be included in the Annexure.

6.11.2 WASTEWATER QUALITY MONITORING

Wastewater quality from the project site will be analyzed in accordance with PEQS. Typical parameters include pH, TDS, TSS, BOD, COD, and Oil & Grease. Results obtained from the EPA-certified laboratory will be attached in the Annexure, along with a comparison against PEQS limits.

6.11.3 NOISE MONITORING

Noise monitoring will be undertaken in accordance with PEQS for noise to assess compliance at the project site boundary and key operational areas. Monitoring results from the EPA-certified laboratory/monitoring agency will be annexed with this report.

6.12 INSTITUTIONAL CAPACITY OF THE UNIT

To ensure effective implementation of the EMP for the petroleum sludge recycling unit, an appropriate institutional arrangement will be maintained.

6.13 OPERATION MANAGEMENT & CONTROL

The concerned Plant Manager/Operations Manager will be responsible for conducting all operational activities in an environmentally sound manner.

The Manager will be trained in relevant environmental and HSE requirements to ensure informed decision-making and effective control.

6.13.1 SUPERVISION & MONITORING

A designated Environmental / HSE Supervisor will oversee implementation of the EMP, day-to-day monitoring, and record-keeping.

The Supervisor will coordinate with the plant management and external consultants/Labs for periodic monitoring, audits, and reporting to the regulatory authority.

6.14 COMMUNICATIONS & DOCUMENTATION

An effective system for recording, storing, and communicating environmental information will be established and maintained throughout the project's life.

6.14.1 MEETINGS

Two main types of environmental meetings will be conducted:

6.14.2 KICK-OFF MEETINGS

i. Held before the commencement of major activities (construction and operation).
ii. To present the EMP to project staff and contractors, discuss implementation arrangements, and review any major environmental incidents observed in similar installations, their root causes, and preventive measures.

6.14.3 WEEKLY / PERIODIC MEETINGS

i. Conducted weekly (or at defined intervals) during construction and operation.
ii. To discuss environmental performance, non-compliance, near misses, and improvement actions.
iii. Outcomes will be recorded in a brief environmental report or minutes of the meeting.

6.14.4 CHANGE-RECORD REGISTER

i. A change-record register will be maintained at the site to document any changes in project design, process configuration, or layout that may have environmental implications.
ii. All such changes will be evaluated through a simple change management mechanism and, where necessary, communicated to the EPA.

6.15 ENVIRONMENTAL TRAINING

Environmental and HSE training is essential to ensure that the requirements of the EIA and EMP are clearly understood and effectively implemented by all project personnel.

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Table 4.6 Training Schedule

Target Audience	Trainers	Contents	Schedule
Selected Management Staff	External Consultants / HSE Experts	HSE Management, Environmental Legal Requirements, EMP Implementation	Every 5 months or as required
All Personnel	Consultants / HSE Officer	Fire Fighting (Training/Drill), Emergency Response, Evacuation Procedures	Monthly
Technical / Operational Staff	Consultants / HSE Officer	Safe Handling of Petroleum Sludge, Use of PPE, Spill Response, Confined Space Entry (if any), Equipment Safety	At induction and refreshers every 6–12 months

6.16 EQUIPMENT MAINTENANCE DETAILS

i. PPEs (helmets, safety shoes, gloves, goggles, masks, ear protection) and other required safety equipment of suitable quality and certified standards will be provided by the Proponent.

ii. Process and pollution control equipment of modern and high-efficiency design will be selected to minimize emissions, energy consumption, and safety risks.

iii. Preventive maintenance schedules will be prepared for all critical machinery, safety systems, and monitoring equipment, and strict adherence will be ensured to maintain environmental performance and operational safety of the petroleum sludge recycling unit.

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CHAPTER NO 07

CONCLUSIONS AND RECOMMENDATIONS

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CHAPTER NO 07: CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSION

This Initial Environmental Examination (EIA) has been conducted for the **installation and operation of a petroleum sludge recycling unit at Rawat Industrial Estate, Rawalpindi, Punjab**. Based on the project description and baseline environmental con ditions, the following conclusions are drawn:

i. The project site is already under industrial use and does not contain any environmentally sensitive receptors or endangered species.

ii. The selected project design and technology are suitable for the current environmental setting and support safe handling and recycling of petroleum sludge.

iii. From an environmental and socio-economic perspective, the project is **feasible and desirable**. It will help in the environmentally sound management of petroleum sludge, reduce uncontrolled disposal, and contribute to resource recovery.

iv. The project will generate employment opportunities for skilled and unskilled labor and support local economic activity within the industrial estate.

v. With proper implementation of the proposed mitigation measures and the Environmental Management & Monitoring Plan (EMMP), **no significant adverse impacts** on the physical, biological, or social environment are anticipated.

Therefore, it is concluded that the project is environmentally acceptable, and **Environmental Approval** may be granted by the Punjab Environmental Protection Agency, subject to compliance with applicable regulations and payment of the requisite scrutiny fee.

7.2 RECOMMENDATIONS

In light of the EIA findings for the petroleum sludge recycling unit, the following key recommendations are made:

i. Strict implementation of the EMP/EMMP during construction and operation should be ensured.

ii. Provide and enforce the use of appropriate PPEs (gloves, safety shoes, helmets, masks, ear

protection) for all workers, especially those handling petroleum sludge.

iii. Conduct regular HSE and SOP trainings for workers and staff, including safe sludge handling, spill response, and emergency procedures.

iv. Install and maintain adequate fire-fighting equipment (extinguishers, hydrants, alarms) in all sludge storage and processing areas; conduct periodic fire drills.

v. Ensure proper equipment maintenance to minimize emissions, leaks, and breakdowns.

vi. Provide designated, secure storage areas for fuels and chemicals with secondary containment to prevent soil and groundwater contamination.

vii. Develop and implement a small-scale plantation/greening plan within and around the unit to improve the micro-environment.

viii. Provide sufficient waste collection bins for domestic and process-related solid waste and ensure its proper segregation and disposal through approved channels.

ix. Establish a first aid facility/dispensary and first aid boxes at key locations within the unit.

x. Enforce a no-smoking policy in all process areas and near fuel and sludge storage zones.

xi. Train security guards and key staff in emergency response and evacuation procedures, including communication with hospitals and emergency services.

xii. Fully implement the Environmental Management & Monitoring Plan and maintain proper records of all monitoring and compliance activities for submission to the regulatory authority when required.

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ANNEXURE A

SITE LAYOUT AND LOCATION MAP

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ANNEXURE B

PROCESS FLOW DIAGRAM

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ANNEXURE C

ENVIRONMENTAL MONITORING REPORT

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ANNEXURE C

CNIC OF PROJECT PROPONENT

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ANNEXURE D

PROPERTY DOCUMENT

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