CLIENT RESPONSIBILITY

- Proponent will be responsible to nominate a senior officer as Coordinator who will be responsible for all coordination activities as required by the Consultants and to whom the Consultants will refer for information and assistance. All correspondence between the Consultants and the CLIENT will be routed through the Coordinator
- Consultants will require free access to all relevant information available with the Client
- The report developed for the CLIENT shall be the property of the CLIENT and the Consultants shall adhere to confidentiality morally as well as legally.
- Client will provide relevant documents as:
    - Signed application on company letter head
    - Pay Order in favor of DG EPA as review fee 30,000/-
    - Undertaking on Stamp Paper as per EPA Format
    - Affidavit on Stamp Paper as per EPA Format
    - Copy of CNIC of proponent
    - Dually filled and Sign Schedule IV
    - Details of firefighting Equipment's
    - Layout Maps of the project
    - Other NOCS/Certificates from other concerned departments (if any)
    - Any other relevant documents/details required by the consultant.

Signatures: _____

Environmental Consultant

Environmental Services Pakistan

(ESPAK) Lahore

Signatures:

Client: Muhammad Naseer

M/s AT Waste Management Company Ltd

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(ESPAK) Lahore

Signatures:

Client: Muhammad Naseer

M/s AT Waste Management Company Ltd

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Establishment of "Battery Recycling Unit" Within the premises of A.T. Waste Management

Address: 0.5 Km Off: 10-Km Raiwind Road, Hudiara Drain, Near Bhobattian Chowk, Lahore

2025

Proponent:

A.T Waste Management

(Waste Management & Resource Recovery Division Lahore)

Environmental Services Pakistan

Office No. 731, Block-2, Sector D1, Shah Jilani Road, Township, Lahore, 54770 Pakistan
Tel: +92 42 35154015 – 16
URL: www.espak.com.pk | Email: info@espak.com.pk

EXECUTIVE SUMMARY

With the global shift towards electric vehicles (EVs), renewable energy storage, and portable electronics, the use of lithium-ion batteries (LiBs) is rapidly increasing. Particularly, lead-acid and lithium-ion (Li-ion) batteries have surged in Punjab, Pakistan. Punjab is also witnessing growth in EV adoption, solar energy systems, and consumer electronics, leading to a surge in spent LiBs. Establishing a Lithium-Ion Battery Recycling and Resource Recovery Plant in Punjab is essential to address environmental concerns, recover valuable materials, and support a circular economy. Improper disposal of spent batteries poses severe environmental and health hazards due to toxic metals (lead, lithium, cadmium, sulfuric acid) and non-biodegradable components. There is an increasing need to address the environmental and economic challenges associated with end-of-life (EoL) batteries (lithium-ion, Dry, & Lead Acid). Establishing a Lithium-Ion Battery Recycling and Resource Recovery Plant in Punjab is both a necessity and an opportunity. The disassembling of lead-acid and dry batteries is not so complete. It will address environmental challenges, contribute to economic growth, and position Pakistan as a responsible player in the global clean energy transition.

This executive summary presents an overview of the main findings of the Environmental Impact Assessment Report for the establishment of Ecologically Safe recycling of condemn batteries especially the Lithium-Ion batteries for which there is no formal battery waste management in Punjab and even in Pakistan.

The project mainly focuses on the management lithium-ion battery recycling as a part of our already operational Integrated waste management system -cum- Circular Economy System for which small portion has been reserved in the existing set up, so no extra land acquisition is needed. The facility is designed to reduce environmental pollution while ensuring circular economy practices and sustainability in waste management.

The Battery Recycling system (about 03-04 Marla area) will be located as a part of the already existing waste management site of a total 30-kanal site facing the Hudiara Drain, Lahore. The project aims to provide innovative waste management solutions through. The site is surrounded by industrial units, with its operations contributing to carbon emissions reduction and ecological sustainability.

This report evaluates the environmental impacts of the project and presents mitigation strategies to ensure compliance with EPA's environmental laws/regulations. The project is anticipated to play a key role in promoting sustainable waste management solutions while contributing to global environmental goals.

The Non-Hazardous Organic Wastes Management Division of the ATWM is already in operation in the complex of the proposed site. This division is working on Net Zero Waste / Carbon Footprint reduction, comprised of various sub-sections like Biomass Briquetting (Waste to energy. Anaerobic Digestion (Biogas Plant of 90 X 20 X 14 cubic ft & its gas is used in plastic moulding), Windrows Vermi-composting (GHGs / Carbon Sequestering), Integrated Waste Management System, Circular Economy System, Bioremediation (Anaerobic & Anaerobic Digestion, Bio-utilization / Bioconversion of Food Wastes into Poultry, Meat & Eggs). In case of any organic component hard for Aerobic / Anaerobic Digestion, it is used in making Biomass Briquetting (Waste to Energy) in our facility.

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

Environmental, Economic, Regulatory Necessity & Health Concerns

a) Environmental Concerns:

- The project will help in streamlining the formal sector recycling instead of unsafe recycling in the informal sectors, which are spreading environmental problems due to a lack of capacity, capability, lack of proper infrastructure & technology.
- The disassembling will be done under strict SOPs.
- All recyclables will be managed under the Circular Economy System.
- The hazardous components will be sent to our incineration facility, already in operation at Small Industries Estate, Kasur. It is already operating with a target of “End Zero Waste” and it is equipped with a belt-operated intermittent Feeding System for saving heat, Wet Scrubber & Temperature Quenching System, and Water Circulation / Recycling System. Bottom dry ash is sieved, and the partially burnt part is re-fed to the Incinerator, and the fine bottom Ash is used for concrete block making. The sludge of the Wet Scrubber is re-fed to the Incinerator.
- Recyclable plastic in the form of separators may be recycled in our already existing Plastic Recycling / Upcycling Division in the said Complex / Site of Battery Recycling, wherein plastic waste is recycled by using Renewable Fuel (Biogas captured in our Anaerobic Digester of size 90 x 20 x 14 cubic ft., for Organic Wastes Management) and Renewable Power (150 KW) of our Solar System.

- No burning activities will be done at the proposed site, as all the combustible hazardous wastes of the battery will be sent to our incinerator.
- Acid produced from lead-acid battery will either be neutralized with lime or will be reused/recycled for battery after proper process/makeup.
- In case of any hazardous liquid waste, the same will be sent for incineration.

b. Economic Opportunity

- Valuable metals such as lithium, cobalt, and nickel can be recovered and reused, reducing the need for expensive imports.
- A formal recycling plant can generate jobs, encourage industrial development, and support circular economy initiatives.

c. Energy Security and Supply Chain Resilience

- Recycling helps reduce dependence on raw material imports, supporting national energy security.
- Pakistan currently has no large-scale LIB recycling facility, making it vulnerable to global supply disruptions.

d. Regulatory and Global Trends

- Global push towards Extended Producer Responsibility (EPR) and sustainability compliance makes LIB recycling a future regulatory requirement.
- Aligns with Pakistan's commitments under SDGs, especially Goal 12 (Responsible Consumption and Production).

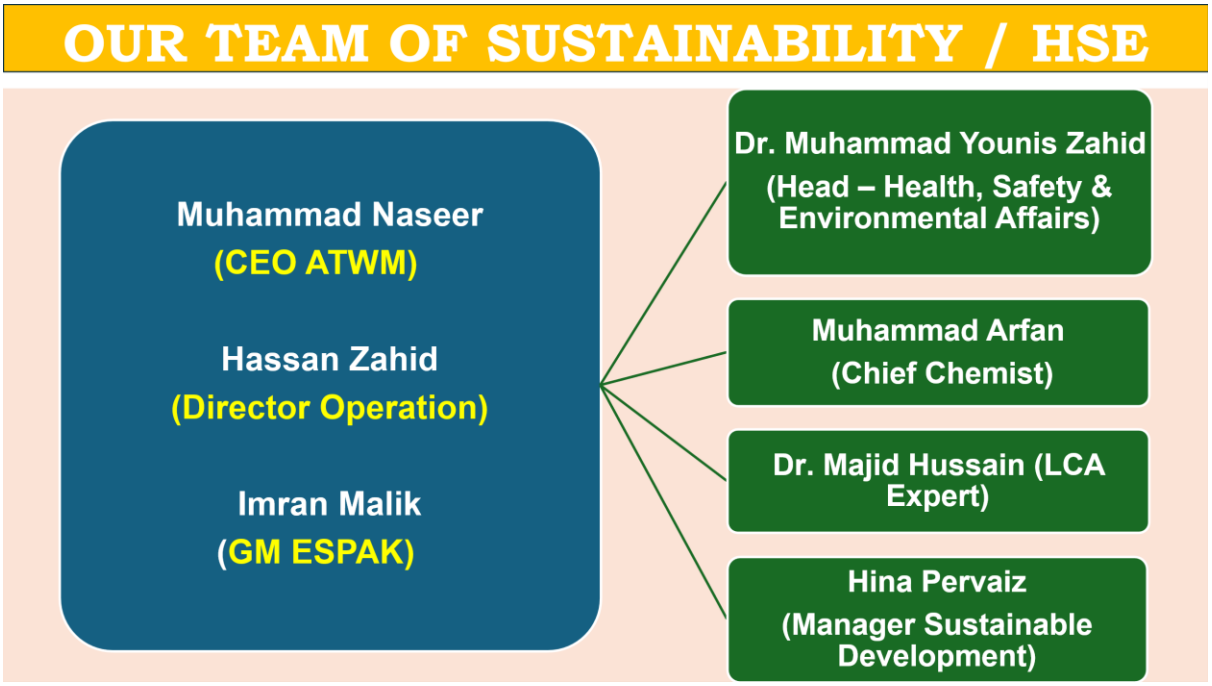
e. Techno-legal and Safety Compliance.

We have qualified and experienced staff for supervision and training of our workers, i.e., **Dr. Muhammad Younis Zahid**, Head-Health, Safety & Environmental Affairs / Techno-Legal Expert (PhD Environmental Management, PGDs in Environmental Laws, Environmental Management, Health, Safety & Environment), and **Miss Hina Pervaiz**, Manager, Sustainable Development M.Phil.: Geo-environmental Conservation and Sustainable Development.

A.T Waste Management (ATWM) is already EPA Punjab Approved, having ISO 9001: 2015, ISO 14001: 2015, ISO 45001: 2018, ISO 27001: 2013, registered under the Companies Act and Labour laws. ATWM is already submitting compliance reports quarterly to the EPA in Punjab.

ATWM has excellent firefighting arrangements, Safety equipment, an emergency evacuation plan, an assembly point, every Section has the necessary instructions for the

worker.



Salient Features of Project:

1.	**Project Title**	Establishment of **"Battery Recycling Unit"** within the premises of A.T. Waste Management Lahore
2.	**Project Location**	0.5 Km Off: 10 Km Raiwind Road, Hudiara Drain, Near Bhobattian Chowk, Lahore, Punjab, Pakistan
3.	**Proponent**	Muhammad Naseer
4.	**Consultant**	Environmental Services Pakistan Private Limited (ESPAK)
5.	**Total Area of Project**	30 Kanal
8.	**Nature of Area**	Industrial Area facing Hudiara Drain
9.	**Present Status of Land Use**	Vacant land portion within the premises of ATWM
10.	**Cost of Project**	01 million, excluding land (Land already Available)
13.	**Description of proposed project**	Establishment of Ecologically Safe "Battery Recycling Unit" within premises of A.T Waste Management, Raiwind Road, Hudiara Drain, Lahore

15.	**Status of Project**	The proposed site is open land within the premises of A.T Waste Management, Raiwind Road, Hudiara Drain, Lahore

PROJECT OBJECTIVES

The primary objective of the proposed project is to establish an ecologically safe battery Recycling Unit within the Recycling / Upcycling premises of the ATWM at Lahore. This includes neutralization/discharging of batteries, disassembling, and segregation into different components according to their utility under the Integrated Waste Management and Circular Economy System. The project aims to reduce environmental pollution and to promote sustainability by adopting a circular economy approach and an Integrated Waste Management System. Moreover, the project seeks to align with national and international environmental standards, including compliance with the United Nations Framework Convention on Climate Change (UNFCCC), and contribute to the Climate Resilient Punjab Vision & Action Plan 2024. Overall, the project aims to serve as a model for responsible waste management, benefiting the environment and the surrounding industrial community.

Site Alternatives

Land is already available with Waste Management Facilities within the premises of the Proponent at Hudiara Drain which is suitable for industrial establishments / Entities.

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

Economic Alternative

The immediate economic benefits of the proposed project are the generation of employment opportunities and revenue. Direct and indirect jobs creation will occur in a broad range of aspects such as construction services, repair and maintenance, electricity supply, hardware and building supplies retailing, motor vehicle and parts retailing, waste collection, treatment and disposal services, gas supply, rental and hiring services, garden supplies retailing, cleaning and janitorial, pest control and printing etc. The project timeline is 03 months, which means that the project will create multiple jobs.

Environmental Alternative

The innovative methods of waste Management & Disposal will be deployed to protect environment and Environmental Compliant and through Circular Economy (Segregation / Sorting into raw materials of Resource Recovery Industry), so no environmental alternatives are needed.

SCREENING

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

CATEGORY OF THE PROJECT: The Proposed Project; falls under Regulation 4 (List of projects requiring an EIA) read with Schedule-II, Sector B (Manufacturing and processing) and sub-Sector-12. (Battery Manufacturing and Recycling Plants) of the Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations 2022. Thus, an EIA report is being prepared and submitted accordingly for approval.

ENVIRONMENTAL CONSULTANT:

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

SCOPING

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

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

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

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

IMPACTS AND RECOMMENDED MITIGATION MEASURES:

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

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

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

Key impacts related to the construction & operational phase include:

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

Mitigation measures recommended to be incorporated into the project include running the machines and vehicles of good quality (low-sulfur fuels) in good working order ensuring regular maintenance, tuning and servicing, and providing them with emission control devices, such as mufflers and silencers, etc. Water suppression and covered transportation and odor of construction materials and slow driving on unpaved roads will control dust emission. No considerable construction will be involved. For community safety, irrelevant persons will not be allowed inside. Safety of the workers will be ensured by developing SOPs for all jobs, training the workers to follow SOPs, discouraging any careless attitude of workers and providing the workers with, and encouraging them to use PPEs.

ENVIRONMENTAL MANAGEMENT & MONITORING PLANS:

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

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

Table 1.1: Environmental Monitoring Plan

Parameter	Project Phase	Parameters	Frequency	Standards	Supervision
Air Quality	Construction (No significant Construction)	SPM, PM10, PM2.5	PM10, for continuous 8 hours, on a quarterly basis	WHO/USEPA guidelines, PEQS	Project Proponent
Roadside Plantation	Construction	Visual inspection of plant species survival rate and status of maintenance	One month after plantation, One year after plantation 1 month, 3 months, 6 months, and 12 months after planting	75 % survival rate	Project Proponent
Noise Levels	Construction	dB (A)	On a quarterly basis	EPA Ambient Noise standards	Project Proponent
Water Quality	Construction	No wastewater will be generated	Quarterly	WHO and PEQS	Project Proponent
Land clearing	Minor Construction	---	---	---	Project Proponent
Air Quality	Operation	particulate matter (PM10 and PM2.5)	Quarterly	WHO/USEPA	Project Proponent

				guidelines, PEQS	
Noise	Operation	dB (A)	Quarterly	WHO/USEPA guidelines, PEQS	Project Proponent
Plantation	Operation	Visual inspection of plant species survival rate and status of maintenance	----	75% survival rate	Project Proponent
Sewerage Effluent	Operation	PEQS parameters for liquid effluents	Quarterly	PEQS	Project Proponent

CONCLUSION

The EIA Report contains a description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study. While the objectives of this study have been to describe the project and its environmental impacts, it also identifies adverse environmental factors associated with the project. Appropriate mitigation measures as explained in the environmental study should be considered, if not eliminate, these impacts so that these are within acceptable limits.

No construction is required, and the activities will be mostly done under the Green Sheets / Cloths of Fiber Glass Green Sheets. The project is waste management having no significant impacts.

List of Abbreviation

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

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CHAPTER # 1

INTRODUCTION

With the global shift towards electric vehicles (EVs), renewable energy storage, and portable electronics, the use of lithium-ion batteries (LiBs) is rapidly increasing. Particularly lead-acid and lithium-ion (Li-ion) batteries has surged in Punjab, Pakistan, particularly Punjab, is also witnessing growth in EV adoption, solar energy systems, and consumer electronics, leading to a surge in spent LiBs. Establishing a Lithium-Ion Battery Recycling and Resource Recovery Plant in Punjab is essential to address environmental concerns, recover valuable materials, and support a circular economy. Improper disposal of spent batteries poses severe environmental and health hazards due to toxic metals (lead, lithium, cadmium, sulfuric acid) and non-biodegradable components. There is an increasing need to address the environmental and economic challenges associated with end-of-life (EoL) batteries (lithium Ion, Dry & Lead Acid). Establishing a Lithium-Ion Battery Recycling and Resource Recovery Plant in Punjab is both a necessity and an opportunity. The disassembling of lead acid and dry batteries is not so completed. It will address environmental challenges, contribute to economic growth, and position Pakistan as a responsible player in the global clean energy transition.

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This report evaluates the environmental impacts of the project and presents mitigation strategies to ensure compliance with EPA's environmental laws/regulations. The project is

anticipated to play a key role in promoting sustainable waste management solutions while contributing to global environmental goals.

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

The report provides relevant information, as required under the officially approved format, to help the decision makers, i.e., EPA Punjab before issuing for Environmental Approval.

1.1 THE PROPONENT

Name of Proponent	Muhammad Naseer
Address	Building No: 733, Block- 2, Sector: D-1, Shah Jilani Road, Township, Lahore - Pakistan

1.2 THE PROPOSED PROJECT

The Proposed Project is titled as "Establishment of **"Battery Recycling Unit"** within premises of A.T Waste Management Hudiara Drain, Raiwind Road, Lahore". Its salient features have been described later in this Chapter, and briefly in the Executive Summary of this EIA Report.

1.	**Project Title**	Establishment of **"Battery Recycling Unit"** within premises of A.T Waste Management Lahore
2.	**Project Location**	0.5 Km Off: 10th Km Raiwind Road, Hudiara Drain, Near Bhobattian Chowk, Lahore, Punjab, Pakistan
3.	**Proponent**	Muhammad Naseer

4.	**Consultant**	Environmental Services Pakistan Private Limited (ESPAK)
5.	**Total Area of Project**	30 Kanal
8.	**Nature of Area**	Industrial Area facing Hudiara Drain
9.	**Present status of Land Use**	Vacant land portion within premises of ATWM
10.	**Cost of Project**	01 million, excluding land (Land already Available)
13.	**Description of proposed project**	Establishment of Ecologically Safe "Battery Recycling Unit" within premises of A.T Waste Management Raiwind Road, Hudiara Drain, Lahore
15.	**Status of Project**	Proposed site is open land within premises of A.T Waste Management Raiwind Road, Hudiara Drain, Lahore

1.2.1 Location of Project

The total area of the Waste Management site is 30 Kanals of which only 03-04 Marla have been allocated for the proposed project. The site has the following physical Coordinates.

GPS Coordinates: 31°23'27.10"N, 74°13'33.20"E

Front Side: Hudiara Drain

Backside: Open Industrial Plot

Right Side: Great Yuemei Textile, Industrial Units, Pak Hero Rickshaw, Raiwind Road, Industrial Units up to Bedian Road

Left Side: Open Industrial Plots, Industrial units up to River Ravi. The proposed site faces the Hudiara Drain. The Hudiara Drain having total 100 km length, originates from India and joins River Ravi (50km in India & 50 Km in Pakistan). It receives industrial as well as sewage from India and Pakistan. The area belt from on both sides of the Hudiara Drain from Bedian Road to River Ravi (About 40 km) has developed as industrial having Textile Mills, Paper Industry, Hosiery, Engineering, Tractor Parts, Food & Beverages, Chemicals, Pharmaceuticals, (About more than 200 Industrial Units).

Site pictures are given below:

A.T Waste Management

Existing Site




1.2.2 Area of Project

The proposed project's total area is approximately 30 Kanal.

1.3 DETAILS OF CONSULTANTS

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

Table1.2: List of Experts

TEAM & QUALIFICATION EMPLOYEES

#	Names	Designation	Qualification
1.	Ali Ramzan	Environmentalist	BS Environmental Science
2.	Hina Pervaiz	Manager Sustainable Development	M.Phil.: Geo-environmental Conservation and Sustainable Development
3.	Asma Akram	Environmentalist	M.S Environmental Science
4.	Shagufta Tahir	Environmentalist	M.phil Environmental Science
5.	Shahzad Ahmad Khan	Business Development Manager	MBA Marketing

1.4 PURPOSE OF REPORT

The main objectives of this IEE study were:

- To determine and document the state of the environment of the project area to establish a baseline in order to assess the suitability of the Proposed Project in that area.
- To identify preconstruction, construction and operation activities and to assess their impacts on environment.
- Provide assistance to the proponent for planning, designing and implementing the project in a way that would eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in cost effective manner.
- To evaluate the potential effects of proposed project.
- To predict the qualitative and quantitative impacts and provide mitigatory measures as well as their reasonable alternatives.
- To assign particular roles and responsibilities to steer their behavior towards environmental awareness.
- To present Mitigation and Monitoring Plan to smoothly implement the suggested mitigation measures and supervise their efficiency and effectiveness.
- To provide an opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.
- Prepare an IEE Report for submittal to the Environmental Protection Agency, Punjab for according to Environmental Approval.

1.5 SCOPE OF STUDY

For the EIA study, the scope of work is as under:

- Description of physical, ecological and socio-economic conditions in and around the proposed facility. Project impact identification, prediction and significance at all stages of the project including planning, implementation and operation.
- Evaluation of needs of disposal and regional dredging.
- Identification and assessment of the workability of mitigation measures to offset or minimize negative project impacts on environment.
- Providing mitigatory measures or appropriate alternatives.
- Identification of occupational hazards during all stages of the project and laying down suggestions for improvement in the conditions.

1.6 IMPACT ASSESSMENT

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

- Geomorphology
- Meteorology
- Groundwater
- Soil quality
- Ambient air quality & noise level
- The ecology of the area, including flora and fauna
- Local communities

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

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

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

CHAPTER# 2.

SCREENING

2.1 SCREENING/TYPE AND CATEGORY OF PROJECT

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

The Proposed Project; falls under Regulation 4 (List of projects requiring an EIA) read with Schedule-II, Sector B (Manufacturing and processing) and sub-Sector-12 (Battery Manufacturing and Recycling Plants) of the Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations 2022. Thus, an EIA report is being prepared and submitted accordingly for approval.

The screening process has identified potential environmental impacts related to waste management practices, necessitating a thorough evaluation to ensure compliance with environmental standards. By conducting this EIA, we aim to assess and mitigate any adverse effects on the environment while promoting sustainable waste management practices within the framework of regulatory requirements.

CHAPTER# 3.

DESCRIPTION OF PROJECT

3.1 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, cost and magnitude of operation and various phases. Inputs and discharges relevant to different phases of the project, such as electricity & materials, etc. have also been examined as a response to possible environmental concerns.

3.2 TYPE AND CATEGORY OF PROJECT

The Proposed Project; falls under Regulation 4 (List of projects requiring an EIA) read with Schedule-II, Sector B (Manufacturing and processing) and sub-Sector-12 (Battery Manufacturing and Recycling Plants) of the Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations 2022. Thus, an EIA report is being prepared and submitted accordingly for approval.

3.3 OBJECTIVES OF PROJECT

The primary objectives of the project are as follows:

- To provide an integrated waste management service focusing on both organic and inorganic waste streams.
- To reduce the carbon footprint of industries by promoting sustainable and climate-resilient waste management practices.
- To convert waste into valuable resources, such as compost, biogas, and biomass briquettes, in line with the circular economy model.
- To ensure compliance with national and international environmental laws, including Climate Resilient Punjab Vision & Action Plan 2024 and UNFCCC guidelines.
- To introduce innovative waste disposal methods that replace traditional incineration and landfilling, minimizing environmental impact and generating carbon credits.

3.4 PROJECT DESCRIPTION

The proposed project, comprised of "**Establishment of Ecologically Safe "Battery Recycling Unit" within premises of A.T Waste Management Raiwind Road, Hudiara Drain, Lahore".** The waste management facility will utilize advanced technologies to recycle the batteries. The project site spans 30 kanals and is located facing the Hudiara Drain in Lahore.

The Hudiara Drain is a significant industrial and sewage conduit shared between India and Pakistan. The surrounding area is a well-established self-developed as industrial zone, home to over 200 industrial units, including textile mills, paper industries, food and beverage processing units, and engineering facilities.

Typical EV Battery Pack Voltages:

EV Type	Common Voltage Range
Small/ Hybrid EVs	100V – 200V
Standard EVs (e.g., Nissan Leaf, Chevy Bolt)	300V – 400V
Performance EVs (e.g., Tesla Model S, Porsche Taycan)	400V – 800V
Ultra-fast Charging EVs	Up to 900V+

Standard Li-ion (3.7V Nominal)

State	Voltage (approx.)
Fully Charged	4.2V
Nominal (average during use)	3.7V
Nearly Discharged	3.0V
Critical Low (unsafe to discharge below this)	2.5V or lower

3.5 NEED & IMPORTANCE OF THE PROJECT

With the global shift towards electric vehicles (EVs), renewable energy storage, and portable electronics, the use of lithium-ion batteries (LiBs) is rapidly increasing. Particularly lead-acid and lithium-ion (Li-ion) batteries has surged in Punjab, Pakistan. Pakistan, particularly Punjab, is also witnessing growth in EV adoption, solar energy systems, and consumer electronics, leading to a surge in spent LiBs. Establishing a Lithium-Ion Battery Recycling and Resource Recovery Plant in Punjab is essential to address environmental concerns, recover valuable materials, and support a circular economy. Improper disposal of spent batteries poses severe environmental and health hazards due to toxic metals (lead, lithium, cadmium, sulfuric acid) and non-biodegradable components. There is an increasing need to address the environmental and economic challenges associated with end-of-life (EoL) batteries. A typical lithium-ion battery stores 150 watt-hours of electricity in 1 kilogram of battery, compared to NiMH Battery pack (100 watt-hours per kg) or Lead Acid Battery (25 watt-hours per kg). It takes 6 kilograms to store the same amount of energy in a lead-acid battery that a 1-kilogram lithium-ion battery

can handle. The growing demand consequently waste generation are increasing rationally, so it is the need of the Era to have formal Resource Recovery units.

- **Rise in EVs & Renewable Energy Storage:** Punjab is promoting electric bikes, rickshaws, and solar systems, increasing LiB usage.
- **E-Waste from Electronics:** Discarded smartphones, laptops, and power banks contribute to LiB waste.
- **Projected Growth:** Without recycling, Pakistan could face thousands of tons of hazardous battery waste annually by 2030.

3.6 ENVIRONMENTAL, ECONOMIC, REGULATORY NECESSITY & HEALTH CONCERNS

Establishing a Lithium-Ion Battery Recycling and Resource Recovery Plant in Punjab is both a necessity and an opportunity. It will address environmental challenges, contribute to economic growth, and position Pakistan as a responsible player in the global clean energy transition.

3.6.1 Environmental Concerns:

- Increasing use in EVs, solar storage, and electronics leads to fire risks, heavy metal pollution (cobalt, nickel), and e-waste accumulation if not recycled properly.
- Unsafe recycling in the informal sectors releases lead and acid, contaminating soil and water, causing neurological disorders, kidney damage, and developmental issues in children.
- Resource Recovery: Lead, lithium, cobalt, Copper, Silver, Steel, Aluminium, and plastic can be extracted and reused, reducing import dependency and supporting circular economy principles.
- Global Precedents: Following EU, China, and India's lead in LiB recycling regulations we may prevent; Improper disposal of LIBs poses serious environmental risks due to toxic elements like cobalt, nickel, and lithium and Groundwater contamination and air pollution from informal recycling or landfill dumping are rising threats.

3.6.2 Economic Opportunity

Valuable metals such as lithium, cobalt, and nickel can be recovered and reused, reducing the need for expensive imports.

A formal recycling plant can generate jobs, encourage industrial development, and support circular economy initiatives.

3.8.3 Energy Security and Supply Chain Resilience

Recycling helps reduce dependence on raw material imports, supporting national energy security.

Pakistan currently has no large-scale LIB recycling facility, making it vulnerable to global supply disruptions.

3.8.4 Regulatory and Global Trends

Global push towards Extended Producer Responsibility (EPR) and sustainability compliance makes LIB recycling a future regulatory requirement.

Aligns with Pakistan's commitments under SDGs, especially Goal 12 (Responsible Consumption and Production).

3.8.5 Battery – basic information

a. Batteries Categorical Comparison

Lead Acid Battery	Dry Cell Battery	Lithium Ion Battery
Car batteries, UPS systems, solar power backup.	Flashlights, toys, remotes (e.g., AA, AAA alkaline batteries).	Smart Phones, laptops, electric vehicles (EVs), power tools.
~2.0 V	~1.5 V	~3.6 to 3.7 V
Lead dioxide (PbO_2), sponge lead (Pb), sulfuric acid (H_2SO_4)	Zinc-carbon or Alkaline (zinc-manganese dioxide)	Lithium ions move from anode → cathode through the electrolyte. Electrons flow from anode → external circuit → cathode.

Lead-acid Battery Anode: Sponge lead (Pb) Cathode: Lead dioxide (PbO_2) Electrolyte: Sulfuric acid (H_2SO_4) Ions: H^+ and SO_4^{2-} ions move between electrodes Form water (H_2O) and lead sulfate ($PbSO_4$) during discharge Electrons: Flow through external circuit from Pb anode → PbO_2 cathode Rechargeable: Yes Key Concept: Redox with formation and dissolution of lead compounds Acid shuffling ions while lead plates react. Flow from one lead plate to the other	Dry Cell Battery (e.g., Alkaline AA) Anode: Zinc Cathode: Manganese dioxide (MnO_2) Electrolyte: KOH (alkaline) or NH_4Cl paste (acidic in old types) Ions: Zn^{2+} ions form at the anode; OH^- ions migrate internally. Electrons: Flow from zinc anode → external circuit → cathode Rechargeable: No (mostly one-time use) Key Concept: Full redox reaction consumes materials Zinc dissolving and reacting Basic electricity flow from zinc	<u>Ions:</u> Lithium ions move from anode → cathode through the electrolyte & Separator. <u>Electrons:</u> Electrons flow from anode → external circuit → cathode (this powers your device). • Reactions: Anode (Oxidation): $Li \rightarrow Li^+ + e^-$ Cathode (Reduction): $Li^+ + e^- +$ Metal Oxide → Li-Metal Oxide Discharging: [Anode] → Li^+ → [Cathode] [Anode] → e^- → (External Load) → [Cathode] Net flow: Ions inside the battery (through electrolyte) & Electrons outside the battery (through the circuit) Key Concept: Intercalation of Li^+ ions into electrodes (not full chemical reactions). Lithium atoms changing beds.
Lead Acid Battery store 25 watt-hours per kg)	NiMH Battery pack store 100 watt-hours per kg	Lithium-ion battery stores 150 watt-hours of electricity per Kg

Feature	Lithium-ion	Dry Cell	Lead-acid
Electrolyte	Lithium salt in organic solvent	Paste of ammonium chloride or KOH	Sulfuric acid (H_2SO_4)
Ion flow	**Li^+ ions** (Anode → Cathode)	**Zn^{2+}, Cl^-, NH_4^+, OH^- ions**, etc.	**H^+, SO_4^{2-} ions** (both ways, depending)
Electron flow	Anode → External circuit → Cathode	Anode → External circuit → Cathode	Anode → External circuit → Cathode
Separator role	Allows Li^+ ions, blocks electrons	Allows ion movement only	Allows ion movement, keeps electrodes apart
Rechargeable	Yes	No (usually)	Yes

Basic Components of Lithium Ion Battery:

Sr #	Feature	Brief
	Anode (Negative electrode)	Usually made of graphite
	Cathode (Positive electrode)	Made of lithium metal oxide (like $LiCoO_2$, $LiFePO_4$, etc.)
	Electrolyte	Lithium salt (like $LiPF_6$) in organic solvent — allows ion flow only
	Separator	A porous membrane that allows lithium ions to pass but blocks electrons

Property	Anode	Cathode
Symbol	(–)	(+)
Function	Electrons leave (oxidation)	Electrons enter (reduction)
During Discharge	Source of electrons	Destination of electrons
During Charge	Becomes positive (in Li-ion)	Becomes negative (in Li-ion)

Basic information of Li Ion Battery

Most devices shut down before the battery hits 0%, usually around 2.5-3.0 volts per cell but in deep discharge the voltage drops below 2.5V, the battery is in a deep discharge state can cause permanent damage if left too long.

Each Li-ion cell has a nominal voltage of 3.6–3.7V, and manufacturers combine hundreds of cells to reach the required total voltage. Example: Tesla Model 3: Uses ~96 cells in series, each 3.6–4.2V. Total voltage = ~350V–400V depending on charge level.

If battery is being dismantled to reuse the cells, it should not deeply discharge. Just bring them to a safe state of charge and handle with care.

The battery stores energy by repacking lithium ions into the anode (-tive) and Lithium ions are not simply deposited as metal, and these are intercalated (inserted) between layers of materials like graphite and metal oxides.

During charging, the Lithium ions move from cathode (+tive) → anode (-tive) through the electrolyte, Electrons flow from cathode → external circuit → anode (supplied by charger).

It takes 6 kilograms to store the same amount of energy in a lead-acid battery that a 1-kilogram lithium-ion battery can handle.

Li Batteries are pressurized and so they need an outer wall made of metal, which has a pressure-sensitive vent hole. If there's a risk of the battery becoming very hot and exploding from over-pressure (pressure buildup at 3,000 kPa), this vent will release the extra pressure and prevent other cells in the battery pack from catching fire.

On excessive heat, when the core reaches 130°C (266°F), the separator melts which stops the transport of ions. This action immediately shuts down the cell.

In case of fire, a standard ABC or BC dry chemical fire extinguisher must be used since these are considered Class B fire. To put out large lithium-ion battery fires, use a foam extinguisher containing CO2, powder graphite, ABC dry chemical, or sodium carbonate.

Lithium-ion fires catch fire at temperatures around 500 degrees Celsius (932 degrees Fahrenheit– and reach up to 1110°).

Batteries should be stored away from direct sunlight, heat sources, and water.

The IEC 62133 standard sets out requirements and tests for the safety and performance of lithium-ion batteries used in portable electronic devices, including cell phones, laptops, tablets, and other devices.

Materials of Anode and Cathode in Li Battery:

a. Anode (Negative Electrode)

Material: Graphite (Carbon-based)

Type: Crystalline carbon (natural or synthetic graphite)

Function: Stores lithium ions during charging (intercalation)

b. Cathode (Positive Electrode)

Materials: Lithium metal oxides

Common types of Cathodes:

Material	Formula	Metals	Notes
Lithium Cobalt Oxide	**$LiCoO_2$**	Cobalt	High energy, used in phones
Lithium Manganese Oxide	**$LiMn_2O_4$**	Manganese	Safer, moderate energy
Lithium Nickel Cobalt Aluminum Oxide	**NCA – $LiNiCoAlO_2$**	Nickel, Cobalt, Aluminum	High energy, used in Tesla EVs
Lithium Iron Phosphate	**$LiFePO_4$**	Iron, Phosphorus	Long life, safe, less energy

c. Electrolyte

Material: Lithium salt in organic solvent

Common lithium salt: $LiPF_6$ (Lithium hexafluorophosphate)

Solvents: Ethylene carbonate (EC), Dimethyl carbonate (DMC), etc.

Nature: Liquid /volatile and flammable / High ionic conductivity/ non-aqueous (no water, or lithium would react violently)

d. Separator

Material: Microporous plastic films

Common: Polyethylene (PE) or Polypropylene (PP)

Function: Prevents short-circuits while allowing lithium ions to pass

Nature: Electrically insulating / Chemically stable/ Microporous structure (for ion flow)/ Some are heat-shutdown separators (melt at high temp to prevent fire)

Current Collectors

Component	Material	Function	Nature
Anode	Copper foil	Conducts electrons out	High conductivity, flexible

Cathode	Aluminium foil	Conducts electrons in	Lightweight, corrosion-resistant

Summary Table of Li battery Materials

Component	Material(s)	Nature / Function
Anode	Graphite (C)	Carbon, layered, stable, conducts electrons
Cathode	Li metal oxides (e.g., $LiCoO_2$)	Crystalline ceramic, redox active, stores Li^+
Electrolyte	$LiPF_6$ in EC/DMC solvents	Ion-conductive, organic, flammable
Separator	Polyethylene / Polypropylene	Porous, ion-permeable, electrically insulating
Current Collectors	Copper (anode), Aluminum (cathode)	Conductive, lightweight metals

Component	Function
Cathode (Positive Electrode)	Stores lithium ions during discharge
Anode (Negative Electrode)	Releases lithium ions during discharge
Electrolyte	Medium for ion movement between anode and cathode
Separator	Prevents contact between anode and cathode while allowing ion flow
Current Collectors	Conduct current to external circuit
Cell Casing	Protects internal components

3.8.6 Lithium battery safety measures:

A. Pressure-sensitive vent holes

Batteries are pressurized and so they need an outer wall made of metal, which has a pressure-sensitive vent hole. If there's a risk of the battery becoming very hot and exploding from over-pressure (pressure buildup at 3,000 kPa), this vent will release the extra pressure and prevent other cells in the battery pack from catching fire.

B. Separator serves as a fuse

Most lithium-ion cells use a separator made of a material known as polyolefin, which boasts of good chemical stability, excellent mechanical properties and is affordable. It serves as a fuse when the cell heats up. On excessive heat, when the core reaches 130°C (266°F), the separator melts which stops the transport of ions. This action immediately shuts down the cell.

Had this provision not been provided, there would have been a possibility of the heat in the failing cell to give rise to the thermal runaway threshold and vent with flame.

C. Positive Temperature Coefficient (PTC)

This a switch that prevents the battery from overheating by protecting it against current surges Lithium-ion cells like all chemistries undergo self-discharge. Self-discharge means the batteries lose their stored charge without connecting the electrodes or the external circuit. This takes place due to chemical reactions inside the cell. Self-discharge of cells increases with age, cycling, and elevated temperature.

3.8.7 Suitable fire extinguishers:

In case of fire, a standard ABC or BC dry chemical fire extinguisher must be used since these are considered Class B fire. To put out large lithium-ion battery fires, use a foam extinguisher containing CO_2, powder graphite, ABC dry chemical, or sodium carbonate and additionally, consider using a foam extinguisher, Class D extinguisher. A common misconception is that lithium-ion batteries contain any actual lithium metal. They don't and that's why in case of fire shouldn't use a Class D Fire Extinguisher. While water can be used to extinguish a lithium-ion battery fire, it's crucial to use a large amount of water and ensure the battery is fully submerged.

Area	Safety Measures
Storage & transport	Insulated containers, dry environment, terminal protection
Handling	PPE, explosion-proof tools, grounding, proper training
Discharge	Controlled discharge systems, flame-retardant surroundings
Shredding	Inert atmosphere (argon, nitrogen), or submerged in liquid
Chemical processing	Fume hoods, acid-resistant materials, spill containment
Fire risk	Fire suppression systems, Class D extinguishers (for metal fires)

Five Classes of Fire (BS-EN2)	
Fire Class	**Feature / Brief**
A	Ordinary combustibles (Free burning materials, paper, wood, plastics etc.)

B	Flammable and combustible liquids (Flammable liquids, petrol, meths, solvents etc.)
C	Flammable gases, methane, hydrogen etc.
D	Combustible metals (Metals, potassium, sodium, Lithium, magnesium, titanium, etc.)
F	Cooking oils (Cooking fats & oils)
Note: Electricity can be involved in any class of fire	

Fire Extinguishant Materials	
Material	**Suitability for the Fire Classes**
Water	Class A only - cools /removes heat
Dry Chemical	Class A, B, or C - interferes with chemical reaction
Carbon Dioxide	Class A, B, or C (usually C) - removes Oxygen / smothers fire
Halon	Class A, B, or C (usually C) – removes Oxygen / smothers fire (being phased out - ozone)
Metl-X	Class D only - specialized dry chemical for metal fires
Foam	Class B, holds down vapors

Hazardous Materials by Class Numbers	
Class 1	Explosive
Class 2	Gasses (Compressed, liquefied or dissolved under pressure)
Class 3	Flammable Liquids
Class 4	Flammable Solids or Substances
Class 5	Oxidizers
Class 6	Poisonous or Infectious Substances
Class 7	Radioactive Substances
Class 8	Corrosives
Class 9	Miscellaneous Dangerous Substances

3.8.8 Flammable materials in lithium ion battery:

The main flammable materials in the lithium battery are:

Electrolyte solvents

These are organic liquids (carbonates) that are very flammable. Examples:

- Ethylene carbonate (EC)
- Dimethyl carbonate (DMC)
- Diethyl carbonate (DEC)
- Ethyl methyl carbonate (EMC)

Separator material

- Made from thin plastics like polyethylene (PE) or polypropylene (PP), which can melt and burn if overheated.

Binder materials

- Polymers (like polyvinylidene fluoride - PVDF) used to hold electrode materials together can also burn under high heat.

Anode (carbon/graphite)

- While graphite itself is quite stable, under high temperatures it can react with the electrolyte, worsening fires.

Cathode material (in some types)

- Certain cathode materials (like lithium cobalt oxide - $LiCoO_2$) can release oxygen when overheated, which fuels the fire even more.

3.8.9 Disassembling / dismantling of lithium-ion batteries

All the recycling operations are done under the supervision of Dr. Muhammad Younis Zahid (PhD Environment, PGDs HSE, E.M & Environmental laws)/ Head-Health, Safety & Environmental Affairs/ Techno-legal Expert. All SOPs are observed by the Workers while Recycling / Dismantling of Batteries.

The charging of Lithium-Ion batteries will be checked by the Battery Analyzer / Voltmeter and a code / Number will be allotted along with its data of status.

The neutralization / discharging 4, 12, 24, 36, 48 volts load resistance (Electric Motors) will be provided without UPS or optionally UPS may be used. After discharging the battery, it will be opened, and its all Cells will be again discharged one by one and “Discharged “Sticker will be pasted. Finally, the partially disassembled batteries / Cells will be kept in Saline water for permanent discharge. Battery can be discharged using a UPS or a resistive load, but it must be done in a controlled, slow, and monitored way and with safety

precautions i.e. a power resistor matched to the battery's voltage and energy (e.g., 10W–50W, appropriate resistance for <1A draw) and monitor voltage with a multimeter and stop when the battery reaches ~2.7V/cell.

After shredding, various techniques, including magnetic separation, screening, and gravity separation, are employed to isolate different materials within the battery. Cathode Materials (+tive / Positive while discharging) are separated from the batteries. Mostly the cathodes comprised of Lithium Cobalt Oxide (LiCoO2), Lithium Nickel Manganese Cobalt Oxide (LiNiMnCoO2 or NMC), Lithium Iron Phosphate (LiFePO4 or LFP), Lithium Nickel Cobalt Aluminium Oxide (LiNiCoAlO2 or NCA). After discharge of batteries, about 95 % lithium deposits at Cathode (+tive).

ATWM approach aims to directly recover and reuse cathode materials without breaking them down into their elemental components. Direct recycling has the potential to reduce energy consumption and achieve higher material recovery rates. The Electrodes of the discharged / spent lithium-ion batteries are the precious and active materials. The Cathode (+tive) has almost whole valuable materials (Lithium Oxide, Manganese, Nickel, Cobalt, Manganese) while the Anode (-tive) comprised of Graphite (carbon material only) with some impurities / deposits.

In this technique 95 % lithium is recovered and the electrodes are supplied to the Material Recovery Facilities or direct recycling / re-use by the lithium battery manufacturers while the Plastic & non -electrode metallic materials/ Housing /Casing/ Packaging materials /Metal foils (e.g., copper or aluminium) (Aluminium, Silver, Copper, etc) are managed by ATWM through Recycling & Circular Economy System.

The Electrolyte (Contains toxic and flammable solvents), Separator (Typically made from polyethylene or polypropylene) and Additives / Fillers (May contain hazardous materials /metals or toxic chemicals) are incinerated in our incinerator.

The incinerator is equipped with Emission Control System (Wet Scrubber) with water Recycling System. Its scrubber's sludge is re-fed to the incinerator while bottom ash is used in concrete block making within out premises.

The environmental monitoring and compliance reports of the incinerator are regularly sent to Environmental Protection Agency Punjab (Regulatory Authority on Incinerators & Waste Management Facilities).

Plastic components are crushed into Granules for moulding in our plastic recycling division.

The Metallic & non metallic parts will be managed under Circular Economy System.

Material	Recovered As	Use
Lithium	Lithium carbonate / hydroxide	New battery cathodes
Cobalt	Cobalt sulfate / oxide	Battery cathodes
Nickel	Nickel sulfate	Stainless steel, batteries
Copper	Metallic copper	Electrical wiring
Aluminum	Metallic aluminum	Casings, general use
Graphite	Flake graphite / carbon	Potential reuse or energy generation

Metallic parts:

Part	Material	Location/Function
Cathode Current Collector	Aluminum foil	Supports cathode coating
Anode Current Collector	Copper foil	Supports anode coating
External Terminals	Nickel, Steel, or Copper	Battery connection points
Cell Can (Casing)	Aluminum or Steel	Structural enclosure
Weld Tabs/Busbars	Nickel, Copper, or Aluminum	Connect cells internally or externally

Non-Metallic Parts:

Part	Material	Location/Function
Cathode Active Material	Lithium metal oxides (e.g., $LiCoO_2$, NMC, LFP)	Stores lithium ions
Anode Active Material	Graphite (carbon) or Silicon blends	Releases lithium ions
Electrolyte	Lithium salt (e.g., $LiPF_6$) in organic solvent (e.g., EC, DMC)	Ion conductor
Separator	Microporous polymer film (e.g., polyethylene, polypropylene)	Prevents short circuits

Binder & Conductive Additives	PVDF, carbon black	Help bind active materials and improve conductivity
Insulating Sleeves/Gaskets	Plastic (e.g., nylon, rubber)	Prevent electrical shorts near terminals

3.8.10 Lead acid batteries recycling

A **lead-acid battery** consists of following key components, each playing a crucial role in its operation. Batteries are dismantled after removal of Electrolyte and its components are Recycled / Disposed off as under.

#	COMPONENT BRIEF
	Positive Plate (Lead Dioxide - PbO_2)
	Negative Plate (Sponge Lead - Pb)
	Electrolyte (Sulfuric Acid - H_2SO_4): A mixture of sulfuric acid and water. During discharge, it participates in the formation of lead sulfate ($PbSO_4$) on both plates.
	Separator: (Plastic Porus Paper Electrolyte Separator & Fiber Glass Pad) Made of porous materials like fiberglass (heat resistant 200-800 C^o) or rubber. Placed between positive and negative plates.
	Battery Case: The casing is typically made from hard plastic like polypropylene (PP), or rubber and other Materials Used in Some Cases are tough Acrylonitrile Butadiene Styrene (ABS) or Polyethylene (HDPE).

3.8.11 Wastes and Recovered Materials Management

Our already existing waste management is operating on end Zero Waste through Integrated Waste Management, Circular Economy System, Bioremediation, Windrows Vermicompost, Biogas production, Recycling / Upcycling, Incineration, Ash Binding / encapsulation / Solidification in to Concrete Brocks. The waste from our battery Recycling Division will also be managed in the same waste management hierarchy; however, the separated detail of Wastes & Recovered items is as follow.

#	Item	Nature	Disposal Option
a)	Lithium (As Lithium carbonate / hydroxide)	Resource Recovered	Used in new battery as in discharged battery 95 % Li integrates on Cathode Electrode (+ive)
b)	Cobalt as Cobalt sulfate / oxide	Metal	Used for Battery cathodes material
c)	Anode (carbon/graphite)	Carbon	Recyclable or Combustible (Waste to energy)
d)	Cathode material	Lithium cobalt oxide - $LiCoO_2$) release oxygen when overheated,	Reusable in new batteries or incinerable
e)	External Terminals	Nickel, Steel, or Copper	Recycled into Stainless steel / batteries
f)	Copper Foil (As Anode Current Collector)	Metallic Copper	Recycling
g)	Aluminium Foil (As Cathode Current Collector)	Metallic aluminium	Recycling
h)	Graphite	Flake graphite / carbon	Reuse as Anode or Waste to energy generation
i)	Li Battery Electrode Separators (Microporous polymer film - polyethylene, polypropylene,	Polyethylene / Polypropylene .	Recycling or Incineration

	ion-permeable, electrically insulating)		
j)	Cell Can (Casing)	Aluminum or Steel	Recycling
k)	Weld Tabs/Busbars	Nickel, Copper, or Aluminum	Recycling
l)	Electrolyte solvents	Ethylene carbonate (EC), Dimethyl carbonate (DMC), Diethyl carbonate (DEC), Ethyl methyl carbonate (EMC)	Incineration
m)	Binder materials	Polymers (like polyvinylidene fluoride - PVDF) used to hold electrode materials together can also burn under high heat.	Incineration
n)	Positive Plate (Lead Dioxide - PbO_2)	Metallic Lead oxide	Disposal under Circular Economy System for Recycling
o)	Negative Plate (Sponge Lead - Pb)	Lead Metal	Disposal under Circular Economy System for Recycling
p)	Electrolyte (Sulfuric Acid - H_2SO_4):	H_2SO_4	Recovered for Reuse after some makeup or can be neutralized with lime
q)	Separator: Made of porous materials like fiberglass (heat resistant 200-800 C^o) or rubber.	Plastic Porus Paper Electrolyte Separator & Fiber Glass Pad	Recycling or incineration

	Placed between positive and negative plates.		
r)	Battery Case	The casing is typically made from hard plastic like polypropylene (PP), or rubber and other Materials Used in Some Cases are tough Acrylonitrile Butadiene Styrene (ABS) or Polyethylene (HDPE).	Recycling / Upcycling

Incineration Facility: Our incineration facility is located at Small Industries Estate, Ferozepur Road Kasur, having 800℃ temperature of 1st Chamber and 1250C in the 2nd Chamber, equipped with Wet Scrubber having water re-circulation System, Temperature Quenching and intermittent belt feeding. The settled sludge of the Wet Scrubber is re-fed to the Incinerator and the bottom Sludge of the Incinerator is used for making concrete blocks as Ash binding / capsulation and the un-sieved Ash material is re-fed to the incinerator.

3.8.12 Location And Layout of Project

Proposed project is located at 0.5 Km Off: 10th Km Raiwind Road, Hudiara Drain, Near Bhobattian Chowk, Lahore, Punjab, Pakistan

The total area of the Waste management site is 30 Kanals having boundary wall and the proposed site lies within this premises having 02-03 Marla only and is lying vacant. The physical Coordinates are.

Front Side: Hudiara Drain

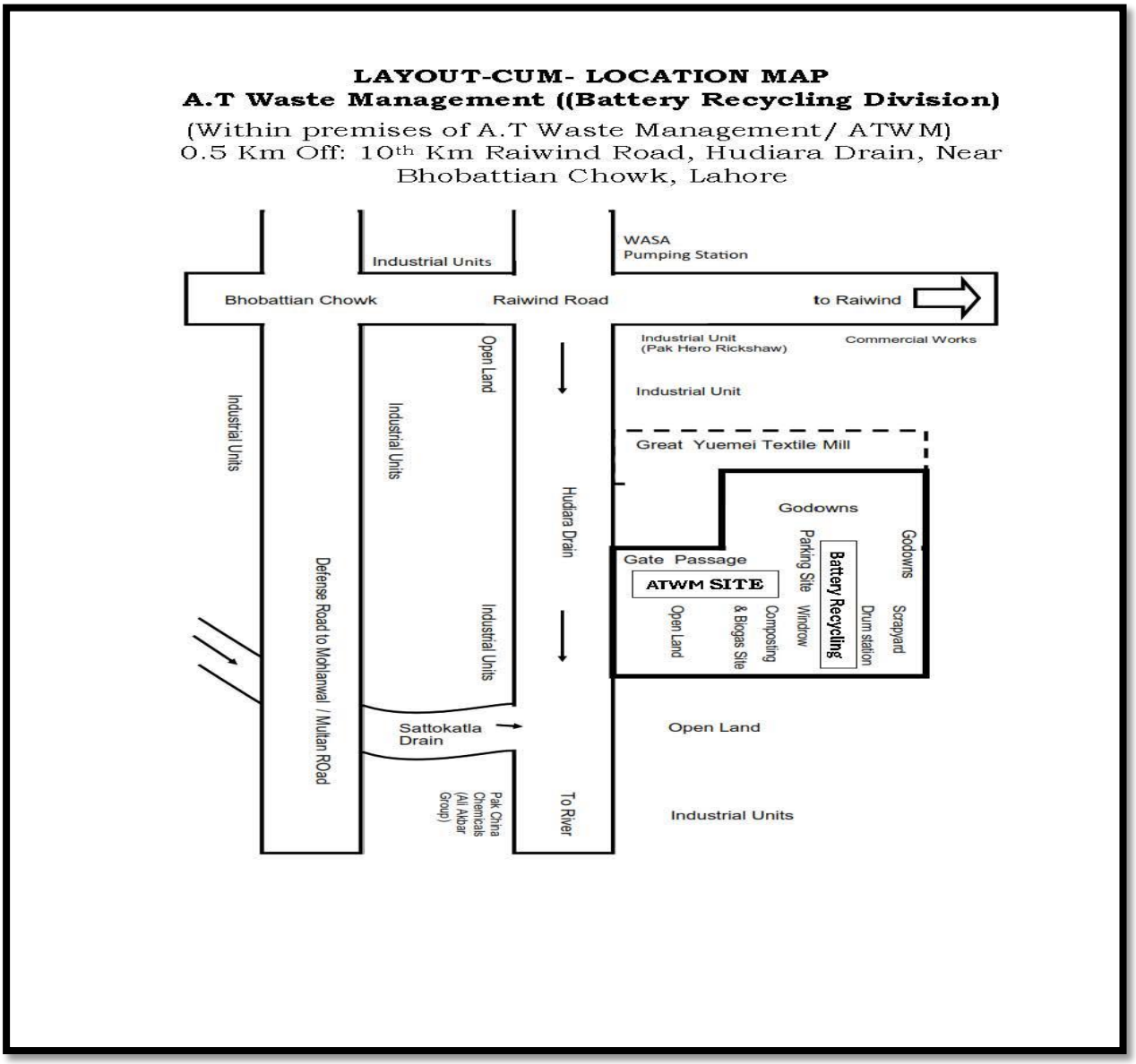
Backside: Open Industrial Plot

Right Side: Great Yuemei Textile, Industrial Units, Pak Hero Rickshaw, Raiwind Road, Industrial Units up to Bedian Road.

Left Side: Open Industrial Plots, Indstials units up to River Ravi.

Status of Locality: The proposed site faces the Hudiara Drain. The Hudiara Drain having total 100 km length, originates from India and joins River Ravi (50km in India & 50 Km in Pakistan). It receives industrial as well as sewage from India and Pakistan. The area belt from on both sides of the Hudiara Drain from Bedian Road to River Ravi (About 40 km) has developed as industrial having Textile Mills, Paper Industry, Hosiery, Engineering, Tractor Parts, Food & Beverages, Chemicals, Pharmaceuticals, (About more than 200 Industrial Units).

Layout Map of the site is given as follows:



3.9 ALTERNATIVES

3.9.1 Site Alternatives

When considering site alternatives for the integrated waste management project, several factors need to be evaluated, including proximity to waste sources, accessibility, environmental impact, and community acceptance. Possible site alternatives might include:

1. **Urban Industrial Zones**: These areas often have existing infrastructure and easy access to waste generators. However, they may face stricter regulations and community opposition due to potential odors and traffic.
2. **Rural Areas**: Sites in rural locations may provide more space and flexibility for operations, but they could lead to increased transportation costs and logistical challenges in waste collection.

3. **Existing Waste Management Facilities**: Utilizing or expanding existing facilities can capitalize on existing infrastructure, but it may limit the ability to incorporate innovative technologies.
4. **Justification for Selected Land**

Proximity to Waste Sources: Being in a well-established industrial zone with over 200 units ensures easy access to a diverse range of organic and inorganic waste materials. This reduces transportation costs and emissions, facilitating efficient waste collection.

Existing Infrastructure: The site benefits from pre-existing infrastructure, including roads, utilities, and waste disposal systems, which minimizes the need for extensive development and accelerates project implementation.

Environmental Considerations: The site has been assessed for environmental impact, ensuring compliance with regulations. Its positioning allows for effective management of any potential emissions or runoff, contributing to sustainable practices.

Community Engagement: The project has engaged with local stakeholders, fostering acceptance and support within the community. This is vital for the facility's long-term success and operational harmony.

Space for Future Expansion: The 30-kanal area provides sufficient space for current operations and future scalability. This flexibility is crucial as waste volumes may increase and new technologies may need to be integrated.

Strategic Location: Being adjacent to the Hudiara Drain, a significant industrial and sewage conduit, positions the facility to utilize waste resources effectively while being mindful of water management considerations. No important religious, archaeological, historical or recreational site, or any other ecologically sensitive, declared protected area or poor population exists within close vicinity of the selected site. In view of these facts, it can be concluded that the selected Site is best suited for the project and will not pose any adverse impact or threat on any component of the environment and will not disturb ecology.

3.9.2 Economic Alternative

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

Direct Job Creation: The project timeline is one year, which means that the project will create jobs.

3.9.3 Environmental Alternative

3.9.3.1 No-Project Alternative

This option considers not implementing the project at all. While it avoids the direct environmental impacts associated with the construction and operation of the facility, it would result in continued improper waste disposal practices in the region, including open dumping and landfilling of organic and inorganic waste, which contributes significantly to greenhouse gas emissions, groundwater contamination, and public health risks. The absence of the project would also eliminate potential carbon crediting and waste-to-energy benefits, making it an unsustainable choice in the long term.

3.9.3.2 Incineration-Based Waste Management

Partially the proposed project will use the incineration facility of our already existing incinerator at Kasur.

3.9.3.3 Landfilling

Landfilling is not a suitable and environmental option for Condemned. discarded batteries.

3.9.3.4 Decentralized Waste Management

This option is not feasible in the case of the proposed project.

3.9.3.5 Recycling and Material Recovery Facility (MRF)

In place of an integrated waste management facility, another alternative could focus solely on material recovery and recycling. This would involve segregating recyclable materials such as plastics, metals, and paper, diverting them from the waste stream. However, this approach would not address organic waste, which forms a significant portion of the waste handled by the project. Recycling alone would not contribute to biogas production or biomass briquetting, nor would it provide the same level of carbon footprint reduction that the proposed project aims to achieve.

Figure 3.1: Vegetation Cover at Site

3.10 COST AND MAGNITUDE

The following fixed and working capital requirements have been identified for operations of the proposed business. The activities will include:

- Land
- Building and Infrastructure
- Health and Safety Management at site
- Maintenance

3.11 RELOCATION AND REHABILITATION PLANS

There exists no human settlement within the selected project site to be displaced owing to the commencement of the proposed project. The godown already present will be used as store. No relocation is involved.

Land Acquisition

The proposed project will be established in the 02-03 Marla Site in the existing waste management site having total 30-kanal area facing Hudiara Drain, within a well-established area for industrial activities in Lahore. Therefore, no additional land acquisition is required for the implementation of this project. Pictures of the project site are given as follows:

The land is self-developed, industrially zoned and situated in a region primarily consisting of industrial units such as textile mills, food and beverage industries, and engineering factories. The site is bordered by other industrial plots and has been chosen to ensure minimal disruption to residential areas or natural habitats.

Given that the project site is within an industrial area, no resettlement or displacement of local communities is involved. Additionally, the project does not encroach on any environmentally sensitive areas, such as forests, wetlands, or wildlife habitats, thereby avoiding adverse impacts on biodiversity.

The acquisition and ownership of the land follow local land use regulations and zoning laws. There are no anticipated legal disputes or conflicts regarding land rights, as the site has been secured through appropriate legal channels. The project does not involve any expropriation of land from private or public entities, ensuring a smooth and conflict-free commencement of activities.

3.12 CURRENT LAND USE OF THE PROJECT SITE

The construction of the Ecologically Safe-Cum-Integrated Waste Management Facility is planned to commence after receiving the necessary environmental approvals from the Environmental Protection Agency (EPA). The plot is well-suited for the proposed development, being located within an industrial zone and away from residential or environmentally sensitive areas.

3.13 CURRENT STATUS OF THE PROJECT

There is no construction activity at the project site. The temporary and minor construction will be started once environmental approval is granted by the Punjab Environmental Protection Agency, Government of Pakistan

3.14 COST OF THE PROJECT

The estimated cost of the proposed project is approx. Rs 01 million.

3.15 MANPOWER REQUIREMENT

Construction crews will have the responsibility of the civil contractor and its petty contractor. It is estimated that a maximum of 03 personnel will be working at the site at a given time during the peak construction period.

These will essentially include masons, carpenter, electricians, painters, plumbers and general laborer. For unskilled employment, preference will be given to residents of the project area. the staffing requirement during the construction phase of the project.

3.16 GOVERNMENT APPROVAL

Initial Environmental Examination of project depicts that there will not sufficient environmental impacts of proposed project, so an environmental approval must be awarded.

CHAPTER# 4.

BASELINE ENVIRONMENTAL PROFILE

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

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

4.1 METHODOLOGY OF CONDUCTING BASELINE STUDY

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

4.2 PHYSICAL ENVIRONMENT

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

4.2.1 Topography

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

The geographical coordinates of project site in Lahore are 31°23'27.1" N latitude and 74°13'33.2" E longitude and 209-meter elevation. The topography of the project site is almost flat. The area around the project site is mostly covered by artificial surfaces.

4.2.2 Geology and Soil

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

Figure 3.1 Geology and Soil

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

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

4.2.3 Seismology

Seismic zoning map of Pakistan proposed by the building code of Pakistan[8] (BCP: 2007) is shown in Figure 4.2. According to this map, Pakistan is divided in five seismic hazards zones (Zones 1, 2A, 2B, 3 and 4); Zone 1 being the lowest and Zone 4 is the highest seismic zone. Figure 4.3 shows the seismic zoning map of Pakistan. The project area falls in Zone 2A that

shows a low to moderate level of seismicity. Zone 2A represents peak ground acceleration (PGA) from 0.08 to 0.16g (Table 4.1).

Table 4.1: Seismic Zones

Seismic Zone	Peak Horizontal Ground Acceleration	Zone Factor Z
1	0.05 to 0.08g	0.075
2A	0.08 to 0.16g	0.15
2B	0.16to 0.24g	0.20
3	0.24 to 0.32g	0.30
4	➢0.32 g	0.4
Where "g" is acceleration due to gravity		

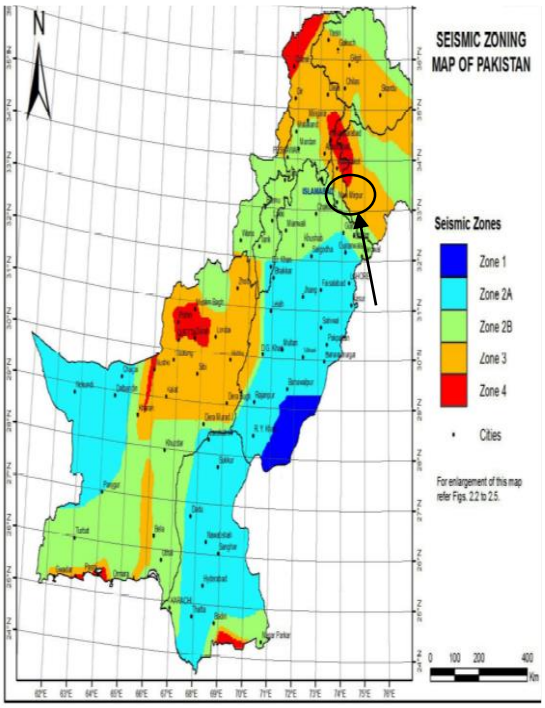


Figure 4.2 Seismic Zones

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

4.2.4 Land Use and Land Cover (LULC)

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

Table **4**.2: Land-use categories of Lahore in 1998 and 2018

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

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

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

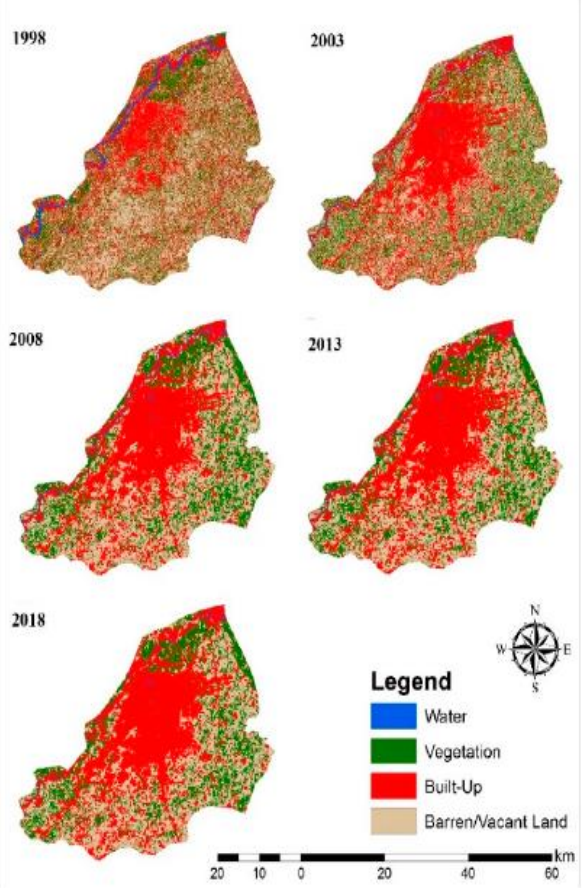


Figure 4.3 Land-use categories

4.3 CLIMATE

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

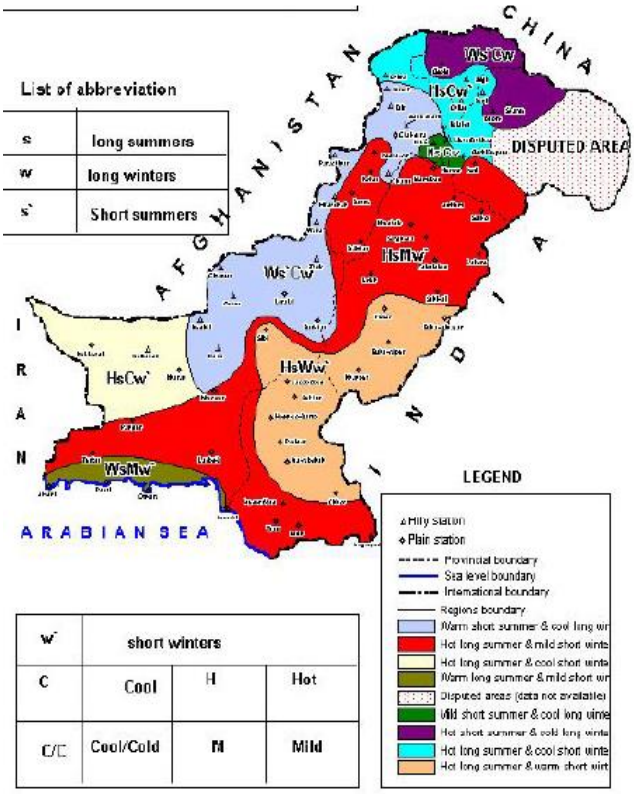
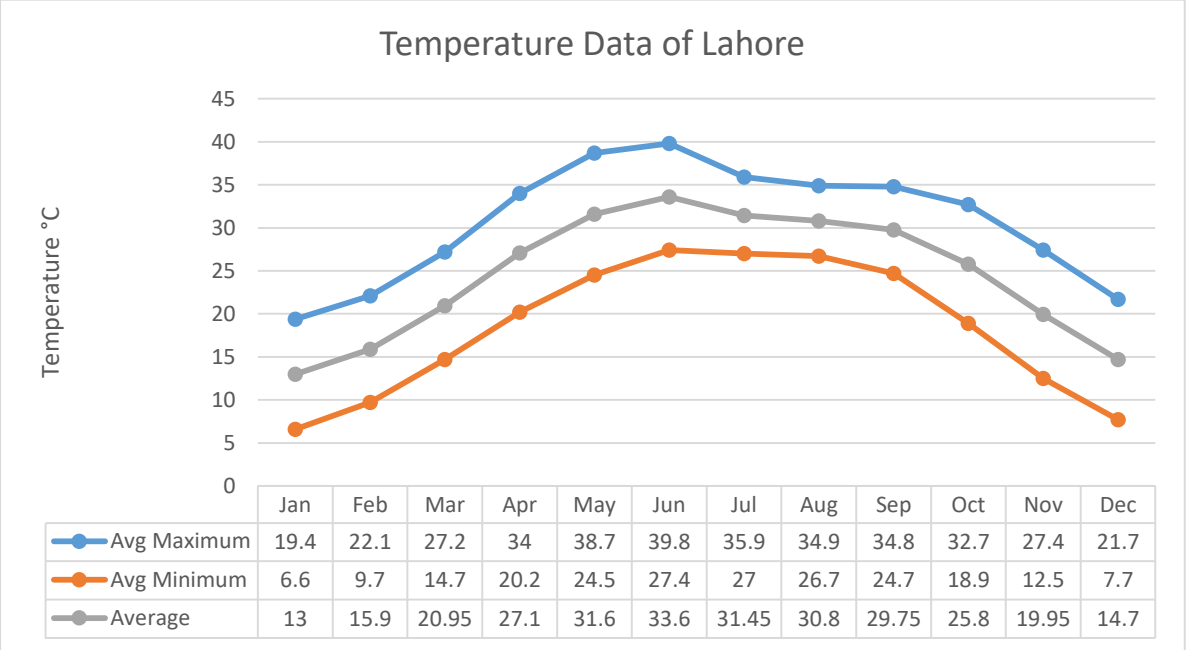


Figure 4.4 Climate



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg Maximum	19.4	22.1	27.2	34	38.7	39.8	35.9	34.9	34.8	32.7	27.4	21.7
Avg Minimum	6.6	9.7	14.7	20.2	24.5	27.4	27	26.7	24.7	18.9	12.5	7.7
Average	13	15.9	20.95	27.1	31.6	33.6	31.45	30.8	29.75	25.8	19.95	14.7

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

4.3.1 Rainfall

The monsoon rains hit Lahore in July, August and September, with July being the wettest month. The yearly variations are considerable. Nearly 70% of it received in the form of high-intensity showers during the monsoon and the remaining in winter. Average rainfall from 2000 to 2024 is illustrated in Figure 4.6.

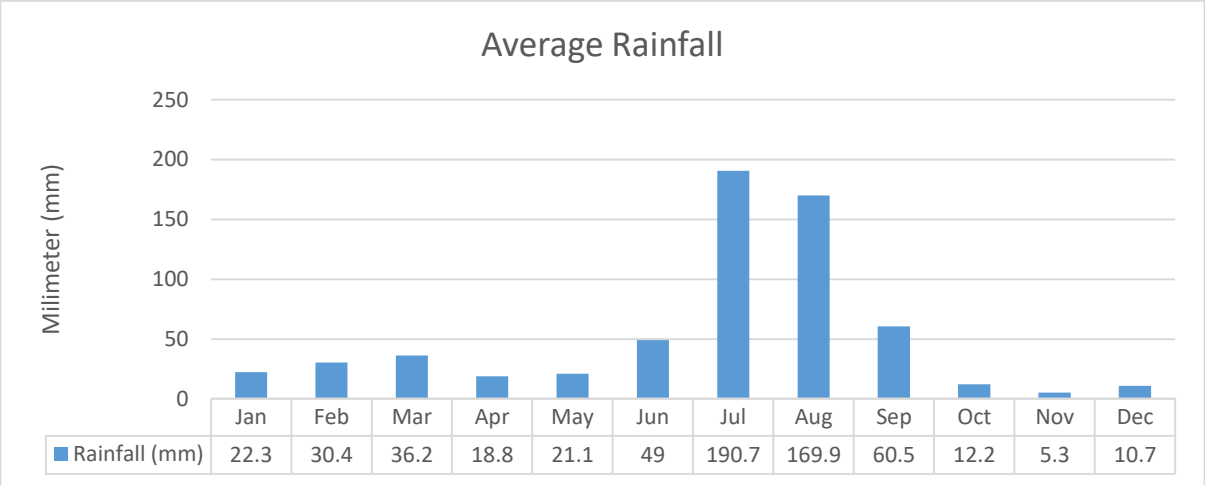


Figure 4.6: Rainfall Amount Data Lahore Region (Data Source: Climatic Data Processing Centre)

4.3.2 Humidity

The average humidity of the Lahore region for years (2000-2024) is exhibited in Figure 4.7.

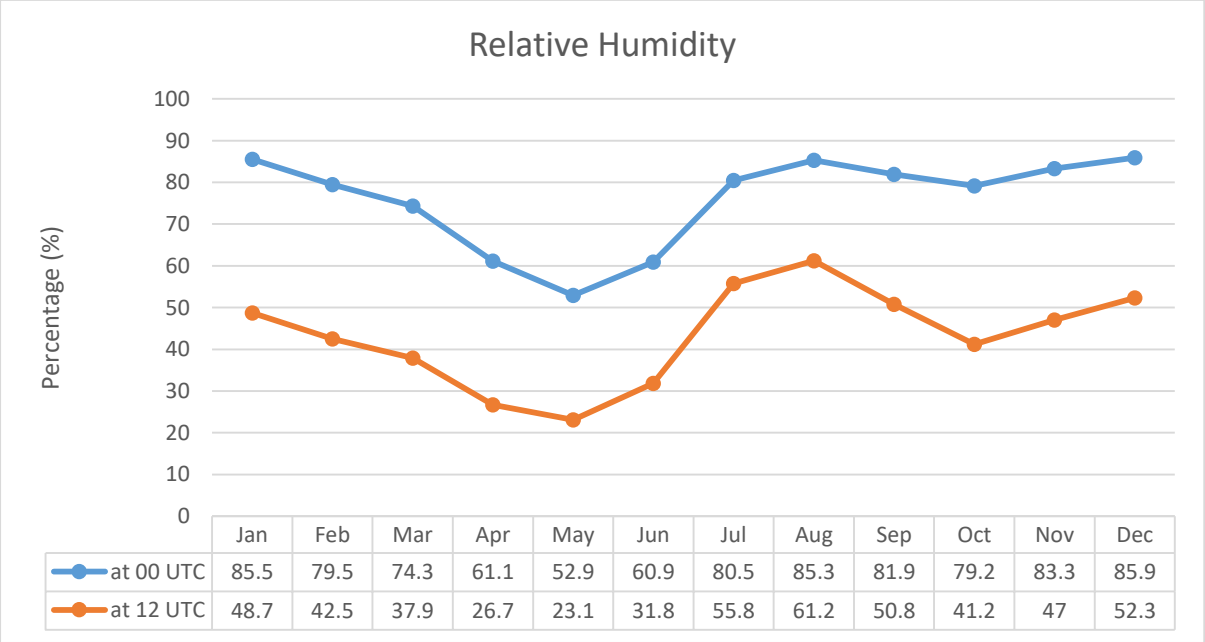
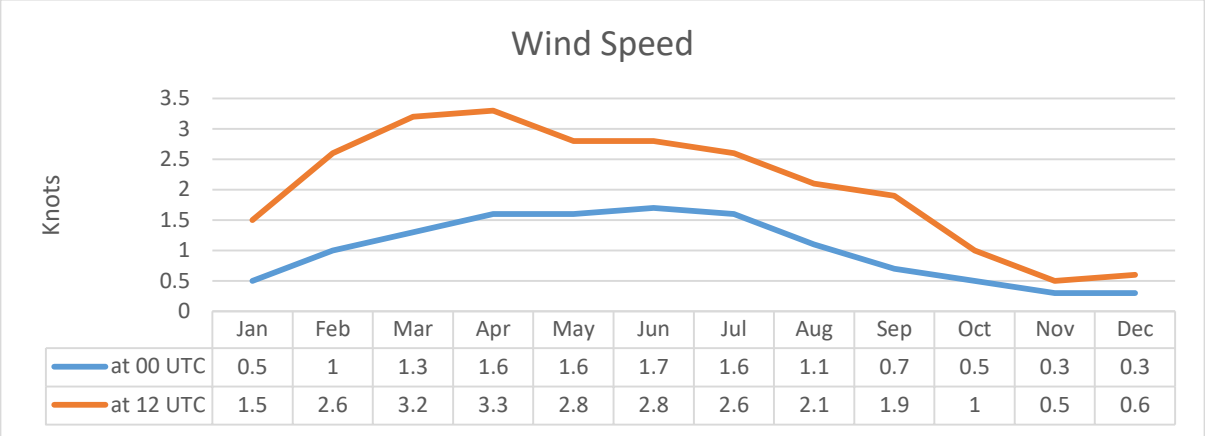


Figure 4.7: Relative Humidity Data Lahore Region (Data Source: Climatic Data Processing Centre)

4.3.3 Wind

The monthly mean velocities for 2000 – 2024 are exhibited in Figure 4.8.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
at 00 UTC	0.5	1	1.3	1.6	1.6	1.7	1.6	1.1	0.7	0.5	0.3	0.3
at 12 UTC	1.5	2.6	3.2	3.3	2.8	2.8	2.6	2.1	1.9	1	0.5	0.6

Figure 4.8: wind Data Lahore Region (Data Source: Climatic Data Processing Centre)

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

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

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

East: From mid-August to mid-October

4.4 WATER RESOURCES

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

4.4.1 Surface Water

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

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

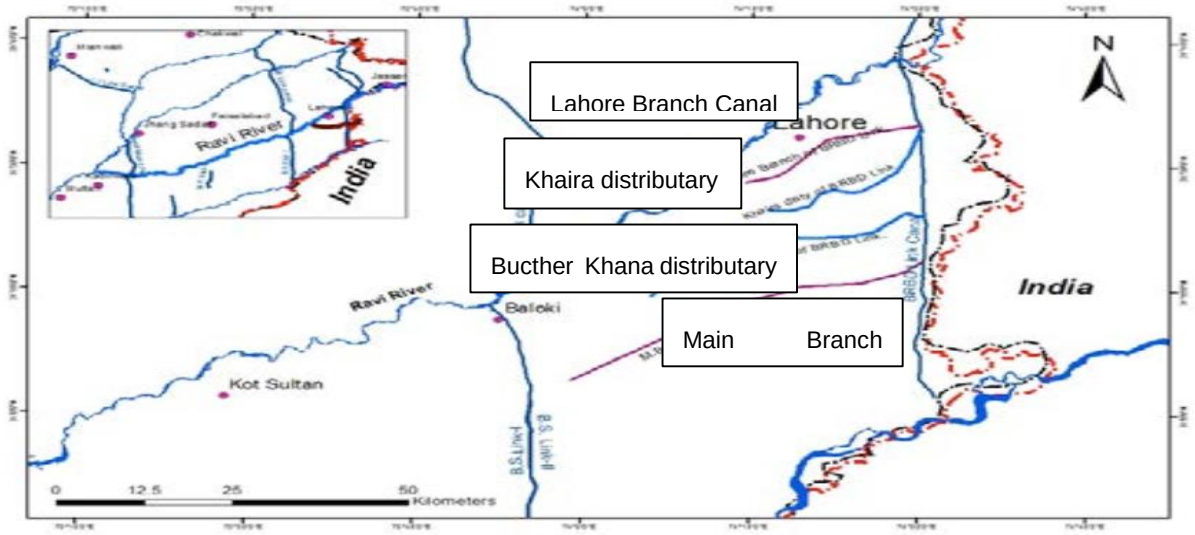


Figure 4.9: Canals System Feeding Lahore City (Canals off-taking from BRBD Canal)

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

a) Diversion of 100 cusec (245,000 m3/day) of water from BRBD canal to the proposed surface water treatment plant and supplying 100 cusec (after treatment) drinking water quality water to the most affected areas of the city.

b) Construction of 3.5km-long transmission main pipeline for water supply from the SWTP to 55 feeding mains pipeline (28 km long) connecting to the existing distribution network of four selected serving areas, and rehabilitation of existing distribution pipes (81km).

The Ravi Riverfront Urban Development (RRFUD) project is another environment friendly initiative of Govt. of Punjab addressing severe issues of Lahore city like contamination of the River Ravi and fast depletion of underground water besides stimulating economic activities. The Ravi Riverfront will be developed in three phases and, in the initial phase, a lake covering

46 kilometers area, six wastewater treatment plants, three barrages and urban forest would be developed during the first three years. (Figure 4.10).

4.4.2 Groundwater

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

In view of increasing demand due to ongoing urbanization and increased commercial activities, the number of tube-wells are also increasing with every passing day. Excessive abstraction of groundwater with less aquifer recharge owing to the reduction in inflow of river Ravi are the major causes of depleted aquifer level that is drastically depleting with an average of 1 meter per annum. Lahore receives an average annual rainfall of about 715 mm, which does not contribute much to recharging the aquifer. This uneven groundwater development has resulted in a big groundwater level recession, with maximum depth to groundwater up to 47 m in some areas. However, in Johar Town, where the Expansion Project has been proposed, the static water level is around 35 m.

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

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

4.4.3 Wastewater

WASA is the prime body for the collection of sewage and wastewater in Lahore city. The existing service area of the sewerage system is approximately 340 Km^2. The WASA Sewerage Service Area is divided into six catchments (Figure 4.11). Summary of catchments is given in

Table 4.3 Summary of Catchments

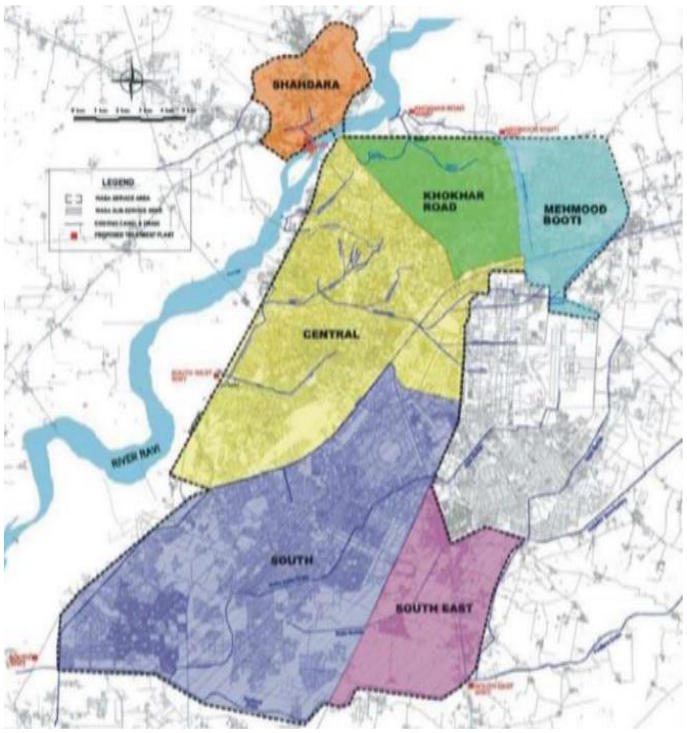


Figure 4.11 WASA Sewerage Catchments

Catchment Area	Area (km^2)	Number of Pumping Station		Length of Sewer (km)
		Disposal Stations	Lift Stations	
Shahdara	18.44	1	6	262
Mahmood Booti	22.79	1	10	126
Khokhar Road	29.19	2	18	526
Central	100.26	6	27	1,325
South	138.95	1	17	1,107
South East	39.65	1	1	162
Total	**340.28**	**12**	**79**	**3,508**

The Lahore drainage system comprises of 14 major drains (Figure 4.12) that collect domestic sewage and industrial wastewater from the entire city and its surroundings through a dense network of small drains. A detailed map of the existing sewerage network of Lahore is illustrated in Figure 4.13. Sewage from all the drains with estimated flow of 8 MCM/day is finally discharged into the River Ravi without any treatment.

The sewage from the SKMCH&RC after passing through their septic pond enters the public sewer system and passes through conduit (6'x6') around 25-30 ft below ground level and flows up to the pumping station. This pumping station is located opposite the housing society "Khyaban-e-Nashamin" on Khyaban-e-Jinnah Road where the sewage is pumped into Sattokatla Drain and finally discharged into the River Ravi. Similarly, the sewage effluent from the expansion Project shall be discharged into WASA sewerage network.

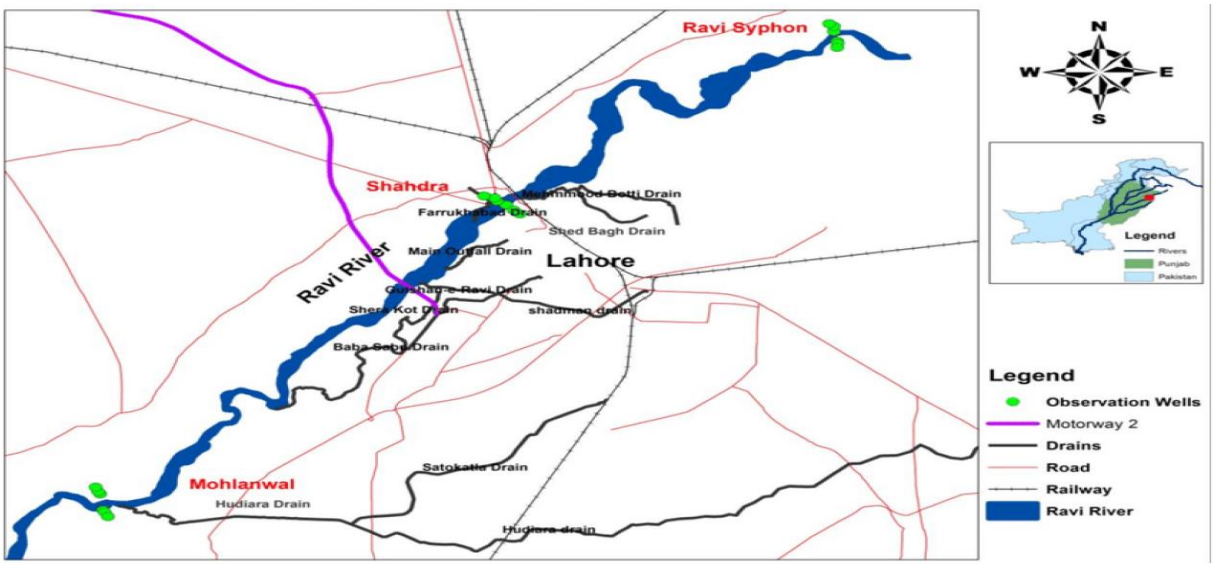


Figure 4.12: Location of major drains in Lahore

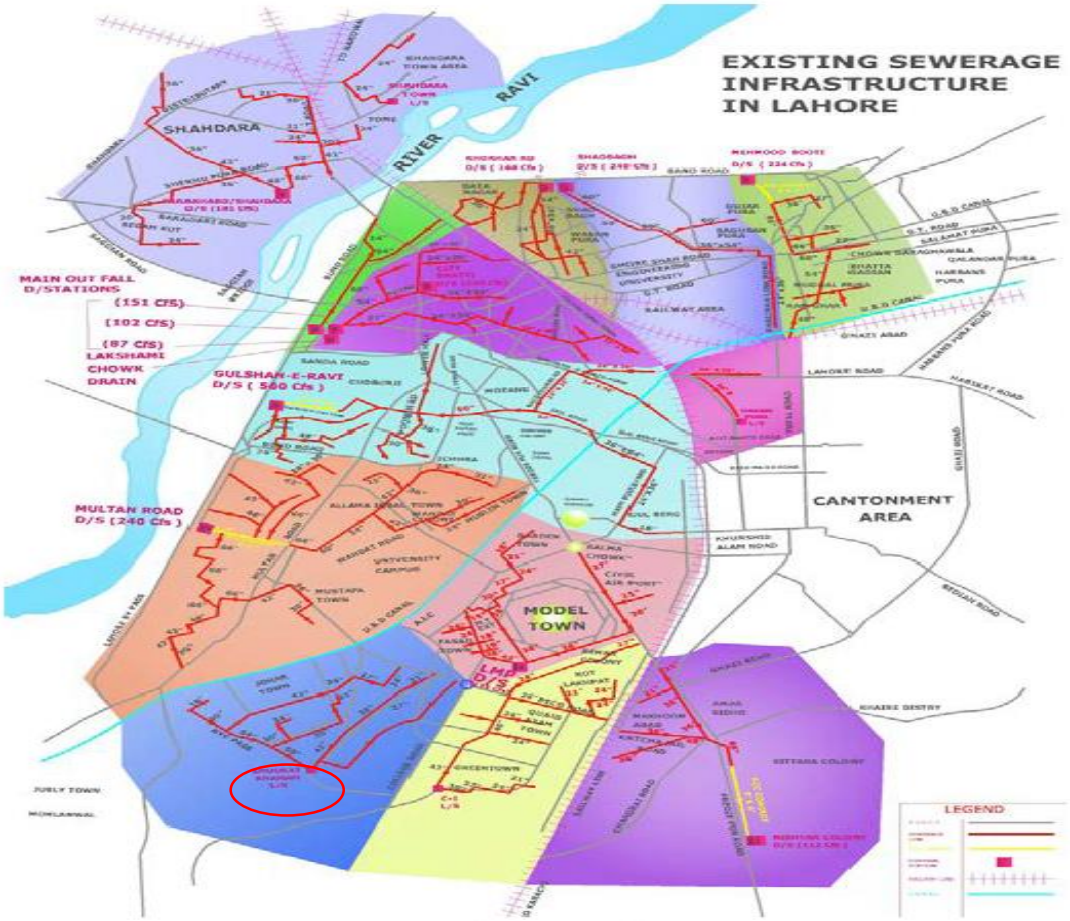


Figure 4.13: Sewerage Network of Lahore

4.4.4 Biological Environment

4.4.4.1 Natural Habitat

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

4.4.4.2 Flora

There are a number of trees and shrubs on green belts of roads outside the Hospital which are managed by Parks and Horticulture Authority. At the boundaries of the Project land, trees of different species and sizes are planted. Main species that will be affected by the Project are Pine (1), Alstonia (24), Jaman (32), Arjun (12) and Sukh chain (20).

4.4.4.3 Fauna

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

4.4.5 Socioeconomic Environment

4.4.5.1 Demographics

The population of Lahore was determined (Census 2017) to be 11,126,285 with an annual growth rate of 4.07% since 1998. Gender-wise, 52.35% of the population is male, while 47.64% is female, and transgender people make 0.01% of the population. Lahore is a young city with over 40% of its inhabitants below the age of 15. Lahore's 2020 population is now estimated at 12,642,423 (Figure 4.14). These estimates represent the urban agglomeration of Lahore, which typically includes Lahore's population in addition to adjacent suburban areas. The population density currently sits around 6,300 residents per square kilometer (16,000 individuals per square mile). There are Muslims (95.4%), Christians (3.0%), Hindus (1.0%), Sikhs (0.5%), others (0.1%) in Lahore[5]. The average household size in Punjab is 6.4 whereas number of households in Lahore is 1,758 thousand. The data also apply to the population in Johar Town.

4.4.5.2 Administration Setup

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

The project site is located in Johar Town in Union Councils 114/115 within Administrative Zone 8 "Allama Iqbal" of Lahore. (Figure 4.15)

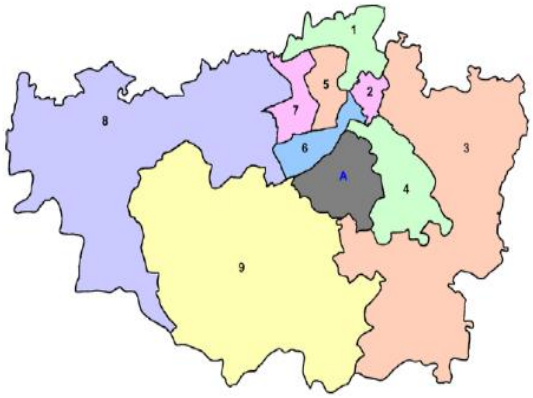


Figure 4.15 Administration Zones of Lahore

4.4.5.3 Business and Recreational Activities around the Project Site

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

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

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

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

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

4.4.6 Education and Literacy

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

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

4.5 Healthcare Facilities

Healthcare needs are taken care of by the Public as well as Private Sectors. The people in Johar Town prefer the Private Hospitals and Clinics of the area. The major hospitals in Johar Town are Iqra Medical Complex, Ihsan Mumtaz Hospital, Latif Hospital, Horizon Hospital, Doctors Hospital and Mughal Eye Hospital. Jinnah Hospital, a public Hospital and Allama Iqbal Medical College are in the neighborhood of Johar Town. The other major Public

Hospitals in Lahore are Services Hospital, General Hospital, Children Hospital, Gulab Devi Hospital and Punjab Institute of Cardiology-PIC. These public Hospitals are delivering diversified healthcare services even with limited resources.

4.6 Culture and Religious Resources

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

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

CHAPTER# 5.

POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURE

5.1 GENERAL

This Chapter discusses the potential environmental and social impacts of the proposed activities, predicts the magnitude of the impact, assesses significance, recommends mitigation measures to minimize adverse impacts, and identifies the residual impacts of the proposed project.

The nature and the significance of the potential impact depend on the nature and magnitude of the different activities and also on the type of pollution control technologies to control or minimize the pollution related to the different activities of the project.

5.2 OBJECTIVES

Objectives of screening all possible impacts and then providing their mitigation measures are:

- To find different alternatives and ways of doing the project activities.
- To enhance the environmental and social benefits of proposal.
- To avoid, minimize and remediate adverse impacts.
- To ensure that residual adverse impacts are kept in acceptable limits

5.3 ENVIRONMENTAL SCREENING OF THE PROJECT

The impacts are broadly classified as physical, biological and socio-cultural, and then each of these broad categories is further divided into different aspects. The potential impacts, thus predicated, are characterized as follows:

- High negative (adverse) impacts,
- The low negative impact,
- Insignificant impact,
- High positive (beneficial) impacts,
- Low positive impact, and
- No impact.

The environmental screening matrix of proposed project is provided in **Table 7.1**.

The negative impacts predicated in this manner are the ‘unmitigated’ impacts. Appropriate mitigation measures have been recommended as part of this EIA. The occurrence possibility and severity of the potentially adverse impacts identified in **Table 5.1** will be reduced as a consequence of the incorporation of the mitigation measures into the project

design/management. The negative impacts screened through this process are discussed later in this Chapter.

Description	Physical			Biological		Social and Socio-economic					
	Soil	Air Quality	Surface and Ground	Natural Vegetation	Wildli	Traffic Congestion	Noise and Vibration	Land Acquisition	Safety Hazard, Public Health and	Employment	or Archeological Historical
Project Sitting											
Project Site, Land Use and Design	-1	N	0	-1	-1	N	N	N	-1	N	N
Visual Impacts	-1	N	0	-1	-1	-1	-1	N	0	N	N
Construction Phase											
Land Acquisition	N	N	N	N	N	N	N	N	N	N	N
Mobilization	0	-1	0	N	0	-2	-2	N	-1	0	N
Construction Camp Establishment	-1	-1	-1	-1	-1	-1	-1	N	-1	+1	N
Construction Camp Operation	0	-1	-1	-1	-1	-1	-1	N	-1	+1	N
Site Preparation	-2	-1	-2	-1	-2	-1	-1	N	-1	+1	N
Construction Works	-1	-1	-1	-1	0	-2	-2	N	-1	+1	N
Laying of Services	-1	-1	-1	-1	0	-1	-1	N	-1	+1	N
Construction of Buildings	-1	-1	-1	-1	0	-1	-1	N	-1	+1	N
Construction Materials Supply	-1	-1	N	0	-1	-1	-1	N	-1	+1	N
Construction Crew Transportation	0	-1	N	0	-1	-1	-1	N	-1	+1	N

Solid Waste Disposal	-2	-1	-2	-1	-1	N	N	N	0	0	N
Waste Effluent Disposal	0	-1	-2	-1	-2	N	N	N	-1	0	N
Demobilization	0	-1	0	0	0	-1	-1	N	-1	0	N
Description	**Physical**			**Biological**		**Social and Socio-economic**					
	Soil	**Air Quality**	**Surface and Ground**	**Natural Vegetation**	**Wildli**	**Traffic Congestion**	**Noise and Vibration**	**Land Acquisition**	**Safety Hazard, Public Health and**	**Employment**	**Historical or Archeological**
Operation Phase											
Operation of Project	N	-1	0	-1	-2		-1	N	0	+1	N
Vehicular Traffic	N	-1	N	-1	-1	-2	-1	N	-1	+1	N
Solid Waste Disposal	-2	-1	-2	-1	-2		0	N	0	0	N
Waste Effluent Disposal	-2	-1	-2	-1	-2	N	N	N	0	0	N

Key: -2: High negative impact; -1: Low negative impact; 0: insignificant/negligible negative; +1: low positive impact; +2; High positive impact, N: no impact.

5.4 COMMUNITY AND STAKEHOLDERS' VIEW

As discussed in chapter 6, a public consultation was held with the community and stakeholders regarding their comments and suggestion on the Establishment of Ecologically Safe-Cum-Integrated Waste Management Facility, Near 1122 Kala Gujran, Jhelum, Punjab. The views of the stakeholders are listed below:

- Mitigation measures should be adopted to control dust and noise pollution that may arise during the construction phase of the proposed project, and the Environmental Management Plan should be strictly followed.
- People emphasized that proper mitigation measures should be implemented to control the solid waste pollution.
- The project will create jobs for many people. Due to high inflation these days, construction industry will create many jobs. The need for any kind of developmental projects to cope with this situation is evident.

An attempt has been made to address the above issues as much as possible in the EIA of proposed Project.

5.5 ENVIRONMENTAL IMPACT CHARACTERIZATION

Various aspects of the impact characterization include:

- Nature (direct/indirect)
- Duration of impact (short term, medium-term, long-term)
- Geographical extent (local, regional)
- Timing (project phase)
- Reversibility of impact (reversible/irreversible)
- Likelihood of the impact (certain, likely, unlikely)
- Impact consequence severity (severe, moderate, mild)
- Signification of impact (high, medium, low)

The above aspects of environmental characterization are defined in **Table 7.2**.

Table 5-1: Impact Characterization of the Project

Categories	Characteristics
Nature	Direct: The environmental parameter is directly changed by the project. Indirect: The environmental parameter changes as a result of a change in another parameter.

Duration of impact	Short-term: Lasting only for the duration of the project, such as noise from the construction activities. Medium-term: Lasting for a period of few months to a year the project before naturally reverting to the original condition such as loss of vegetation due to the clearing of the campsite, contamination of soil or water by fuels or oil. Long-term: Lasting for a period much greater than medium-term impact before naturally reverting to the original condition such as loss of soil due to soil erosion.
Geographical extent	Local, regional (spatial dimension)
Timing	Construction and operation
Reversibility of impact	Reversible: When a receptor resumes its pre-project condition. Irreversible: When a receptor does not or cannot resume its pre-project condition.
Likelihood of the impact	Almost Certain: Impact expected to occur under most circumstances Likely: Impact will probably occur under most circumstances Possibly: Impact may possibly occur at some time Unlikely: Impact could occur at some time Rare: Impact may occur but only under exceptional circumstances
Impact consequence severity	Major: When an activity causes irreversible damage to a unique environmental feature; causes a decline in abundance or change in distribution over more than one generation of an entire population of species of flora or fauna; has long-term effects (period of years) on socio-economic activities of significance or regional level. Moderate: When an activity causes long-term (period of years), reversible damage to a unique environmental feature; causes reversible damage or change in abundance or distribution over one generation of a population of flora or fauna; has short-term effects (period of months) on socioeconomic activities of significance on a

	regional level. Minor: When an activity causes short-term (period of few months) reversible damage to an environmental feature; sight reversible damage to a few species of flora or fauna within a population over a short period; has short- term (period of months) effects on socio-economic activities of local significance. Negligible: When no measurable damage to the physical, socio-economic, or biological environment above the existing level of public concern; and conformance with legislative of statutory requirements.
Significance of impact	Categorized as High, Medium, or Low Based on the consequence, likelihood, reversibility, geographical extent, and duration; the level of public concern; and conformance with legislative of statutory requirements.

Subsequent to the characterization, appropriate mitigation measures were identified, in order to minimize, if not completely eliminate, the adverse impacts associated with project activities. Finally, residual impacts were identified.

The impact characterization of the predicted impacts, mitigation measures and residual impacts are discussed below:

5.6 PRE-CONSTRUCTION/DESIGN PHASE IMPACTS

5.6.1 Project Siting Impacts

The impacts associated with the project sitting are those which relate to its location at the designated site. These impacts are different from those which are associated with the project's construction and operational phases. The construction and operational impacts are associated with the activities such as land clearing, waste disposal, whereas the sitting impacts relate to the mere presence of a facility at the given location.

For the proposed project, the following two aspects of the project sitting were considered:

- The project site, land use and design
- Visual Impacts (aesthetic value)

5.6.2 Project Site, Land Use, and Design

The project site is located in seismic Zone II, where II represents a high hazard with moderate damage zone. An earthquake can cause damages to the proposed project. The project site is a barren land with scarce natural vegetation.

The unmitigated impacts associated with the above issues are characterized as follows:

Nature:Direct and Indirect

Duration: Long term

Geo extent: Local

Reversibility: Irreversible

Likelihood: Possibly

Consequence: Severe

Impact significance: Medium

- **Mitigation Measures**

Project Site: The Project is being developed in an area which is accessible by Grand Trunk Road

Land Use: The land use and design of proposed project will be in line with the existing by-laws.

Design: proposed Project has been designed on a sustainable basis with all utilities like water, energy, drainage and electrical system.

- **Residual Impacts**

As a result of the above mitigation measures, the project sitting impact of the proposed project will be greatly reduced. There will be some residual impact; however, its significance is expected to be low.

- **Visual Impacts**

proposed project is being developed in an urban area. The natural landscape has an aesthetic value, although not very significant, indeed is a valuable asset of the area. It is thus likely that an impact of low negative will occur, as a result of the project.

The unmitigated impact associated with the aesthetic value of the area is characterized as follows:

Nature:Direct

Duration: Long term

Geo extent: Local

Reversibility: Irreversible

Likelihood: Possibly

Consequence: Severe

Impact significance: High

Timing: Design Phase

- **Mitigation Measures**

The design of the proposed project would be adopted in a manner that minimizes the changes in the topography, landscape and damage to the natural vegetation.

A plantation plan has been proposed for "The Proposed "Project, which will be implemented.

- **Residual Impacts**

As a result of the above mitigation measures, the visual impact of the project will be greatly reduced. There will be some residual impact; however, its significance is expected to be low.

5.7 CONSTRUCTION PHASE IMPACTS

The construction phase will be the most significant part of the project with respect to environmental considerations since most of the impacts are likely to take place during this period.

Various construction activities will invariably create environmental disturbances, which may have impacts on the physical, biological and social environment of the area and nearby communities. Such impacts include the following:

Physical Environment

Soil erosion and degradation

Air quality deterioration

Water Quality (Surface and groundwater)

Biological Environment

Loss of Vegetation

Damage to wildlife

Social Environment

Traffic congestion

Noise and vibration

Safety hazards, public health and nuisance issues

- Sites of Archeological or Historical Significance

These impacts and their respective mitigation measures are discussed hereunder:

5.7.1 Soil Degradation and Contamination

The soil-related issues include soil erosion, slope stability, and soil contamination. These may be caused by land clearing, levelling and grading, excavation and filling, construction activities and maintenance of equipment/vehicles.

The soil may be contaminated as a result of improper handling of fuel, oil, chemical and a solid waste or untreated wastewater from the campsite. Extraction of stone or gravel from the project area may potentially lead to soil erosion.

This contaminated soil may adversely affect the natural vegetation in the area. Soil erosion may affect road stability, increase flooding risk due to rapid and higher levels of runoff, siltation in the nearby water bodies and safety issues.

Nature:	Direct
Duration:	Long term
Geo extent:	Local
Reversibility:	Irreversible
Likelihood	Certain
Consequence	Moderate
Significance of Impact:	Moderate

Mitigation Measures

The followings mitigation measures will minimize soil erosion and contamination:

Good management of topsoil should be done to prevent the loss of soil fertility.

Construction activities carried out in a manner to minimize soil erosion.

Land clearing, levelling and grading be minimized.

Provision of such vegetation native species of trees which help in reducing the erosion.

Excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken as per the design (i.e., Stone pitching).

Temporary measures, such as the construction of temporary walls reinforced with brick lining bordering the construction areas to contain debris and spoil, will also be undertaken to avoid soil erosion and water contamination.

The stone and gravel will not be extracted from the project area.

Vehicles and equipment will not be repaired in the project site. If unavoidable, impervious sheathing will be used to avoid any soil contamination.

For the domestic sewage from the campsite, septic tanks with soaking pits will be constructed having adequate capacity. Waste oils (if any) will be collected in drums and sold to the recycling contractor.

The recyclable waste from the project site (such as cardboard, drums, broken/used parts, etc.) will be used as appropriate or to be sold to recycling contractor.

The hazardous waste should be kept separate and handled according to the nature of the waste. While storing, hazardous waste will be marked.

Domestic solid waste will be disposed of in a manner that does not cause soil contamination/water contamination.

The campsites will be completely restored after the completion of the construction works. All temporary structures will be demolished, the land levelled and re-contoured to the original condition or better. All debris and any other material will be removed from the site.

Residual Impacts

Appropriate construction practices and management actions as listed above will greatly minimize the soil erosion and contamination. The significance of the residual impacts is therefore expected to be ‘low’.

5.7.2 Air Quality Deterioration

The Construction machinery and project vehicles will release exhaust emissions, containing Carbon Monoxide (CO), Oxides of Sulfur (So_x), Oxides of Nitrogen (NO_x) and Particulate Matter ($PM_{2.5, 10}$).

Impacts of air emissions may be carried over long distances depending upon the wind speed, direction, temperature of the surrounding air and atmospheric stability. The installation of batching plant at the project site during the construction phase of the project will create dust emissions if dust collector is not installed.

These emissions can deteriorate the ambient air quality in the immediate vicinity of the project site. Furthermore, construction activities such as excavation, land levelling, filling and vehicular movement on unpaved tracks may also cause fugitive dust emissions.

The unmitigated impacts related to air quality deterioration are characterized below:

Nature: Direct

Duration: Temporary

Geo extent: Local

Reversibility: Irreversible

Likelihood Certain

Consequence Moderate Significance of Impact: High Negative

Mitigation Measures

- Construction machinery and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions.
- Fugitive dust emissions will be minimized by sprinkling water on the soil, where required and appropriate.
- Vehicular traffic on unpaved track will be avoided as far as the possible and unpaved road will be sprinkled with water.
- To minimize the occupational health hazard, proper personal protective gears, i.e. masks, shall be provided to the workers who are engaged in dust generation activity.
- Dust collectors will be installed at the batching plant.

Residual Impacts

The above measures will reduce the magnitude of the adverse impacts on ambient air quality. The significance of the residual impacts on air quality is expected to be low.

5.7.3 Noise and Vibration

Due to the movement of heavy vehicles, there would be excessive noise and vibration. Other construction activities which may result in intermittent noise and vibration include:

- Piling – boring steel and concrete support structures below ground to support retaining walls and deep excavations, such as the tunnel shaft
- Vibratory rolling – used to compact fill material in order to reach required compaction levels, used during the installation of piling pads and during road reinstatement as required
- The use of air compressors, concrete plants, generators and light towers.
- Use of Batching Plant

The unmitigated impacts related to the noise and vibration caused by the project are characterized below:

Nature:Direct

Duration: Temporary

Geo extent: Local

Reversibility: Irreversible

Likelihood Certain

Consequence Moderate Significance of Impact: Moderate negative

Measures and Mitigation

- To mitigate these impacts noise barriers should be constructed in sensitive areas.
- Construction equipment and vehicles will have exhaust mufflers (silencers) to minimize noise generation.
- Nighttime traffic and construction activities will be avoided. The local population will be taken in confidence if such work is unavoidable.
- Construction machinery will be kept in good condition to reduce noise generation.
- Concrete pouring in the cement tankers will be in a closed enclosure to limit the noise and dust generation.

All generators and heavy-duty equipment will be installed and placed enclosures to minimize ambient noise levels.

Residual Impact

Despite the above mitigation measures, there will be some residual impacts of the project on the noise and vibration of the area. The significance of these residual impacts is expected to be low.

5.7.4 Surface Water and Groundwater Contamination

The project activities that can contaminate soil may also contaminate the surface water and groundwater. These include.

- Solid waste disposal
- Sewerage disposal
- Equipment/ vehicles maintenance
- Spillage/ leakage of fuels, oils and chemicals
- Campsite sanitation facilities

Following are the most susceptible locations for contamination of water during construction:

- Waterlogged areas that have water in them during the period of construction;
- Surface and groundwater resources close to construction material storage yard, concrete mixer plants and maintenance sites of construction vehicles; and

The unmitigated impacts of the proposed construction activities on the water quality of the area characterized below:

Nature: Direct and indirect

Duration: Short-term impact

Geo extent: Local

Reversibility: Irreversible

Likelihood Certain

Consequence Moderate Significance of Impact: Moderate negative

Mitigation Measures

- Protection of the groundwater reserves from any contamination.
- Water required for construction should be obtained in such a manner that water availability to the local community remains unaffected.
- Prohibit the washing of vehicles and machinery at the project site.
- Concrete should be brought in concrete movers and used.
- Rainwater harvesting shall be practiced for the collection of stormwaters from the roofs and pavements for possible horticultural use.
- The mitigation measures recommended forestalling soil contamination will also prevent surface and groundwater contamination.

- Fecal Coliforms Bacteria and E.coli values if exceed the reference values then do chlorination.

Residual Impacts

If the recommended mitigation measures are effectively employed, the residual impacts of the project activities on the water quality of the area will be negligible.

5.7.5 Loss of Vegetation

The project site has limited vegetation cover. The project site preparation and construction activities may necessitate the removal of the shrubs. There are no trees at the project site.

Damage and/or loss of vegetation and clearing of other indigenous species, as well as undergrowth species, comprising of bushes, grass, etc. will also be lost.

The construction crew can also indulge in tree/shrub cutting to obtain fuelwood for the camp from the project area.

The unmitigated impacts of the proposed activities on the loss of vegetation of the area are characterized below.

Nature: Direct

Duration: Long Term

Geo extent: Local

Reversibility: Irreversible

Likelihood Certain

Consequence Moderate Significance of Impact: Significant Impact

Mitigation Measures

- Endeavors will be made to compensate for the loss by enhancing the environment, through a plantation of trees.
- Indigenous species should be preferred, and invasive should be avoided. Flowering and fruiting shrubs can be planted to beautify the landscape.
- All preventive measures will be adopted to control the spill-over of chemicals and other effluents on the ground to protect soil fauna and ensure microbial activity in accordance with PEQS.
- The construction workforce will be provided with LPG as cooking and heating (if required) fuel. The burning of fuelwood will be strictly prohibited.

- A plantation plan for "The Proposed "Project has been prepared, which has a mix of appropriate trees /bushes which will be raised within the available open spaces particularly along its boundary.
- All preventive measures will be adopted to control the spill-over of chemicals and other effluents on the ground to protect soil fauna and ensure microbial activity.

Residual Impact

At present, there are no trees at the project site only some wild shrubs. The trees planted under the plantation plan will take some time to grow and mature and once grown the planted trees and vegetation will be compensated. This impact cannot be fully mitigated, and the residual impact would be medium; at least in the short term.

5.7.6 Disposal of Construction Waste/Excavated Material

Dumping of construction wastes/excavated material, in the surrounding area, may limit the use of land in the project area. The solid waste may be generated due to different construction activities, and it will mainly include surplus excavated and construction material. It may also be generated from the construction camp.

The indiscriminate disposal of solid waste may cause dust emissions due to the wind blowing thereby affecting the health of the workers working or passing in the immediate vicinity of solid waste heaps. The impacts of solid waste would be temporary and minor negative in nature. The unmitigated impacts of the proposed activities area are characterized below:

Nature: Direct
Duration: Medium to long-term
Geo extent: Local
Reversibility: Irreversible (reversible in medium to long-term)
Likelihood: Certain
Consequence: Severe
Impact significance: Moderate

Mitigation Measures

- Management of construction activities will be done in a way to ensure minimal degradation to the soil around the project site
- Dumping of excavated waste and waste generated from the construction camp will be done at a designated site.

- The contractors will be bound by contractual obligations to take care of the waste generated from the construction activities.

5.7.7 Traffic Management

During the construction phase, the movement of heavy machinery and transportation of construction material and equipment may cause traffic problems.

The vehicle traffic during the construction phase of the project is expected to be 8-10 round trips for construction material supplies and movement of construction crew during the peak construction period, per day.

The unmitigated impacts associated with vehicular traffic are characterized below:

Nature:Direct

Duration: Short Term

Geo extent: Local

Reversibility: Reversible

Likelihood Certain

Consequence Mild

Significance of Impact: Medium

Mitigation Measures

- The number of trips from Proposed Project will be minimized through astute planning.
- The project vehicles will avoid the peak vehicular traffic time (morning and evening).
- The project vehicles will comply with Traffic Police rules and follow the timings set for the movement of heavy vehicular traffic.
- Movement of vehicles carrying construction materials will be restricted during the nighttime to reduce traffic load and inconvenience to the local residents.
- There will also be a provision of caution signs on the access road to alert users on construction activities in progress in order to prevent the occurrence of incidents.
- Project vehicles shall not be fitted with pressure horns.
- The speed of vehicles will be regulated during the construction phase.
- Designated parking areas will be provided for the different type of project vehicles within and around the project sites.
- Traffic Management Plan will be introduced to manage the smooth flow of vehicular traffic and to avoid traffic jam and long queues.

Residual Impacts

With the implementation of the above-mentioned mitigation measures, the residual impacts of the project related vehicular traffic nearby will be negligible.

5.7.8 Safety Hazards, Public Health and Nuisance

The project may pose some safety hazards to the local population and pose a varying degree of a safety hazard.

The public health issues related to the project location are the possibility of contamination of local drinking water resources and dust emissions during the construction phase. The anticipated health impacts are classified into the following categories:

Dust and Pollen Allergy: One of the main problem people may face of dust and pollen allergy.

Eye and Respiratory Diseases: Construction workers may be susceptible to the eye and respiratory diseases due to their routine exposure to dust and exhaust emissions on the project site.

Accidents: During the construction phase, as the traffic will increase, it may cause accidents and become a safety problem.

Physical Injuries: Injuries could happen primarily by occupational-related accidents, etc. Activities such as land clearing, earthworks, and construction of buildings present various occupational hazards to the workers on site.

Psychological Disorders: Some workers may suffer from depression and anxiety disorders due to working and accommodation conditions, and their relationship with fellow workers. The psychological wellbeing of some members of the community may be affected due to disturbances created by the project activities.

Excessive illumination at the construction site may potentially cause light pollution, creating a public nuisance.

The unmitigated impacts related to the safety hazards; public health and nuisance are characterized follows:

Nature: Direct and indirect

Duration: Short to medium term

Geo extent: Local

Reversibility: Reversible

Likelihood: Likely

Consequence: Major

Impact significance: High.

Mitigation Measures

Protected fencing will be fixed around the construction site. Unauthorized access within the construction area will not be allowed.

- The local community will be educated regarding the safety hazards at the project site.
- The mitigation measures discussed under air quality deterioration, soil and water contamination will address the public health concerns as well.
- Defensive driving practices will be inculcated in the project drivers through training, posters and other similar measures.
- Appropriate light diffusers and reflectors will be used, if required, to minimize the public nuisance caused by light pollution.
- Personnel injuries risks can be mitigated through the provision of appropriate training and emergency response procedures.
- Better working conditions for the employees would be ensured.
- Regular routine health screening of the staff should be carried out.
- Firefighting equipment will be made available at the camp.
- The camp staff will be provided for firefighting training.
- The construction camps and site offices will have first-aid kits.
- The construction crew will be provided awareness for the transmissible diseases (such as HIV/AIDS, hepatitis B and C).
- All safety precautions will be taken to transport, handle and store hazardous substances such as fuel.
- Road signage will be fixed at appropriate locations to reduce safety hazard associated with project-related vehicular traffic.

Residual Impacts

There will be a moderate level of the residual impact of safety hazard associated with the vehicular traffic and construction activities.

The residual public health and nuisance issues will be quite negligible after the effective implementation of the mitigation measures.

5.7.9 Sites of Archaeological or Historical Significance

There is no such archaeological and historical site in the vicinity of the project area. In case any other, artifact of some significance is found during the construction activities, the Archeology Department, Government of Pakistan will be informed.

5.8 OPERATIONAL PHASE IMPACTS

The operation of project will interact with different components of the environment. This interaction may result in the following adverse impacts:

- Air Quality Management
- Odor Generation
- Noise Pollution
- Solid Waste Generation & Management
- Soil Pollution
- Socio Economic Impacts
- Health and Safety
- Traffic Congestion

However, the magnitude of some of the above impacts is likely to be lower as compared to the construction phase impacts.

The potential environmental impacts of the proposed project during the operational phase are characterized in **Table 7.1** and discussed below:

5.8.1 Air Quality Management

Emissions from **biogas production**, **biomass briquetting**, and fuel usage may contribute to localized air pollution.

The impacts related to air quality management caused by the project are characterized as follows:

Nature: Direct

Duration: Medium-term

Geo extent: Local

Reversibility: Reversible

Likelihood: Certain

Consequence: Moderate

Impact significance: Medium

Mitigation Measures:

Mitigation measures for air pollution in operations can include:

- Air pollution control devices such as scrubbers and filters will be installed on emission points.
- Biogas capture systems will be installed to efficiently capture and utilize biogas, minimizing methane and carbon dioxide emissions.
- Emission levels will be monitored regularly to ensure compliance with national air quality standards.
- Renewable energy sources are also in plan to be incorporated to further reduce emissions.

5.8.2 Odor Generation

Processing of organic wastes may produce unpleasant odors during composting and anaerobic digestion.

The impacts related to air quality management caused by the project are characterized as follows:

Nature: Direct

Duration: Medium-term

Geo extent: Local

Reversibility: Reversible

Likelihood: Certain

Consequence: Moderate

Impact significance: Medium

Mitigation Measures:

Mitigation measures for odor and noise pollution in operations can include:

Odor-neutralizing systems, including biofilters, shall be installed at key odor-generating points.

Compost windrows will be covered and regularly turned to minimize odor accumulation.

Organic waste will process immediately upon arrival to prevent odor formation.

Water Quality and Usage

Nature: Direct

Duration: Medium-term

Geo extent: Local

Reversibility: Reversible

Likelihood: Certain

Consequence: Moderate

Impact significance: Medium

Potential contamination of local water bodies from **leachate** or wastewater generated by the facility.

Mitigation Measures:

Leachate collection and treatment systems are operational to prevent any contamination of groundwater or surface water.

Treated wastewater is **recycled** and reused for **irrigation** or **process cooling**.

A robust **stormwater management system** is in place to handle surface runoff and prevent water contamination.

5.8.3 Noise Pollution

Impact: Noise generated from machinery and equipment during waste processing and briquetting operations.

Nature: Direct

Duration: Medium-term

Geo extent: Local

Reversibility: Reversible

Likelihood: Certain

Consequence: Moderate

Impact significance: Medium

Mitigation Measures:

Noise barriers and **acoustic insulation** will be installed around high-noise areas.

Maintenance and waste handling operations will conduct during daytime hours to minimize disturbances.

Noise levels are **monitored regularly** to ensure compliance with local noise standards.

5.8.4 Solid Waste Generation

Nature: Direct

Duration: Medium-term

Geo extent: Local

Reversibility: Reversible

Likelihood: Certain

Consequence: Moderate

Impact significance: Medium

Impact: Generation of solid waste from inorganic residues, biogas digestate, and compost rejects.

Mitigation Implemented:

- **Inorganic waste is segregated and recycled** where possible, reducing landfill demand.
- **Biogas digestate** is repurposed within the composting process, minimizing solid waste generation.
- Residual solid waste is managed and disposed of according to **local waste management regulations**.

5.8.5 Impact on Soil

- **Nature:** Indirect
- **Duration:** Medium-term
- **Geo extent:** Local
- **Reversibility:** Reversible
- **Likelihood:** Certain
- **Consequence:** Moderate
- **Impact significance:** Medium

Impact: Risk of soil contamination due to leachate or improper waste management.

Mitigation Implemented:

- **Leachate containment systems** are fully operational to prevent soil contamination.
- Soil quality around the facility is **monitored regularly** to ensure that there are no signs of contamination.
- Composting practices are designed to **improve soil health** while minimizing any potential for harmful effects.

5.8.6 Energy Consumption

- **Nature:** Direct
- **Duration:** Medium-term
- **Geo extent:** Local
- **Reversibility:** Reversible
- **Likelihood:** Certain
- **Consequence:** Moderate
- **Impact significance:** Medium

Impact: The facility will consume energy for **biogas production**, **composting**, and **biomass briquetting**.

Mitigation Implemented:

- The facility utilizes **biogas** and **biomass briquettes** produced on-site to meet a portion of its energy requirements.
- **Energy-efficient equipment** and processes have been installed to reduce overall consumption.
- **Energy audits** are conducted periodically to ensure that consumption is optimized.

5.8.7 Socio-Economic Impacts

- **Nature:** Indirect
- **Duration:** Medium-term
- **Geo extent:** Local
- **Reversibility:** Reversible
- **Likelihood:** Certain
- **Consequence:** Moderate
- **Impact significance:** Medium

Impact: The project will create employment and support local industry by providing **sustainable waste management services**.

Mitigation Implemented:

- Local labor has been **prioritized for hiring**, and training programs have been conducted for workers on waste management practices.
- Continuous engagement with local industry and stakeholders ensures **ongoing communication** of the project's socio-economic benefits.

5.8.8 Public Health and Safety

- **Nature:** Direct
- **Duration:** Medium-term
- **Geo extent:** Local
- **Reversibility:** Reversible
- **Likelihood:** Certain
- **Consequence:** Moderate
- **Impact significance:** Medium

Impact: Proper management of waste reduces public health risks associated with open dumping and incineration.

Mitigation Implemented:

- **Health and safety protocols** are in place and implemented to ensure worker and public safety during operations.
- Facility operations are regularly monitored for potential health hazards, and staff receive **safety training** on waste handling.

5.8.9 Traffic and Transportation

- **Nature:** Direct
- **Duration:** Medium-term
- **Geo extent:** Local
- **Reversibility:** Reversible
- **Likelihood:** Certain
- **Consequence:** Moderate

- **Impact significance:** Medium

Impact: Increased traffic due to the transportation of waste to the facility and distribution of **biomass briquettes**.

Mitigation Implemented:

- **Transport schedules** are coordinated to minimize congestion by restricting movements during **off-peak hours**.
- All vehicles comply with **emission standards** to reduce environmental impact during transportation.
- **Traffic management plans** are operational to mitigate any disruptions in the surrounding community.

CHAPTER# 6.

ENVIRONMENTAL MANAGEMENT PLAN

6.1 GENERAL

This IEE provides the Environmental Management Plan (EMP) of the project for its construction and operational phases to keep it environment benign as well as the monitoring plan to ensure the compliance of the established EMP. Outline and key features of the EMP for operations phase is presented. As per the environmental legislation in Pakistan, the EMP for the operations phase, along with other documents, is to be submitted to the environmental protection agency to obtain confirmation for compliance and Environmental Approval for project operation.

Even after implementation of the suggested mitigation measures, the impact may remain significant, and require monitoring. This section also underlies the monitoring framework for both construction and operation phases to check compliance of the EMP and to take timely actions for correction in case any accidence of significant criteria, requirements or goals are found.

6.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Monitoring Plan (EMP) was outlined alongside Environmental Management Plan to ensure all the corrective actions to counter adverse impacts which gives a detailed EMMP. The EMMP will serve as a principal execution module of the project that would not only mitigate adverse environmental impacts during the installation and the operational phase of the project but also ensures that environmental standards and good in-housekeeping are being practiced. Continuous environmental monitoring is exercised to ensure that preventive measures are in place and effective to sustain environmental integrity.

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified for construction phase in the IEE.
- Define the responsibilities of the project proponent and contractor and provide a means of effective communication of environmental issues between them.
- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures

- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

6.3 MANAGEMENT APPROACH

The organizational roles and responsibilities of the key players are summarized below:

Proponent: M/S AT Waste Management Company, being the proponent, will have an entire dedicated team for compliance with the Environmental Management Plan of the proposed Project. Furthermore, M/S AT Waste Management Company will implement an Environmental Monitoring Plan, which has been prepared for the construction and operational phases of the project.

Project Manager: The project manager will carry out field activities and will be responsible for implementing various mitigation actions prescribed in the IEE report relevant to the contract. The project manager will make sure the Environmental Monitoring Plan is being followed and complied with on the project site. The Executing Agency will monitor the project site and ensure the implementation of the EMP and the IEE report.

Contractors: The contractors will implement the majority of environmental and social mitigation measures. The contractors will carry out field activities as part of the project. The contractors are subject to certain liabilities under the environmental laws of the country, and under its contract with proponent.

6.3.1 Operational Phase

The magnitude of environmental impacts during the operational phase will be less as compared with the construction phase; therefore, the management will have to implement various mitigation actions as described in the operational phase. Furthermore, keeping in view of the magnitude of environmental impact, and Environmental Monitoring Plan has been proposed for the operational phase of the project.

6.4 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

6.4.1 Construction Phase

The organizational structure for the construction phase EMP is described as follows:

Primary Responsibilities: The primary responsibilities for the environmental performance of the project proponent, design and consultant will be assumed by respective highest-ranking officers during the project.

The Project Manager, will be responsible for the compliance with the EMP of the project.

Field Management and Quality Control: The construction activities will be carried out in an environmentally sound manner during the construction phase of the project and will be the responsibility of the Site Engineer. He will be responsible for implementing EMP and EIA recommendations.

The Project Manager will be responsible for ensuring the overall environmental soundness of all construction activities. He will ensure the implementation of EMP and IEE.

Environmental Monitoring: The management will make necessary arrangements to monitor the key environmental data during the construction phase.

These will include the quantity of water used, a record of waste produced, a record of waste disposal, and project-related vehicular traffic.

6.4.2 Operational Phase

The management will assume the main responsibility for the environmental performance of the project during the operational phase.

An environmental monitoring plan has been developed as part of the project. The key environmental parameters, such as water consumption, waste disposal, water quality, traffic count, noise, odor and status of implementation of plantation plan will be monitored on a regular basis. The environmental monitoring reports will be produced and shared with the concerned authorities if required.

6.4.3 Environmental Improvement Cell and Responsibilities

The proposed project will form up an Environmental Improvement Cell, which will be responsible for the environmental management and supervisory affairs during the construction and operational phases of the proposed Project.

The responsibilities of the Environmental Improvement Cell are as follows:

- To ensure implementation of all the proposed mitigation measures during and after the proposed project.
- Capacity building of the staff regarding environmental improvement and awareness.
- To develop operational guidelines and implementation schedule.
- Receiving complaints from the local community and other people and assisting the local environmental authority.

- To ensure that the proposed project is implemented in an environmentally friendly manner, causing the least harm to the existing environment including flora and fauna.
- To make sure that the business and affecters of the proposed project are relocated or compensated in the most judicious manner.

6.4.4 Project Monitoring

M/S AT Waste Management Company will make necessary arrangements to monitor the key environmental data during the operational phases at intervals. These will include a record of waste produced, a record of waste disposal, and vehicular traffic.

The project manager of the proposed project shall monitor project impacts during the operation. He will keep a record of all non-conformances observed and report these along with actions to management for further action. He will also have to report any impacts anticipated, along with his recommendations for further action.

6.4.5 Approvals

M/S AT Waste Management Company will obtain all the relevant clearances and necessary environmental approvals required by the Pakistan Environmental Agency, Government of Pakistan, and other regularity agencies.

6.4.6 Contractual Provisions

Adherence to the requirements of the IEE and EMP in terms of environmental mitigation will be required from all project contractors, and thus EMP will form part of their contracts with the management of the project.

The contractor shall be responsible for implementing the mitigation measures and monitoring of various environmental parameters. The management shall monitor the contractor's performance with respect to EMP implementation.

6.4.7 Environmental Mitigation Matrix

An Environmental Mitigation Plan (Matrix) describing the summary of the impacts and mitigation measures and institutional responsibility is provided in **Table 6.1**

Table 6.1: Environmental Management Plan

Sr. No.	Activity/Aspect	Objectives	Project Enhancement Measures	Time of Implementation	Responsibility	
					Implementation	Supervision
CONSTRUCTION PHASE						
1.	Site Preparation and Clearing	Minimize environmental disruption and soil erosion	Implement **erosion control measures** (e.g., silt fences, mulching) - Proper disposal of **construction debris**	Before and during construction	Contractor	Site Engineer
2.	Dust Emissions from Construction Activities	Reduce air pollution during construction	- Use of **water spraying** to suppress dust - **Covering materials** during transportation - Monitoring air quality	During construction	Contractor	Site Engineer
3.	Noise Pollution from Construction Equipment	Minimize noise pollution from heavy machinery	- **Install sound barriers** around noisy areas - Schedule noisy activities during **daytime** hours only	During construction	Contractor	**Supervision:** Site Engineer

Sr. No.	Activity/Aspect	Objectives	Project Enhancement Measures	Time of Implementation	Responsibility	
					Implementation	Supervision
4.	Waste Management from Construction	Ensure proper disposal of construction waste	- **Segregation** of recyclable materials (metal, wood, etc.) - Disposal of hazardous waste through **EPA-certified contractors**	During construction	Contractor	Site Engineer
5.	Water Use and Wastewater	Minimize water wastage and prevent contamination	- Use of **water-efficient practices** - **Septic tanks** for temporary wastewater treatment	During construction	Contractor	Site Engineer
OPERATIONAL PHASE						
6.	Air Emissions from Biogas and Biomass Briquetting	Minimize air pollution and ensure compliance with air quality standards	- Installation of **air pollution control devices** (scrubbers/filters) Regular monitoring of **air emissions** to meet **EPA air quality standards**	Continuous during operation	Facility Manager	Environmental Officer

Sr. No.	Activity/Aspect	Objectives	Project Enhancement Measures	Time of Implementation	Responsibility	
					Implementation	Supervision
7.	Odor Generation from Organic Waste Processing	Prevent Odor-related nuisances in the surrounding area	- Use of **Odor-neutralizing systems** (biofilters) - Timely processing of organic waste to avoid Odor buildup - Proper covering and turning of compost piles	Continuous during operation	Waste Processing Team	Environmental Officer
8.	Wastewater and Leachate Management	Prevent contamination of local water bodies	- Installation and operation of **leachate collection and treatment systems** - Recycling of treated wastewater for on-site use (e.g., irrigation, cooling)	Continuous during operation	Facility Manager	Environmental Officer
9.	Solid Waste Management	Ensure responsible handling and disposal of waste	- **Segregation** of recyclable materials (inorganic waste, packaging) - Handing over residual waste to	Continuous during operation	Waste Processing Team	Environmental Officer

Sr. No.	Activity/Aspect	Objectives	Project Enhancement Measures	Time of Implementation	Responsibility	
					Implementation	Supervision
			EPA-certified third-party contractors for reuse/recycling			
10.	Noise Pollution from Machinery and Equipment	Minimize noise disturbance to surrounding areas	- Installation of **noise barriers/acoustic insulation** around noisy equipment - Regular noise monitoring to comply with local standards	Continuous during operation	Facility Manager	Environmental Officer
11.	Energy Consumption	Optimize energy use and promote renewable energy	- Utilization of **biogas** and **biomass briquettes** produced on-site for energy needs - Conduct periodic **energy audits** to improve energy efficiency	Continuous during operation	Facility Manager	Energy Management Team
12.	Traffic and Transportation	Reduce traffic congestion and minimize the carbon footprint	- **Schedule transportation** during off-peak hours - Ensure vehicles comply with **emission standards**	Continuous during operation	Logistics Manager	Facility Manager

Sr. No.	Activity/Aspect	Objectives	Project Enhancement Measures	Time of Implementation	Responsibility	
					Implementation	Supervision
			- Implement **traffic management plans**			
13.	Public Health and Safety	Protect worker and public health from risks associated with operations	- Implement **health and safety protocols** for waste handling - Provide workers with **personal protective equipment (PPE)** - Regular safety training and monitoring	Continuous during operation	Health & Safety Officer	Facility Manager

6.5 SOLID WASTE MANAGEMENT PLAN

Construction Phase

During the construction phase of the biomass boiler project, solid waste management will focus on minimizing environmental impacts and ensuring proper disposal of various types of waste generated. The types of waste expected include construction debris such as concrete, bricks, wood, metal scraps, and packaging materials, as well as hazardous wastes like paints, solvents, and chemicals. Organic waste may also be generated from site clearing activities.

To manage these wastes, the project will integrate waste reduction strategies from the design phase, selecting materials and methods that minimize waste generation. Procurement practices will include bulk purchasing and choosing suppliers with sustainable packaging. Workers will be trained in waste minimization techniques to ensure effective on-site management.

Waste segregation will be a key focus, with separate bins provided for different waste types, including recyclables and hazardous materials. Clear labeling and a color-coded system will facilitate proper waste separation. A regular collection schedule will be established to prevent waste accumulation, and licensed waste transporters will be used for safe disposal. Detailed records of waste collection and transportation will be maintained.

Recycling and reuse efforts will include partnering with local facilities to process recyclable materials and reusing construction materials like wood and bricks where feasible. Biomass residues such as ash will be explored for potential reuse in soil amendments. Hazardous waste will be disposed of at licensed facilities, while organic waste will be composted on-site or sent to local composting facilities. Non-recyclable waste will be directed to approved landfills.

Regular waste audits will be conducted to monitor the effectiveness of waste management practices. Reports will be prepared and submitted to relevant authorities, and compliance with local regulations will be continually reviewed and adjusted as needed.

Operation Phase

In the operational phase of the biomass boiler project, solid waste management will address the waste generated by the boiler's ongoing use and the broader operational activities. This includes biomass residues such as ash and slag from the boiler, packaging waste from materials and products, general waste like office and food waste, and hazardous waste such as used oils and filters.

To manage these wastes, the project will implement waste reduction practices by optimizing fuel use and minimizing packaging. Segregation will involve setting up designated bins for different waste streams and ensuring proper labeling. Regular waste collection will be arranged, with licensed transporters handling the movement of waste to treatment or disposal facilities. Documentation of waste management activities will be maintained.

Recycling initiatives will focus on partnering with local facilities to process recyclable materials and finding uses for biomass residues such as ash in construction or soil amendments. Hazardous waste will be managed through licensed disposal facilities, while organic waste will be composted or processed at local facilities. Non-recyclable waste will be sent to approved landfills, and opportunities for waste-to-energy conversion will be explored where applicable. Monitoring and reporting will continue with regular audits to assess waste management performance. Reports will be prepared and submitted as required, and compliance with environmental regulations will be monitored and updated as necessary to ensure effective waste management throughout the operational phase.

6.6 HSE MANAGEMENT PLAN

Health Safety and Environment (HSE) induction/orientation will be provided to all workforce at the project site.

Assembly point will be established for the gathering of workforce regarding daily HSE Toolbox Talk at the project site.

HSE Toolbox Meeting will be held by HSE Manager on a weekly basis.

Special education sessions will be conducted properly at the site.

The daily walkthrough will be conducted at the project site.

All the Mandatory PPE's (Safety Helmet, Safety Jacket, Safety Shoes, Coverall, Full body Harness, Safety Goggles, Earplug, Earmuff, Dust mask/Special Safety Gloves, etc.).

Proper and safe scaffolding will be provided at the site for safe work at height.

All the heavy machinery will be inspected properly at the site.

All Cranes and lifting gears will be inspected/checked on a regular basis.

Inspection Tagging system will be maintained at the project site.

Safety signage will be provided at the project site.

Fire posts will be established at the project site at easy approach location.

Waste will be maintained properly.

HSE Signboard will be installed at the project site for an emergency response.

Rest area smoking zones will be established at the site.

Regular First Aid Center, along with all required medicines 24/7, will be available at the project site.

Paramedic (dispensers) will be deployed at the first-aid post for day-night shift

Fully equipped Ambulance will be made available at the site for 24/7

In-house training will be conducted on the project site.

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

First Aid Boxes: First aid boxes will be provided at all active construction sites to cope up the emergency situations. Usually, a typical first aid box mainly contains antibiotics, basic medicines, cotton, bandages, sunny plasts, healing balms, pyodine, spirit, pain killer, etc.

Dispensaries: Medical facilities will be established on-site. A dedicated room will be established as a dispensary and first aid services at the campsite.

PPEs: Site Engineer and HSE Manager will be responsible for providing PPEs to all workers.

Safety Signs: Relevant safety signboards will be displayed on the worksites and labour camps to make aware / train workers about safety rules. Mainly safety signs include signs of speed limits, electric spark, etc.

TBTs: Tool Box Talks (TBTs) will be delivered on a regular basis and when a new team of workers start a new activity like shuttering, steel fixing, steel cutting, steel bending, scaffolding, concrete pouring, mechanical works, electrical works, etc. at sites to promote safety culture.

Water Sprinkling: Dust pollution will be controlled with water sprinkling and minimizes the risk of adverse impacts of dust on workers and surrounding areas. Water sprinkling will be carried out regularly to minimize dust pollution and avoiding creating slush.

Barricading: Barricade tape at all the active work sites will be put. Hard barricading (scaffolding pipes) will be used to cover exposed areas where excavation is more than 10 feet.

Training: Safety training will be delivered by the HSE Manager to achieve its objectives. Trainings will be conducted for capacity building of employees / workers /labor/ sub-contractors to make them well effective to respond in any kind of emergency situation.

6.7 TRAFFIC MANAGEMENT AND CONSTRUCTION MATERIAL TRANSPORTATION PLAN

The Traffic Management and Construction Material Transportation Plan is designed to ensure the efficient, safe, and environmentally responsible transportation of construction materials for the biomass boiler project at AT Waste Managment Company (PTC). The plan aims to minimize disruptions to local traffic, ensure the safety of workers and the public, and comply with all relevant regulations.

6.8 TRAFFIC MANAGEMENT

1. Traffic Assessment Before construction begins, a comprehensive traffic assessment will be conducted to evaluate current traffic conditions, peak traffic hours, and potential impacts of construction activities on local traffic flow. This assessment will help identify necessary adjustments and improvements to manage traffic effectively during the construction phase.

2. Traffic Routing and Signage A traffic management plan will be developed, detailing designated routes for construction vehicles to minimize disruption to local traffic and residential areas. Clear signage will be installed to direct vehicles, inform the public of construction activities, and provide instructions for alternate routes if necessary. Signage will be strategically placed at key locations to alert drivers in advance.

3. Construction Hours Construction activities involving heavy traffic and material transportation will be scheduled during off-peak hours to reduce traffic congestion and minimize impact on local traffic flow. Construction hours will be communicated to local authorities and residents to ensure awareness and coordination.

4. Traffic Control Personnel Traffic control personnel will be deployed at critical points to manage traffic flow and assist with the safe movement of construction vehicles. These personnel will be trained to handle traffic management tasks, including directing vehicles, monitoring traffic conditions, and addressing any issues that arise.

5. Coordination with Local Authorities Regular coordination with local traffic authorities and law enforcement will be established to ensure compliance with traffic regulations and to address any emerging issues promptly. Meetings with local authorities will be held to discuss traffic management plans and obtain necessary permits.

6.9 CONSTRUCTION MATERIAL TRANSPORTATION

1. Transportation Schedule A detailed transportation schedule will be developed to plan the delivery of construction materials in a timely manner. This schedule will take into account the availability of materials, transportation routes, and construction timelines. Coordinated delivery times will help prevent congestion and ensure efficient material handling.

2. Vehicle Maintenance and Safety All vehicles used for transporting construction materials will be regularly maintained to ensure they are in good working condition. Safety checks will include inspections of brakes, tires, and loading mechanisms. Vehicles will be equipped with safety features such as reflective markings and working lights to enhance visibility.

3. Loading and Unloading Procedures Safe and efficient loading and unloading procedures will be implemented to prevent accidents and ensure that materials are handled properly. Designated loading and unloading areas will be established at the construction site to streamline these processes and minimize disruption to traffic.

4. Waste Management Construction materials will be managed to minimize waste, and any waste generated during transportation or construction will be promptly addressed. A waste management plan will be in place to handle excess materials and debris, ensuring they are disposed of or recycled appropriately.

5. Communication with Suppliers Effective communication with suppliers will be maintained to ensure timely deliveries and to address any issues related to transportation. Suppliers will be informed of the traffic management plan and any specific requirements for delivery vehicles.

6. Emergency Response An emergency response plan will be developed to address any incidents involving construction material transportation. This plan will include procedures for handling accidents, spills, or other emergencies, as well as contact information for emergency services.

6.10 EMERGENCY PREPAREDNESS, RESPONSE AND SITE EVACUATION PLAN

The management will always be ready for response in any kind of emergency at the project site.

Special assembly points will be established at the project site (offices site).

The emergency siren will be installed at assembly points.

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

6.11 FIRE FIGHTING PLAN

The Fire Fighting Plan for the installation of the biomass boiler at AT Waste Management Company is designed to integrate with the existing large-scale firefighting infrastructure and procedures of the operational unit. The plan focuses on ensuring that the new boiler installation aligns with established fire safety protocols while addressing any specific risks associated with biomass fuel and boiler operations.

Integration with Existing Fire Fighting Infrastructure

1. Existing Fire Fighting Infrastructure Overview The existing unit at AT Waste Management Company has a comprehensive and large-scale firefighting plan that includes advanced systems, such as automated sprinkler systems, fire alarms, hydrants, and a dedicated

firefighting team. This infrastructure is designed to handle a wide range of fire scenarios, including industrial and operational fires.

2. Coordination with Existing Systems The installation of the biomass boiler will be integrated into the current firefighting infrastructure to ensure seamless operation. Coordination will involve:

Review and Integration: Assessing the current firefighting systems and integrating any new requirements specific to the biomass boiler, such as additional fire detection and suppression systems.

System Upgrades: Upgrading existing systems if necessary to accommodate the new boiler's specific fire risks and requirements.

Coordination Meetings: Regular meetings with the existing firefighting team to ensure that all new procedures and equipment are incorporated into the existing emergency response plans.

Specific Fire Safety Measures for the Biomass Boiler

1. Fire Risk Assessment:

A detailed fire risk assessment will be conducted for the biomass boiler installation to identify potential fire hazards specific to biomass fuel and boiler operations. This assessment will guide the implementation of targeted fire safety measures.

2. Fire Detection Systems:

Enhanced fire detection systems will be installed in the areas surrounding the biomass boiler. This includes:

- Smoke and Heat Detectors: Installation of smoke and heat detectors in key areas to provide early warning of potential fires.
- Automatic Alarms: Integration of alarms with the existing fire alarm system to ensure prompt notification and response.

3. Fire Suppression Systems:

Fire suppression systems will be tailored to address the specific needs of the biomass boiler:

- Sprinkler Systems: Ensure that existing sprinkler systems are adjusted to cover the new installation adequately.

Fire Extinguishers: Placement of appropriate fire extinguishers near the boiler, including those rated for combustible materials and electrical fires.

Specialized Systems: Consideration of specialized suppression systems such as water mist or foam systems if recommended by the fire risk assessment.

4. Emergency Response Procedures:

Emergency response procedures will be updated to include the biomass boiler installation:
Fire Evacuation Plan: Update the existing fire evacuation plan to include evacuation routes and procedures specific to the boiler area.
Fire Drills: Conduct regular fire drills involving the new boiler area to ensure all personnel are familiar with emergency procedures and equipment.

5. Training and Awareness Training for staff and the firefighting team will be updated to include:
6. Fire Safety Training: Specialized training on the unique fire risks associated with biomass boilers and how to handle them.
7. Equipment Use: Instruction on the use of new fire suppression equipment and systems installed for the boiler.
8. Maintenance and Inspection Regular maintenance and inspection routines will be established:
9. System Checks: Frequent checks of fire detection and suppression systems to ensure they are functioning correctly.
10. Equipment Maintenance: Regular maintenance of firefighting equipment and systems to ensure readiness.
11. Documentation and Reporting

Fire Safety Documentation: Maintain detailed records of all fire safety measures, including risk assessments, equipment installations, and training.
Incident Reporting: Implement a system for reporting and investigating any fire-related incidents or near misses to continuously improve safety protocols.
The campsite will be equipped with fire extinguishers as well as communication equipment for contacting the appropriate emergency response teams.
At the campsite, emergency alarms will be installed. Persons will be nominated to ring the emergency alarm in case of an emergency situation or any emergency risk.

All the camp residents will be trained and well communicated how to respond to the emergency alarm and reach at assembly point immediately. Workers will be trained to respond to an emergency alarm, as discussed below:

- If the alarm rings for 20 seconds, only once, then it is a less severe emergency;
- If it rings for 20 seconds thrice after intervals, then it is medium to a severe high emergency, but it can be much severe; and
- If it rings for 60 seconds or more continuously, then the emergency situation is most difficult so, everyone should respond to it immediately, evacuate the workplace and move towards the assembly point.

Proper evacuation routes will be designated, nominated and well communicated to all. All the workers will be trained to follow the particular evacuation routes and reach the assembly point in case of an emergency situation.

6.12 ENVIRONMENTAL MONITORING PLAN

Environmental Monitoring is normally undertaken during both the construction and operational phases of the project to ensure the effectiveness of the proposed mitigation measures.

In order to respond to unanticipated environmental concerns at an early stage and to determine the accuracy of impact, predictions are also required. Specific monitoring programs are outlined below as well as responsibilities for the collection and analysis of data and the reporting requirements.

The various purposes of the environmental monitoring plan are:

- To evaluate the proper implementation and effectiveness of mitigation measures.
- To respond and minimize the unanticipated environmental impacts when the project is under implementation.
- To make regulations and improve management and environmental controls based on the monitoring data.

An Environmental Monitoring Plan for proposed Project has been provided in **Table 6.2**. The plan will be used as a management and monitoring tool for the implementation of the mitigation measures required by the EIA. The plan entails the required mitigation measures recommended in the IEE.

Table 6.2: Environmental Monitoring Plan

Parameter	Project Phase	Parameters	Locations	Frequency	Standards	Implementing	Supervision
Construction Phase							
Air Quality	Construction	PM10, PM2.5	At one location in Proposed site	Quarterly	PEQS	Project Manager	Project Proponent
Noise Levels	Construction	dB (A)	At a central location in Proposed site	Quarterly	EPA Ambient Noise standards	Project Manager	Project Proponent
Operational Phase							
Air Quality	Operation	PM	within and around the project	Quarterly	PEQS	Project Manager	Project Proponent
Noise	Operation	dB (A)	within and around the project	Quarterly	WHO/USEPA guidelines, PEQS	Project Manager	Project Proponent
Sewerage Effluent	Operation	PEQS parameters for liquid effluents	Sewerage outfall in Sewerage Line	Quarterly	PEQS	Project Manager	Project Proponent

6.13 TRAINING PROGRAM

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

- Environmental sensitivity of the project area.
- EMP communication and documentation requirement.
- Vegetation and community issues and their mitigation measures.
- Safe construction practices

- Use of personal protective equipment's (PPEs)
- Environmentally sound construction practices
- Vehicular safety
- Site restoration requirement
- Solid Waste Disposal

AT Waste Management Company will be primarily responsible for providing training to all project personnel. Framework for the environmental and social training program is being provided

Table 6.3: Framework for Environmental Social Training Program

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

6.14 COMMUNICATION AND DOCUMENTATION

An effective program for storing and communicating environmental information during the project is an essential requirement of an EMP. This activity will be done by an independent monitoring consultant. The key features of such a mechanism are:

- Precise recording and maintenance of all information generated during the monitoring in a predetermined format.
- Communicating the information to a central location
- Storing the raw information in a central database
- Processing the information to produce periodic reports

Data recording and maintenance: All forms will be numbered, and a tracking system will be developed for each. Whenever a form is released for use in the field, its number will be recorded. The monitors will be required to account for each form after completion. In this manner, it will be ensured that all forms are returned to the office, be they filled, unused or discarded.

Storage of information: A database for information collected during the project will be prepared. The database may include information on training programs, staff deployment, non-compliance, corrective actions, water resources, results of effecting monitoring.

Meeting: For effective monitoring, management, and documentation of the environmental performance during the operation, environmental matters will be discussed during a daily meeting held on-site. Environmental concerns raised during the meetings will be mitigated after discussions with the higher management

Reporting: Monitoring body will produce daily, weekly, monthly and another periodic report, as well as a final report of the project based on the information collected. The site representative and the contractor will prepare a weekly environmental report.

CHAPTER# 7.

STAKEHOLDER CONSTULTATION

The consultation process with various stakeholders of ESPAK has been carried out to involve community and other stakeholders at earlier stages. Information dissemination during public consultation is fundamental to the successful conclusion of the Project. This chapter describes the objectives and details of the consultative process adopted; its outcome and the conclusions drawn thereafter.

As the site is on the premises of owned land so there was no affectees involve in this project. However, our team tries to take consultation with the environmental practitioners.

7.1 OBJECTIVES OF CONSULTATION

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

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

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

7.2 SUMMARY OF ISSUES RAISED BY STAKEHOLDERS

There is no objection from any local or stakeholder against the project site and project activities.

CHAPTER# 8.

CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSION

Considering the location, Environmental Impacts, Climate Change and Circular Economy, the proposed is suitable & beneficial.

Recommendations

Emissions Control: Implement advanced emissions control technologies, such as bag filters and electrostatic precipitators, to minimize air pollution and ensure compliance with environmental standards.

Waste Management: Develop a comprehensive waste management plan for handling biomass ash and other byproducts. Consider recycling options and safe disposal methods to minimize environmental impact.

Water Management: Monitor and manage water usage efficiently, including the treatment of wastewater, to ensure minimal environmental impact and compliance with discharge regulations.

Noise Mitigation: Use noise-dampening materials and schedule maintenance activities to reduce noise pollution and limit disturbances to nearby communities.

Traffic Management: Coordinate with local authorities to manage traffic during construction and material transportation, aiming to minimize congestion and ensure safe operations.

Health and Safety: Ensure rigorous health and safety protocols for construction and operational workers, including the use of personal protective equipment (PPE) and regular safety training.

Stakeholder Engagement: Maintain open communication with local communities, regulatory bodies, and other stakeholders throughout the project lifecycle to address concerns and incorporate feedback.

Regular Monitoring: Implement a robust monitoring and reporting system to track environmental impacts and operational performance. Conduct periodic reviews to ensure compliance with environmental and safety standards.

Economic and Environmental Benefits: Continue to highlight the positive impacts of the project, including energy efficiency and reduced greenhouse gas emissions, to reinforce the company's commitment to sustainability and corporate social responsibility.

ANNEXURE-A

TERM OF REFERENCES (TORS)

TERMS OF REFERENCES (TORS)

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OF M/S AT WASTE MANAGEMENT COMPANYAT 0.5 KM OFF: 10TH KM RAIWIND ROAD, HUDIARA DRAIN, NEAR BHOBATTIAN CHOWK, LAHORE, PUNJAB

TERM OF REFERNCES

These terms of references are being submitted for the subject EIA study under 5 (f) of policy and procedure for the filing, review and approval of environmental assessment. These TORs of EIA have been prepared by the environmental consultants, in consultation with the project proponent.

Introduction of project:

The project mainly focuses on the management lithium-ion battery recycling as a part of our already operational Integrated waste management system -cum- Circular Economy System for which small portion has been reserved in the existing set up, so no extra land acquisition is needed. The facility is designed to reduce environmental pollution while ensuring circular economy practices and sustainability in waste management.

Total area of the project is 01 Kanal. Process will include storage of petroleum products like High-Speed Diesel (HSD), Mogas and proposed capacity of the project will be approx. 2020 metric tons.

Cost of Project:

The estimated initial cost of the project will be Rs 01 million.

Area of the Project:

Total area of the project is 30 Kanal.

Name & Address of proponent

Name: Mr. Muhammad Naseer

Address: 0.5 Km Off: 10th Km Raiwind Road, Hudiara Drain, Near Bhobattian Chowk, Lahore, Punjab

Environmental Consultant & Client

Proponent has appointed the Environmental Services Pakistan Pvt Ltd (ESPAK), as the Consultant for the subject project to conduct the EIA. M/S Environmental Services Pakistan Pvt Ltd (ESPAK), will be called as "Consultant" and M/s AT Waste Management Compnay as the "Client".

Objective of the EIA study

The Objective of study includes Compliance of section 12 of PEPA 1997 (Amended 2012) & PEQS.

Purpose of the EIA

The key objectives of the EIA are to:

- Document the ecological and socioeconomic baseline conditions of the study area and the affected communities
- Inform and obtain input from stakeholders, (e.g., governmental authorities, the public, and indigenous communities) and capture their relevant issues and concerns

- Assess in detail the environmental, social, and health impacts that would result from the Project
- Identify environmental and social mitigation measures to address the impacts identified
- Develop the EMPs as discussed above, based on the mitigation measures developed in the EIA.
- Meet the requirements or recommendations of the applicable national Environmental Laws and Guidelines

Scope of Services

1. Review of existing regulatory framework

    1.1 Laws and Regulations

    1.2 National and International Guidelines and Policy

    1.3 Guidelines of Labor & Human Resource Department

    1.4 Punjab Local Government Ordinance

2. Methodology for carrying out this study

    2.1 Project Description

    2.2 Site Selection

    2.3 Project Alternatives

3. Process Description

    3.1. Detailed review of the processes

    3.2 Design Parameters

    3.3 Details related to Plant and Equipment's

4. Environmental profile of the environmental study area

    4.1 Climatology

    4.2 Geographical features

    4.3 Geological and Hydrological features

    3.5.4 Historical review

    3.5.5 Land Use

    3.5.6 Ecology, i.e. Flora and Fauna etc.

    3.6 Analysis of EPA required environmental parameters

    3.6.1 Sampling for Air, Water, and Noise Level

3.7 Investigate Socio-Economic and Socio-Environmental aspects and cultural values within and around the operating facility

3.7.2 Cultural and Social Values

3.7.4 Interviews from different groups

3.8 Development activities and Waste Management

3.9 Identify and evaluate major environmental impacts

3.10 Identify mitigation measures and develop Environmental Management and Monitoring plan

3.11 Conclusions based on the study conducted for this EIA

3.12 1-2 Site Visits for data acquisition

3.13 Environmental Monitoring plan

3.14 Preparation of Lab Analysis Report

3.15 Preparation of Environmental Management Plan EMP

3.16 Briefing & Presentation to the Expert Committee in the EPA Punjab.

3.17 Reply to technical Environmental Objections/Review

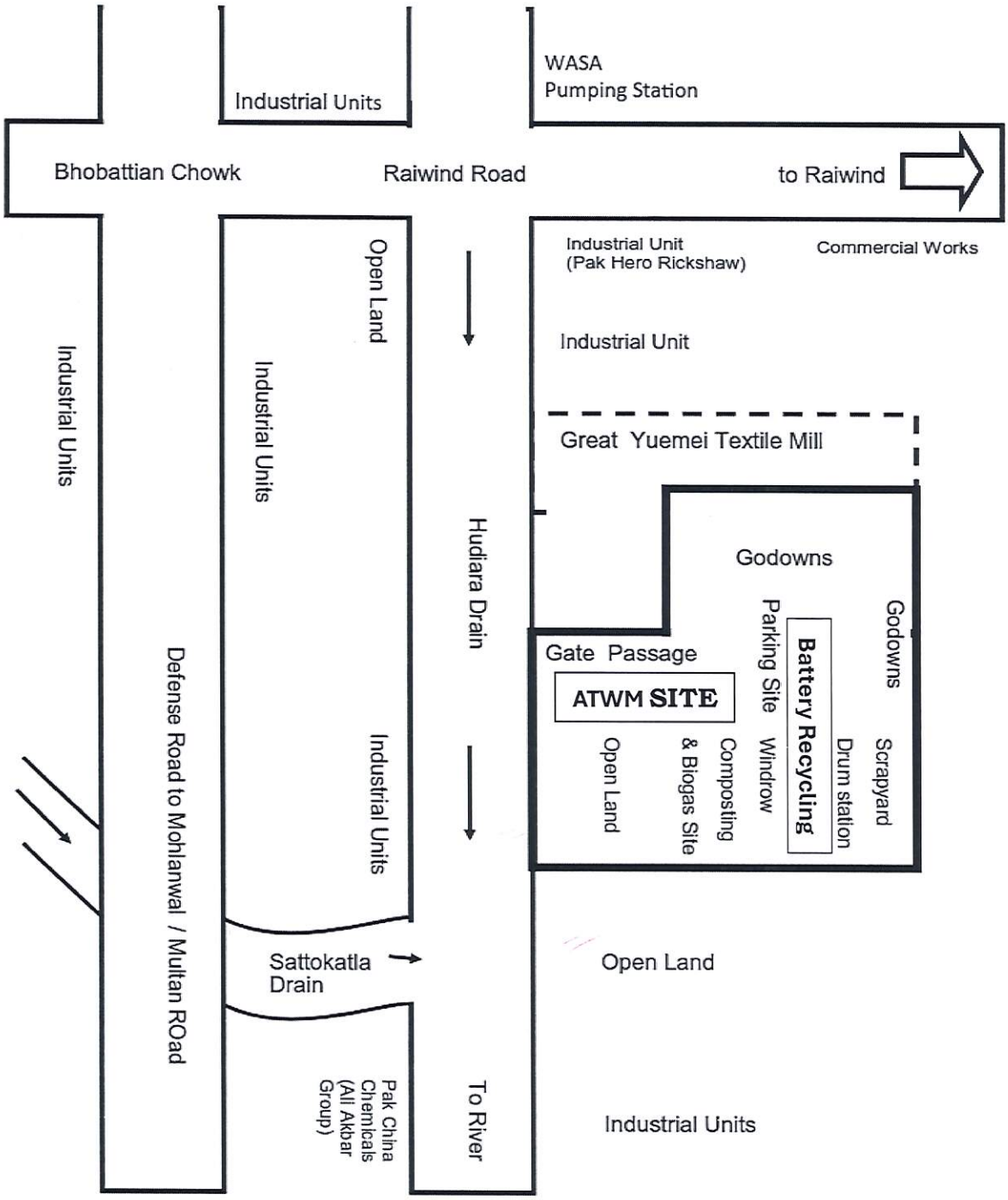
3.18 Presentation in the office of DG EPA, Punjab (if required)

ANNEXURE-B

LAYOUT MAP OF PROPOSED SITE

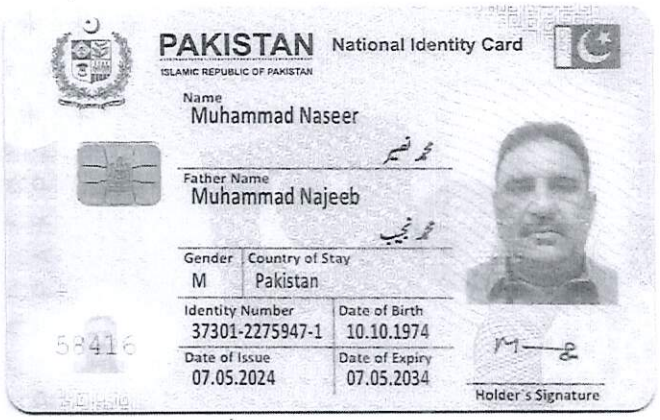
LAYOUT-CUM- LOCATION MAP
A.T Waste Management ((Battery Recycling Division)

(Within premises of A.T Waste Management/ ATWM)
0.5 Km Off: 10th Km Raiwind Road, Hudiara Drain, Near Bhobattian Chowk, Lahore



ANNEXURE-C

CNIC & NOCS/ CERTIFICATES



PAKISTAN National Identity Card

ISLAMIC REPUBLIC OF PAKISTAN

Name
Muhammad Naseer
محمد نصیر

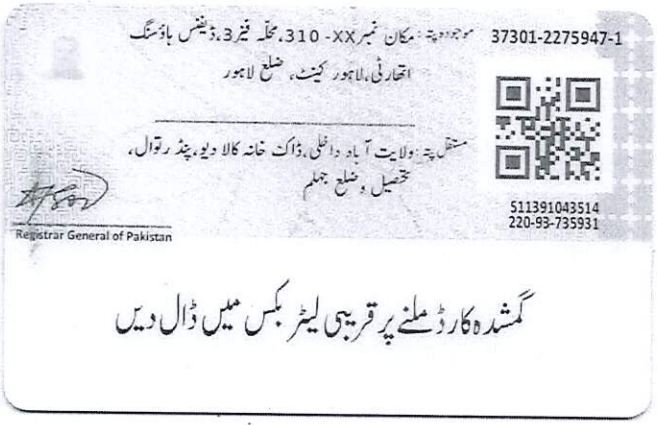
Father Name
Muhammad Najeeb
محمد نجیب

Gender	Country of Stay
M	Pakistan

Identity Number	Date of Birth
37301-2275947-1	10.10.1974

Date of Issue	Date of Expiry
07.05.2024	07.05.2034

Holder's Signature



موجودہ پتہ: مکان نمبر XX-310، محلہ فیز 3، ڈیفنس ہاؤسنگ
اتھارٹی، لاہور کینٹ، ضلع لاہور

37301-2275947-1

مستقل پتہ: ولایت آباد داخلی، ڈاک خانہ کالا دیو، پنڈ رتوال،
تحصیل و ضلع جہلم

Registrar General of Pakistan

511391043514
220-93-735931

گمشدہ کارڈ ملنے پر قریبی لیٹر بکس میں ڈال دیں

GOVERNMENT OF THE PUNJAB
ENVIRONMENTAL PROTECTION AGENCY
National Hockey Stadium, Gate No. 10
Ferozepur Road, Lahore

No. DD(EIA)/EPA/F-205(EIA)/2022/68
Dated: 24/01/2023

To,

Mr. Muhammad Naseer,
Chief Executive,
M/s Ali Traders Waste Management (A.T. Waste Management),
Office No. 731, Block No.2, Sector D-1,
Shah Jilani Road, Township, Lahore

Subject: **EXTENSION IN VALIDITY PERIOD OF ENVIRONMENTAL APPROVAL OF OPERATIONAL PHASE / CONFIRMATION OF COMPLIANCE OF A.T WASTE MANAGEMENT ALREADY GRANTED ON 30.08.2011 VIDE NO. DD(EIA)/EPA/F-76(EIA)/0808/2010/700 AT PLOT NO. 53-A, PUNJAB SMALL INDUSTRIAL ESTATE, DISTRICT KASUR**

Please refer to your application received in one window cell vide diary No. 23093 dated 23.08.2022.

2. I am directed to intimate that Environmental Approval / Confirmation of Compliance issued vide EPA Punjab letter No. DD(EIA)/EPA/F-76(EIA)/0808/2010/700 dated 30.08.2011 (substituted) is valid for another three years from 24.01.2023 to 23.01.2026 under Regulation 16 of IEE / EIA Regulation, 2022 read with Section 12 of PEP, Act, 1997 (Amended 2012) with the same terms & conditions.

ASSISTANT DIRECTOR (EIA)

CC

Assistant Director (Environment), District Kasur w.r.t his letter No. 429/AD/EPA/KSR dated 02.09.2022 for information, please.

ENVIRONMENT PROTECTION DEPARTMENT

Government of the Punjab

National Hockey Stadium, Ferozepur Road, Lahore

TO BE SUBSTITUTED WITH SAME No. & DATE

NO. DD (EIA)/EPA/F-76(EIA)/0808/2010/700
Dated: 30 / 08 / 2011

To

Mr. Muhammad Naseer,
Chief Executive,
M/s Ali Traders Waste Management (A.T. Waste Management),
34-Irfan Center, Barkat Market, Garden Town,
Lahore.

Subject: **ENVIRONMENTAL APPROVAL**
(Under Section 12 & 14 of PEPA-1997 read with IEE & EIA Regulations, 2000)

Ref: Environmental Approval issued vide No. DD(EIA)/EPA/F-76(EIA)/1806/2010/460 dated 25.06.2011 for construction phase.

1.	Description of Project:	Operations of Incinerator having incineration capacity 350-450 Kg/hr and Collection, Transportation, Handling, Storage, Disposal of Hazardous, Non-Hazardous Wastes/Scrap, Solvents, WWTP Sludge from all kinds of Industries like beverages, food, Agro, Pharmaceutical, Paint, Pesticides, Fertilizers, Chemical, Textile etc & Hospitals.
2.	Location of Project:	The project site is located at Plot No. 53-A, Small Industrial Estate, Kasur.
3.	Date of submission of application	27.12.2010.

4. After review of the Environmental Impact Assessment (EIA) Report and other relevant record, the Environmental Protection Agency, Punjab has decided to accord its approval for operational of the project subject to the following conditions:

i. The proponent shall ensure compliance of National Environmental Quality Standards (NEQS).
ii. The proponent shall be liable to collect, transport, handle, store, dispose, incineration of all types of hazardous and non-hazardous industrial and hospital waste/scrap according to rules and regulations.
iii. The proponent shall be responsible for adopting appropriate mitigation measures for controlling anticipated environmental hazards i.e. incinerator shall not be operated without wet scrubber etc, and emissions from incinerator shall be monitored randomly.
iv. Mitigation measures suggested in the EIA Report and Environmental Management & Monitoring Plan (EMMP) should be strictly adhered to minimize any negative impacts on soil, ground water, air and biological resources of the project area.
v. Monitoring shall be carried out during the entire period of the project activities. Monitoring reports of the whole operation shall be submitted to EPA, Punjab on quarterly basis.
vi. The proponent shall dispose off residue from incinerator in an environment friendly manner.
vii. The proponent shall maintain proper record of the industrial and hospital waste/scrap.
viii. At least 90% unskilled and to the extent possible skilled jobs shall be given to the locals after providing them proper training.
ix. Effective fire fighting arrangements shall be ensured.
x. The proponent shall ensure that strict and efficient health and safety measures are in place for protection of workers backed by a comprehensive emergency response system.
xi. The proponent shall do proper segregation of scrap waste.
xii. The proponent shall not sale any kind of hazardous material/waste to any kind of industry.
xiii. The instructions for the workers, safety signs, precautionary / preventive measures for the customers / visitors shall be displayed at suitable / prominent places.
xiv. The emergency phone numbers of hospitals, fire stations, nearest police stations, rescue services, and civil defense will be displayed at prominent places.

xv. The proponent shall plant trees of minimum height 6 to 7 feet especially of indigenous species in and around the project area on available space in consultation with District Officer (Environment) within six months. The proponent shall make arrangements for maintenance and plantation of these plants.

xvi. The proponent shall do proper landscaping of the project after completion of the construction activities.

xvii. The proponent shall convey the name of Environmental Manager of the project along with his complete Mailing Address and Phone Numbers.

5. The proponent shall be liable for correctness and validity of the information supplied by the Environmental Consultant.

6. The proponent shall be liable for compliance of Sections 17 and 18 of IEE/EIA Regulations, 2000, regarding approval, confirmation of compliance, entry, inspections and monitoring.

7. Any change in the approved project shall be communicated to EPA, Punjab and shall be commenced after obtaining the approval.

8. This approval shall be treated as null and void if all or any of the conditions mentioned above, is/are not complied with. This approval does not absolve the proponent of the duty to obtain any other approval or consent that may be required under any law in force and is subjudice to legal proceedings in any legal fora / court.

9. This approval can be withdrawn at anytime without any prior notice if deem necessary in the public / national interest.

(RIAZ AHMED)
ASSISTANT DIRECTOR (EIA)
for Director General, EPA, Punjab
Ph: (042)99232228

NO. & DATE EVEN.

A copy is forwarded for information to:

1. The Director (North), EPA, Punjab, Lahore.
2. The District Officer (Environment), Kasur. He is requested to ensure compliance of the above mentioned conditions / measures under intimation to this office.

(RIAZ AHMED)
ASSISTANT DIRECTOR (EIA)
for Director General, EPA, Punjab

F-02(Misc)/AD(EIA)/AMN/2023/.2680.

GOVERNMENT OF THE PUNJAB
ENVIRONMENT PROTECTION AGENCY
NATIONAL HOCKEY STADIUM, FEROZEPUR ROAD, LAHORE

Dated: 27-08-2024.

To

Muhammad Naseer
Chief Executive
M/S AT Waste management
Office: Building No. 731, Block-2, Sector D-1, Shah Jilani Road, Township, Lahore

SUBJECT **ENDORSEMENT REGARDING MANAGEMENT & DISPOSAL OF TOBACOO WASTE AND ITS ALLIED WASTE / DISCARDED NICOTINE THROUGH AEROBIC & ANAEROBIC BIODEGRADATION (EXTRACTION OF BIOGAS FOLLOWED BY WINDROW COMPOSTING)**

Please refer to your application / letter received in EPA Lahore vide No. 770/ATWM/LHR, dated 10-07-2024, regarding the matter cited above.

2. The matter has been examined in continuation of already granted Environmental Approval under Section 12 of the Punjab Environment Protection Act 1997 vide No. DD(EIA)/EPA/ F-76(EIA)/0808/2010/700 dated 30-08-2011 and subsequent extension for the "operations of Incinerator and collection, Transportation, Handling, Storage, Disposal of hazardous Waste, Non-hazardous Wastes/ Scrap, Solvents, WWTP Sludge from all kinds of Industries like Beverages, Food, Agro, Pharmaceutical, Paint, Pesticides, Fertilizers, Chemical, Textile etc. & Hospitals".

3. Your method of disposal of tobacco crush wastes along with its allied wastes / discarded nicotine / Cigarette filters through anaerobic followed by aerobic decomposition (Extraction of biogas followed by windrow composting) by mixing & co-digestion it with other organic wastes like animal dung, agriculture / crop residue waste in a specific composition / recipe, has been found feasible and environmental friendly supporting Climate change mitigation & environmental Protection, hence EPA endorses this methodology subject to compliance of environmental standards (PEQS).

Assistant Director (EIA)
EIA Wing, EPA Punjab, Lahore

CC
i. Assistant Director (Environment), Kasur District, EPA, Punjab.
ii. PA to Director General, EPA, Punjab.
iii. One window cell, EPA, Punjab.

DIRECTORATE OF LABOUR WELFARE
GOVERNMENT OF THE PUNJAB,
LAHORE

Reg No: ***2025011700863***

Issuance Dated: ***27-02-2025***

Factory Registration Certificate

This is to certify that the premises known as *M/S ALI TRADERS WASTE MANAGEMENT (ATWM),HUDIARA DRAIN, NEAR BHABATTIAN CHOWK, 01-KM OFF RAIWIND ROAD, LAHORE, TEHSIL RAIWIND DISTRICT LAHORE* *is hereby registered as it falls within the definition of* ***"factory"*** *under Section 2(J) of the Factories Act, 1934.*

Chief Inspector of Factories,
Punjab

This is a system generated certificate and does not require signature.

DIRECTORATE OF LABOUR WELFARE
GOVERNMENT OF THE PUNJAB,
LAHORE

Serial No. 305

No.DLW/F/~~LHR~~/S/1998 *Dated* 06-05-2019

Registration Certificate

This is to certify *that the premises*

Known as M/S Ali Traders Waste Management,
53-A Punjab Small Industrial Estate, Kasur.

falls within the definition of a 'factory' as given in Section 2(J) of the Factories Act, 1934, and have been placed on the register of factories maintained for the purpose.

Seal

DIRECTOR LABOUR WELFARE
LAHORE(SOUTH).

Certificate of Registration

This is to certify that the Quality Management System of

A. T WASTE MANAGEMENT

OFFICE # 731, BLOCK # 2, SECTOR D-1, NEAR RIAZ CHOWK TOWNSHIP, LAHORE, PAKISTAN

is in accordance with the requirements of the following standard

ISO 9001:2015

(Quality Management System)

SCOPE

Providing Disposal and Waste Collection Services

(IAF Code: 39)

Certificate Number : 020724019219

Initial Registration Date : 02-Jul-2024
Certificate Expiry Date : 01-Jul-2025

To verify certificate, visit at :

www.arscert.com
www.uafaccreditation.org
www.iafcertsearch.org

Issued by ARS Assessment Private Limited

Managing Director

CB-MS-3923

UAF Address : 400, North Center Dr, STE 202, Norfolk, VA 23502, United States of America

This certificate remains the property of ARS and must be returned to ARS on Cancellation or Suspension of the certificate Validity of the certificate is subject to successful completion of surveillance audits. Further clarification regarding the scope of this certificate and the applicability of standard may be obtained by consulting the Organisation on info@arscert.com

Certificate of Registration

This is to certify that the Environmental Management System of

A. T WASTE MANAGEMENT

OFFICE # 731, BLOCK # 2, SECTOR D-1, NEAR RIAZ CHOWK TOWNSHIP, LAHORE, PAKISTAN

is in accordance with the requirements of the following standard

ISO 14001:2015

(Environmental Management System)

SCOPE

Providing Disposal and Waste Collection Services

(IAF Code: 39)

Certificate Number : 020724029220

Initial Registration Date : 02-Jul-2024
Certificate Expiry Date : 01-Jul-2025

To verify certificate, visit at :

www.arscert.com
www.uafaccreditation.org
www.iafcertsearch.org

Issued by ARS Assessment Private Limited

Managing Director

CB-MS-3926

UAF Address : 400, North Center Dr, STE 202, Norfolk, VA 23502, United States of America

This certificate remains the property of ARS and must be returned to ARS on Cancellation or Suspension of the certificate Validity of the certificat
Further clarification regarding the scope of this certificate and the applicability of standard may be obtained by consulting the Organisation on info

Certificate of Registration

This is to certify that the Occupational Health and Safety Management System of

A. T WASTE MANAGEMENT

OFFICE # 731, BLOCK # 2, SECTOR D-1, NEAR RIAZ CHOWK TOWNSHIP, LAHORE, PAKISTAN

is in accordance with the requirements of the following standard

ISO 45001:2018

(Occupational Health and Safety Management System)

SCOPE

Providing Disposal and Waste Collection Services

(IAF Code: 39)

Certificate Number : 020724039221

Initial Registration Date : 02-Jul-2024
Certificate Expiry Date : 01-Jul-2025

To verify certificate, visit at :

www.arscert.com
www.uafaccreditation.org
www.iafcertsearch.org

Issued by ARS Assessment Private Limited

Managing Director

CB-MS-3919

UAF Address : 400, North Center Dr, STE 202, Norfolk, VA 23502, United States of America

This certificate remains the property of ARS and must be returned to ARS on Cancellation or Suspension of the certificate Validity of the certificate

Certification & Inspection

Certificate of Registration

This is to certify that the

Information Security Management System

of

A.T WASTE MANAGEMENT

at

OFFICE # 731, BLOCK # 2, SECTOR D-1, NEAR RIAZ CHOWK TOWNSHIP, LAHORE, PAKISTAN

has been independently assessed and
is compliant with the requirements of:

ISO/IEC 27001:2013

For the following scope of activities:

PHYSICAL AND ENVIRONMENTAL SECURITY – CONTROLS DEFINING SECURE AREAS, ENTRY CONTROLS, PROTECTION AGAINST THREATS, EQUIPMENT SECURITY, SECURE DISPOSAL

Certificate Number: UQ - 20220307101

Validity of this certificate can be verified at www.ukcertifications.org.uk/verify

Date of Initial Registration	7th March 2022
Date of this Certificate	6th March 2024
Certificate Expiry	6th March 2025
Recertification Due	6th March 2025

Authorised Signatory

ANNEXURE-D

LAND DOCUMENTS

AC141195

0106-1424573

PB-LHR-E071DB65D4374754

Non-Judicial

Rs 117,000/-

Description	: CONVEYANCE - 23(a)
Seller	: MIAN FEROZ SALAH UL DIN [35202-7197725-9]
Purchaser	: MUHAMMAD NASEER [37301-2275947-1]
Agent	: MUHAMMAD USMAN [35202-9352419-1]
Stamp Duty Paid by	: MUHAMMAD NASEER [37301-2275947-1]
Issue Date	: 24-May-2017, 04:25:03 PM
Paid Through Challan	: 2017672F5DDD4FAB
Amount in Words	: One Lac Seventeen Thousand Rupees Only

18704
39000
31-5-12

Please Write Below This Line

بسم اللہ الرحمٰن الرحیم ○

بیعنامہ زرعی

وستاویز بیعنامہ بابت زرعی اراضی رقبہ تعدادی چھ کنال سات مرلے (6K-7M)
واقع حدبست موضع چک نمبر 62 کوٹ جیون مل تحصیل رائیونڈ ضلع لاہور

بالعوض مبلغ انتالیس لاکھ روپے (Rs.39,00,000/-)

کلھم زرنمن پیشگی وصول شدہ

منجانب :- میاں فیروز صلاح الدین ولد میاں صلاح الدین

قوم کشمیری ساکن مکان نمبر 99، محلہ ڈی بلاک ماڈل ٹاؤن لاہور (بائع)

بحق :- محمد نصیر ولد محمد نجیب

قوم [illegible] ساکن مکان نمبر 310-XX، فیز 3، ڈیفنس ہاؤسنگ اتھارٹی لاہور کینٹ ضلع لاہور (مشتری)

CNIC# 37301-2275947-1

میاں فیروز صلاح الدین (بائع)

CNIC# 35202-7197725-9

05 MAR 2024

FOLIO L

E (0300) : LAHO

11-May-2017

Corporate RTO Lahore

2017

لینڈ ریکارڈ مینجمنٹ انفارمیشن سسٹم

رجسٹری

ریٹ فی ایکڑ مرلہ Rs.4900,000

موضع چک نمبر 62 کوٹ جیون لال

رقبہ تعداد 6K-7M

رجسٹری مالیت 39,00,000/-

اسٹام مالیت 1,17,000/-

CON... ...AL

مطابق - بیاروب رجسٹرار

میاں فیروز صلاح الدین (بائع)

CNIC# 35202-7197725-9

22532 25-5-17

بائع / بائعان نے دستاویز ہذا کی تحریر و تکمیل سے اقرار کیا اور دستاویز ہذا کو پڑھ کر درست تسلیم کیا۔

توصیت دستاویز ... شناختی ...

بذریعہ شناختی کارڈ کرتے ہیں ... مطابق دستاویز ...

ہیں فریقین نے دستاویز ہذا پر دستخط / نشان انگوٹھا ...

روبرو ثبت کر دیئے ہیں

دستاویز ہذا بغرض رجسٹری لاہور لوکل کمیشن شباب ہاشمی

ایڈووکیٹ مورخہ 21-5-17 بوقت ...

منجانب جناب ...

دستخط لوکل کمیشن

نقل مطابق ریکارڈ ...

شناخت کنندہ

رجسٹرار / مشتری ... (مشتری)

میاں فیروز صلاح الدین (بائع)

CNIC# 37301-2275947-1

CNIC# 35202-7197725-9

15 MAR 2024

ھنکہ میاں فیروز صلاح الدین ولد میاں صلاح الدین قوم کشمیری ساکن مکان نمبر 99 محلہ ڈی بلاک ماڈل ٹاؤن لاہور کا ہوں جو کہ زرعی اراضی رقبہ تعدادی چھ کنال سات مرلے (6K-7M) کھیوٹ نمبر 75 کھتونی نمبر 134 سالم کھاتہ قطعات 19 رقبہ (139K-13M) کا حصہ مشتملہ 28575/628425 رقبہ مشتملہ (6K-7M) میزان 127/2793 رقبہ بقدر چھ کنال سات مرلے (6K-7M) بروئے فرد آئی ڈی نمبر 360536 مورخہ 02-05-2017 اجراء کنندہ عمران خان ولد محمد اسمٰعیل نقل رجسٹر حقداران زمین 2015-2016 اراضی ریکارڈ سنٹر لاہور رائیونڈ واقع حدبست موضع چک نمبر 62 کوٹ جیون مل تحصیل رائیونڈ ضلع لاہور کی رو سے میں بلاشراکت غیرے ومداخلت دیگرے مکمل طور پر مالک وقابض ہوں اور من بائع کو بحیثیت مالکان زرعی اراضی مذکورہ کو بیع وفروخت کرنے کیلئے مکمل قانونی اختیارات حاصل ومیسر ہیں اینوقت اس کو بیع کرنے میں کوئی قانونی یا اتفاقی امر مانع نہیں ہے اور میں نے بحیثیت مالک اس سے قبل مذکورہ زرعی اراضی کا نہ تو کسی کے ساتھ معاہدہ بیع کیا ہے اور نہ ہی کسی کو فروخت کیا ہے۔ لہذا ابقائمی ہوش وحواس خمسہ وثبات عقل خود بلا مداخلت دیگرے، برضا ورغبت بلا جبر واکراہ غیرے بلا دھوکہ دہی بلا فریب بضرورت جائز زرعی اراضی مبیعہ بالا مع جملہ حق وحقوق اندرونی بیرونی، داخلی خارجی، ظاہری باطنی مع حق، راستہ، حق کاشت وبرداشت مع کھال، وٹ، بنہ مع حق آبپاشی وذرائع آبپاشی مع درختان وفصلات ستادہ وغیر ایستادہ موجودہ مع دیگر جمیع حق حقوق مالکانہ ہمہ متعلقہ اش ہر قسم جو کہ مجھے بحیثیت مالک کامل وقابض حاصل ہیں تمام وکمال بالعوض مبلغ انتالیس لاکھ روپے (Rs.39,00,000/-) نصف جسکے مبلغ انیس لاکھ پچاس ہزار روپے (Rs.19,50,000/-) ہوتے ہیں بدست وبحق محمد نصیر ولد محمد نجیب ساکن مکان نمبر 310-XX، فیز 3، ڈیفنس ہاؤسنگ اتھارٹی لاہور کینٹ ضلع لاہور (مشتری) بیع قطعی وفروخت دائمی کر دیا ہے اور کلیم زرثمن پیشگی وصول پالیا ہے اسطرح بذمہ مشتری کچھ لینا باقی نہ ہے اب میرا یا میرے جملہ وارثان ودیگر جدیان وقائمقامان ورشتہ داران وغیرہ کا کوئی تعلق یا واسطہ نسبت زرعی اراضی مبیعہ نہیں رہا اور نہ ہی آئندہ کبھی ہوگا من بائع نے اپنا قبضہ مالکانہ زرعی اراضی مبیعہ سے ہمیشہ ہمیشہ کیلئے اٹھالیا ہے۔ قبضہ زرعی اراضی مذکورہ بالا خسرہ نمبران 230، 231، 238 میں سے حوالے مشتری کر دیا گیا ہے۔ اب اسطرح مشتری زرعی اراضی مبیعہ کا واحد مالک وکامل وقابض بلاشراکت غیرے ہو گیا ہے۔ اس کو حق واختیار ہوگا کہ وہ

العبد

میاں فیروز صلاح الدین (بائع)

CNIC# 35202-7197725-9

15 MAR 2024

E-STAMP

زرعی اراضی مبیعہ کو اب جس طرح چاہے اپنے تصرف واستعمال میں لائے یا بیع، ہبہ، رہن، منتقل وغیرہ کرے، داخل خارج حسب ضابطہ کاغذات مال میں بنام مشتری کروادونگا۔ بلکہ مشتری کو بھی حق واختیار ہوگا کہ وہ میری عدم موجودگی میں دستاویز ہذا کو متعلقہ محکمہ جات میں پیش کر کے انتقال بیع اپنے نام کرالے من بائع کو کوئی عذر واعتراض نہ ہوگا سابقہ واجبات نسبت زرعی اراضی مبیعہ کی ادائیگی کا من بائع خود ذمہ دار ہونگا۔ مشتری کو یقین دلا دیا ہے کہ زرعی اراضی مبیعہ قبل ازیں ہر قسم کے انتقالات وتمام قسم کی زیرباریوں، بار ضمانت، رہن، بیع، ہبہ، تملیک، وقف، حق مہر، قرقی عدالت وجملہ قسم کے تنازعات سے مبرا وپاک صاف ہے اگر کوئی نقص ملکیت میں ثابت ہو یا مشتری کے ادا شدہ زرثمن کو کوئی نقصان پہنچے یا اگر کسی دیگر شخص نے کسی قسم کا کوئی دعویٰ نسبت زرعی اراضی مبیعہ بالا برخلاف مشتری کیا اور اس صورت میں زرعی اراضی مبیعہ کسی قانونی سقم یا اتفاقی لحاظ سے کلی یا جزوی طور پر مشتری کے قبضہ ودخل سے نکل جائے تو ادائیگی مطالبہ مشتری کیلئے من بائع کی ذات خاص ودیگر جائیداد منقولہ وغیر منقولہ بمطابق مارکیٹ ریٹ معہ حرجہ وخرچہ بمعہ میرے وارثان بازگشت قریبی وبعیدی ویک جدیان وقائمقامان مع آرائش وزیبائش وترقی حیثیت زرعی اراضی مبیعہ بالا مع حرجہ وخرچہ ہر قسم ذمہ دار ہونگے۔ اخراجات بیعنامہ ہذا قطعی مشتری نے از گرہ خود برداشت کیے ہیں۔ لہذا بیعنامہ ہذا قطعی طور پر تحریر کر دیا ہے تا کہ سند رہے اور بوقت ضرورت کام آوے المرقوم 24-05-2017

نوٹ، انتقال نمبر 256 بیع منظور شدہ مورخہ 29-06-2016 ہے۔ بحدود اربعہ جانب مشرق ملکیت دومن سوسائٹی، جانب مغرب راستہ 30 فٹ عریض، جانب شمال زرعی رقبہ ملکیت رمضان گجر، رشید گجر، جانب جنوب زرعی رقبہ ملکیت شرح حق ہے۔ نوٹ:۔ زرعی اراضی مبیعہ پر کوئی حکم امتناعی نہ ہے۔ اور کسی ہاؤسنگ سکیم میں واقع نہ ہے۔

Drafited by :-

رانا ایسوسی ایٹس رائیونڈ روڈ لاہور

گواہ شد

37301-8232818-3

گواہ شد

37301-2257946-7

میاں فیروز صلاح الدین (بائع)

CNIC# 35202-7197726-9

5 MAR 202

175A1C02722C

Is certified that following ... have been
checked ...

FBR TAXES

دستاویز ۲۵ فوٹ جچوبن حل
تنخواہ
۶۹,۰۰,۰۰۰ روپے
۳۹,۰۰,۰۰۰ روپے
۱,۱۷,۰۰۰ روپے

1159

Advance ... U/S ... 39,000/-
31-5-...

WHT U/S ... نل

WHT U/S 236-K Rs ... نل

Dated ...

11. This is ...

Registration ...

Stamp Duty Rs: 1,17,000/-
C.V.T Rs: نل
Extra Fee ... 1120/-
... Stamp

17266
6997

91612

Sub Registrar

نقل مطابق ریکارڈ جاری ہوئی
سب رجسٹرار شہر ٹاؤن لاہور

4 5 MAR 2024

Non-Judicial

Rs 1,200/-

Description	: AGREEMENT OR MEMORANDUM OF AN AGREEMENT - 5(cc)
First Party	: MIAN FEROZ SALAH UL DIN [35202-7197725-9]
Second Party	: MUHAMMAD NASEER [37301-2275947-1]
Agent	: MUHAMMAD USMAN [35202-9352419-1]
Stamp Duty Paid by	: MUHAMMAD NASEER [37301-2275947-1]
Issue Date	: 24-May-2017, 02:47:27 PM
Paid Through Challan	: 2017A8601A6DDA1A
Amount in Words	: One Thousand Two Hundred Rupees Only

سٹوئمپ بشمول

Please Write Below This Line

اقرارنامہ وصولی کلہم زرثمن زرعی اراضی

بحق: محمد نصیر ولد محمد نجیب ساکن مکان نمبر XX-310 محلہ فیز 3-D,H,A لاہور کینٹ ضلع لاہور (مقرالیہ)

CNIC #:37301-2275947-1

منکہ میاں فیروز صلاح الدین ولد میاں صلاح الدین **CNIC #:35202-7197725-9** قوم کشمیری

ساکن مکان نمبر 99 محلہ ڈی بلاک ماڈل ٹاؤن لاہور کا ہوں جو کہ زرعی اراضی رقبہ تعدادی چھ کنال سات مرلے (6K-7M) کھیوٹ

نمبر 75 کھتونی نمبر 134 سالم کھاتہ قطعات 19 کل رقبہ (139K-13M) کا حصہ مشتملہ 28757/628425 میزان

مشتملہ حصہ 127/2793 رقبہ بقدر چھ کنال سات مرلے (6K-7M) بروئے فرد آئی ڈی نمبر 360536 مورخہ 02-05-2017 اجراء

کنندہ عمران خاں ولد محمد اسماعیل نقل رجسٹر حقداران زمین 2015-2016 اراضی ریکارڈ سنٹر لاہور رائیونڈ واقع حدبست موضع چک

العبد

میاں فیروز صلاح الدین (من مقر)
35202-7197725-9

محمد نصیر (مقرالیہ)
37301-2275947-1

For NOC

نمبر 62 کوٹ جیون مل تحصیل رائیونڈ ضلع لاہور ہے کی رو سے میں بلا شراکت غیرے و مداخلت دیگرے مکمل طور پر قابض ہوں اور من مقرر زرعی اراضی مذکورہ بالا کو ہبہ تبادلہ بیع و فروخت کرنے کے مکمل قانونی اختیارات رکھتا ہوں، ایں وقت اس کو بیع کرنے میں کوئی قانونی یا واقعاتی امر مانع نہیں ہے۔ لہذا بقائمی ہوش و حواس خمسہ بثبات عقل خود بلا مداخلت دیگرے برضا و رغبت بلا جبر و اکراہ غیرے بلا دھوکہ دہی بلا فریب برضرورت جائز زرعی اراضی مبیعہ بالا مع جملہ حق و حقوق اندرونی بیرونی داخلی خارجی ظاہری باطنی مع حق و حقوق راستہ گزرگاہ وٹ کھال بنہ پانی فصلات وغیرہ مالکانہ ہمہ متعلقہ اش ہر قسم جو کہ مجھے بحیثیت مالک کامل و قابض حاصل و میسر ہیں فی کنال قیمت مبلغ پنتالیس لاکھ روپے (Rs,45,00,000) طے ہوا ہے اس طرح تمام و باکمال بالعوض مبلغ دو کروڑ پچاسی لاکھ پچہتر ہزار روپے (Rs,2,85,75,000) نصف جن کے مبلغ ایک کروڑ بیالیس لاکھ ستاسی ہزار پانچ صد روپے (Rs,1,42,87,500) ہوتے ہیں بدست و بحق محمد نصیر ولد محمد نجیب ساکن مکان نمبر XX-310 محلہ نیز D,H,A-3 لاہور کینٹ ضلع لاہور (مقرالیہ) سے مبلغ دو کروڑ پچاسی لاکھ پچہتر ہزار روپے (Rs,2,85,75,000) جس کی تفصیل مبلغ

2,50,00,000/= بذریعہ چیک / پے آرڈر نمبر 1583690 مورخہ 25-05-2017 برانچ

_____ و مبلغ _____ بذریعہ چیک / پے آرڈر

نمبر _____ مورخہ _____ برانچ _____ و مبلغ

_____ بذریعہ چیک / پے آرڈر نمبر _____ مورخہ _____ برانچ

_____ و مبلغ _____ بذریعہ چیک / پے آرڈر

نمبر _____ مورخہ _____ برانچ _____ و

مبلغ 357000/- نقد کیش اس طرح کل مبلغ دو کروڑ پچاسی لاکھ پچہتر ہزار روپے (Rs,2,85,75,000) مورخہ 25-05-2017 کو روبرو گواہان کلہم زرثمن وصول پالیے ہیں۔ اس طرح بذمہ مشتری کچھ لینا باقی نہ ہے۔ اب میرا یا میرے جملہ وارثان و یک جدیان و

العبـــــــــــــــــــــــد

میاں فیروز صلاح الدین (من مقر) محمد نصیر (مقرالیہ)

35202-7197725-9 37301-2275947-1

قائمقامان ورثہ دران وغیرہ کا کوئی تعلق یا واسطہ نسبت زرعی اراضی مبیعہ نہیں رہا اور نہ ہی آئندہ کبھی ہوگا۔ من مظہر نے اپنا قبضہ زرعی اراضی مبیعہ سے ہمیشہ ہمیشہ کے لیے اٹھالیا ہے اب اس طرح خریدار زرعی اراضی مبیعہ کا قابض بلاشراکت غیرے ہوگیا ہے ان کو حق واختیار ہوگا ہیں کہ وہ زرعی اراضی مبیعہ کو اب جس طرح چاہیں اپنے تصرف واستعمال میں لائے سابقہ واجبات نسبت زرعی اراضی مبیعہ کی ادائیگی کی من مقر خود ذمہ دار ہوگا یہ کہ من مقر بمطابق گورنمنٹ رول گین ٹیکس Gain Tex دینے کا پابند ہوگا اور من مقر نے قبضہ حوالے خریدار کر دیا ہے خریدار کو یقین دلا دیا ہے کہ زرعی اراضی مبیعہ قبل ازیں ہر قسم کے انتقال اور تمام قسم کی زیر باریوں، بار ضمانت، رہن، تبادلہ، بیع، ہبہ، تملیک، واقف، حق مہر، قرقی عدالت و جملہ قسم کے تنازعات سے مبرا و پاک وصاف ہے اگر کوئی نقص ملکیت میں ثابت ہو یا خریدار کے ادا شدہ زر ثمن کو کوئی نقصان پہنچے یا اگر کسی دیگر شخص نے کسی قسم کا کوئی دعوی نسبت زرعی اراضی مبیعہ کسی قانونی سقم یا واقعاتی لحاظ سے کلی یا جزوی طور پر خریدار کے قبضہ و دخل سے نکل جائے تو ادائیگی مطالبہ خریدار کے لیے من مظہر کی ذات خاص و دیگر جائیداد منقولہ وغیرہ منقولہ بمطابق موجودہ مارکیٹ ریٹ سے دوگنا بمعہ ہمارے وارثان بازگشت قریبی وبعیدی و یک جدیان و قائمقامان مع آرائش وزیبائش وترقی حیثیت زرعی اراضی مبیعہ بالامع ہرجہ وخرچہ زر بیع بمطابق مارکیٹ ویلیو کے مطابق ذات وخاص دیگر جائیداد ہر قسم کا ذمہ دار ہوگا۔ اخراجات بیع نامہ ہذا قطعی خریدار نے از گرہ خود برداشت کیے ہیں لہذا بیع نامہ ہذا قطعی طور پر تحریر کر دیا ہے تا کہ سند رہے اور بوقت ضرورت کام آوے المرقوم 25-05-2017 نوٹ: جس کا حدود اربعہ مشرق ملکیت و من سوسائٹی مغرب راستہ 30 فٹ شمال زرعی رقبہ ملکیتی رمضان گجر ورشید گجر جنوب ملکیتی زرعی اراضی شمع حق ہے خسرہ نمبران 238,231,230 میں سے رقبہ تعدادی (6K7M) کا قبضہ حوالے خریدار کر دیا ہے۔

گواہ شد ----------

گواہ شد ----------

العبد

میاں فیروز صلاح الدین (من مقر)

35202-7197725-9

محمد نصیر (مقرالیہ)

37301-2275947-1

ANNEXURE-E

LAB REPORTS (AIR, NOISE, WATER)

ENVIRONMENTAL PROTECTION AGENCY
GOVERNMENT OF THE PUNJAB
National Hockey Stadium, Gate No. 08
Gaddafi Stadium Complex, Lahore

EPA
ادارہ تحفظ ماحول حکومت پنجاب

Validation # 4778-A **Issue Date;** 30-05-2025

Validation for Monitoring / Sampling of Stack Emission, Noise, Ambient air, Vehicular emissions

(Read conditions of certificate along with Regulation 9(1)(d) of CELR, 2000)

Cautions Related to scope, use & legal foundation of Validation

1. The Validation is quality control check under Regulation 91(d) for sampling & monitoring.
2. The Sampling / monitoring performed under Regulation 3(a) by Technical & Scientific Staff of private Laboratory as allowed through Conditions of Certificate.
3. The Scope of quality check of validation does not cover quality check of results declared with Report.
4. "The validated sampling / monitoring of the tests report is for non- punitive actions such as baseline study EIA/IEE, Self-monitoring, reporting under conditions of EIA/IEE, etc. while the report is not valid for Court cases, EPO, compliance reporting for operational Phase approvals, punitive actions such as Smog prevention & control Rules, 2023, complaint cases, etc.". The same shall be exhibit at top of Report during its issuance under Regulation 12.
5. The tests Report cannot be used as evidence against any non-compliance SMR /report issued by EPA official Laboratory.
6. The EPA officer as well as certified Laboratory should also comply directions issued by authority vide letter No. 01-DD(Labs)/EPA dated 25.07.2022 while considering test report.

Nature Of Sample	~~Stack Emissions~~	Ambient Air✓	~~Vehicular Emission~~	Ambient Noise✓
Description of monitored source / Site	**(Baseline)**			
Name and category of Unit	**M/S A.T Management Company. (53-A Punjab Small Industrial Estate Kasur)**			
Standard Method	**ISO-1996 ThermoScientific**			
Equipment, Model,	**AQMS**			
Field Tested Parameters ,	**(CO), (SO2), (NOx), (O3), (PM2.5&10) (SPM)**	Lab Tested Parameters **(Not Validated)**	Declared Result	

~~**Industrial Gaseous Emissions**~~			
~~Values of tested Field Parameters: CO .....mg/nM3, NOx ...mg/nM3 , excess air (%age):~~			
~~(i) 5 min Ramp Up phase (ii) flow rate & EC Temp. measured during calibration & testing (iii) Data recorded with 15 min interval (iv) complied all QA/QC checks~~	~~Yes~~	~~NO~~	~~NA~~
~~**Stack Particulate Matter (PM) Monitoring / Sampling under USEPA Method 5 / 17**~~			
~~(i) Sample train is complete (ii) Leak Test Performed (iii) data sheet filled (iv) "K" & "Y" calculated (v) QA/QC complied (vi) suitability of filter ensured~~	~~Yes~~	~~No~~	~~NA~~
~~**Stack Sox sampling as per Method 8 (Thorin Indicator Method)**~~			
~~(i)Absorbent solution available (ii) Flow rate as per method (iii) sampling as per Method~~	~~Yes~~	~~No~~	~~NA~~
Ambient Air Quality Monitoring by Automatic Monitors for CO, O3, SO2, NOx, PM2.5 & PM10			
Zero/span check is performed ~~(ii)~~ CE of NOx 96% - 104.1% , Compliance of Critical Criteria (iii) Compliance of operational Criteria (iv) Comply PEQS measuring technique	Yes✓	No	NA
Ambient Air Sampling of SPM, PM10, Pb by High Volume Sampler			
(i) The flow rate of sampler 1.1m3/min, (ii) Calibration performed	Yes✓	No	NA
~~**Vehicular Emissions &**~~ **Noise Measurement**			
~~Vehicle emissions and~~ noise measurement performed as per method.	Yes✓	No	NA

Remarks;
Signature

Research Officer
Environment Protection Agency
Punjab Lahore

Monitoring Date
21-05-2025

Signature
Assistant Analyst
Mehmood Aslam

ENVIRONMENTAL PROTECTION AGENCY
GOVERNMENT OF THE PUNJAB
National Hockey Stadium, Gate No. 08
Gaddafi Stadium Complex, Lahore

EPA
ادارہ تحفظ ماحول حکومت پنجاب

Validation # 4778-B

Issue Date; 30-05-2025

Validation for Sampling of Wastewater & Drinking Water / Ground water

(Read conditions of certificate along with Regulation 9(1)(d) of CELR, 2000)

Nature Of Sample	**Ground Water (01)**		~~Drinking Water~~	
Description of Sample source /Site	From Bore			
Name and category of Project /Unit	**M/S A.T Management Company. (53-A Punjab Small Industrial Estate Kasur)**			
Standard Method used for Sampling	**APHA-1060**			
Field Tested Parameters ,	Field Tested parameter	Temperature PH	**Lab Tested Parameters (Not validated)**	

Waste Water Treatment facility	Primary	Secondary	Tertiary
Total WW collected Sample	Total Collected Drinking water samples.....		

Sample Tag for testing parameter is assigned on sample container	Yes✓	NO	NA
Sample is preserved properly for each testing parameter	Yes✓	NO	NA
Sample size is adequate for testing the target parameters	Yes✓	NO	NA
Wastewater Flow Measurement performed to ensure sample representativeness	Yes	NO✓	NA

No. of Waste Water outlets	Waste Water Flow m^3/hr from each outlet (**Optional**)	Water intake m^3/hr(**Optional**)	Water Mass balance (**Optional**)	Sample Type Ground Water
			Yes No	Grab Composite

Parameter	Matrix W	Matrix WW	Container	Sample Size	Preservation	YES	NO	NA
Coliform,TotalorFecal	✓	---	Sterile Container	100mL	Refrigerate6C	✓	---	---
Coliform,TotalorFecal,ChlorinatedWater	✓	---	Sterile Container	100mL	0.008% Thiosulphate& cooled6C	✓	---	---
Color, Turbidity	✓	---	P,G	500mL	Cool6C	✓	---	---
Hardness,Total	✓	---	P,G	500ml	HNO3 to pH<2	✓	---	---
Nitrogen,Nitrate+Nitrite , Phenolic Compounds, Oil & Grease, COD, NH3	✓	---	P,G	2000 mL	H2SO4 topH <2,Cool6C	✓	---	---
Metals,General	✓	---	P,G Rinsed1.1 HNO3	500mL	HNO3 topH < 2	✓	---	---
Cyanide,Total	✓	---	P,G	500mL	NaOHtopH> 12,Cool 6C	✓	---	---
Pesticides, General	---	---	Glass	1Liter	Cool6C	---	---	---

Field Parameters

Field parameter		pH meter, Model Make	Measurement Method	Calibrated in Field	Measured value
pH				Yes NO	
Temp					
Cl					

Remarks / Caution: (1) The Validation is quality control check under Regulation 91(d) for sampling & monitoring. (2)The Sampling / monitoring performed under Regulation 3(a) by Technical & Scientific Staff of private Laboratory as allowed through Conditions of Certificate (3)The Scope of quality check of validation does not cover quality check of results declared with Report (4) The validated sampling / monitoring of the tests report is for non- punitive actions such as baseline study EIA/IEE, Self-monitoring, reporting under conditions of EIA/IEE, etc. (5) The tests Report cannot be used as evidence against any non-compliance SMR /report issued by EPA official Laboratory (6) The EPA officer as well as certified Laboratory should also comply directions issued vide letter No. 01-DD(Labs)/EPA dated 25.07.2022 while considering test report.

Remarks;

Signature

Research Officer
Environment Protection Agency
Punjab Lahore

Monitoring Date
21-05-2025

Signature
Assistant Analyst
Mehmood Aslam

ESYAK

CHEMICAL ANALYSIS TEST REPORT (AMBIENT AIR)

Reference Number: ESPAK/00481P/25/AA/04640/00709 **Date:** 26/05/2025
Name of Industry/Client: A.T Waste Management
Address: 0.5 Km Off 10th Km, Raiwind Road, Hudiara Drain, Near Bhobattian Chowk, Lahore, Punjab, Pakistan
Validation Officer: Muhammad Nadeem, Research Officer
Nature of Sample: Ambient Air **Monitoring Location:** Near Mid-Point of Site
Date of Sample Collection: 21/05/2025
Sample Collected/Sent By: Mehmood Aslam, Analyst (Field), ESPAK **Grab / Composite:** Continuous 24-Hours
Date of Completion of Analysis: 22/05/2025

S. No	Parameters	Limit Values (PEQS-24 Hours)	Concentration	Method / Equipment Used	Remarks
1	Carbon Monoxide (CO)	5 mg/m³ (8 Hours)	1.2 mg/m³	Non Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
2	Sulfur Dioxide (SO_2)	120 µg/m³	10.3 µg/m³	UV Fluorescence (UVF)	Within Prescribed Limits
3	Ozone (O_3)	130 µg/m³ (1 Hour)	34.2 µg/m³	Non Dispersive UV Absorption	Within Prescribed Limits
4	Oxides of Nitrogen as NO	40 µg/m³	22.3 µg/m³	Chemiluminescence Detection	Within Prescribed Limits
5	Oxides of Nitrogen as NO_2	80 µg/m³	30.4 µg/m³	Chemiluminescence Detection	Within Prescribed Limits
6	Particulate Matter $PM_{2.5}$	35 µg/m³	32.8 µg/m³	Particulate Sensor	Within Prescribed Limits
7	Particulate Matter PM_{10}	150 µg/m³	137 µg/m³	Particulate Sensor	Within Prescribed Limits
8	Suspended Particulate Matter (SPM)	500 µg/m³	343 µg/m³	Particulate Sensor	Within Prescribed Limits

PEQS: Punjab Environmental Quality Standards for Ambient Air, 2016

Note:

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1. **Sample Analyzed By:** Mehmood Aslam, Analyst (Field)
2. **Name of Chief Analyst with Seal:** Muhammad Arfan
3. **Signature of Incharge of the Environmental Laboratory:**
   Name: Imran Malik
   General Manager
   Date: 26/05/2025

ENVIRONMENTAL SERVICES PAKISTAN (PVT) LIMITED ★ ESPAK

---------- End of Report ----------

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NOISE MONITORING REPORT

Reference Number: ESPAK/00481P/25/N/04641/00621 **Date:** 26/05/2025

Name of Industry/Client: A.T Waste Management

Address: 0.5 Km Off 10th Km, Raiwind Road, Hudiara Drain, Near Bhobattian Chowk, Lahore, Punjab, Pakistan

Validation Officer: Muhammad Nadeem, Research Officer

Nature of Sample: Noise

Date of Sample Collection: 21/05/2025 **Grab / Composite:** Continuous 24-Hours

Sample Collected/Sent By: Mehmood Aslam, Analyst (Field), ESPAK

Date of Completion of Analysis: 22/05/2025

Method/Equipment Used: Sound Level Meter

S. No	Measurement Point	Limit Values (PEQS)	Noise Level in dB(A) Leq	Remarks
1	Near Mid-Point of Site- Day time	75 dB(A)	69 dB(A)	Within Prescribed Limits
2	Near Mid-Point of Site- Night time	65 dB(A)	57 dB(A)	Within Prescribed Limits

PEQS: Punjab Environmental Quality Standards for Noise in Industrial Area, 2016 Day Time Hours (6:00 am to 10:00 pm) Night Time Hours (10:00 pm to 6:00 am)

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1. **Sample Analyzed By:** Mehmood Aslam — Analyst (Field)
2. **Name of Chief Analyst with Seal:** Muhammad Arfan
3. **Signature of Incharge of the Environmental Laboratory:**

Name: Imran Malik
General Manager
Date: 26/05/2025

ENVIRONMENTAL SERVICES PAKISTAN (PVT) LIMITED ESPAK

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CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)

Reference Number: ESPAK/00481P/25/GW/04642/00786 **Date:** 26/05/2025

Name of Industry / Client: A.T Waste Management

Address: 0.5 Km Off 10th Km, Raiwind Road, Hudiara Drain, Near Bhobattian Chowk, Lahore, Punjab, Pakistan

Validation Officer: Muhammad Nadeem, Research Officer

Nature of Sample: Ground Water from Bore

Date Sample Received: 22/05/2025 **Grab / Composite:** Grab

Date of Sample Collection: 21/05/2025

Sample Collected / Sent By: Mehmood Aslam, Analyst (Field), ESPAK

Date of Completion of Analysis: 26/05/2025

S. No	Parameters	Limit Values (DW-PEQS)	Concentration	Method / Equipment Used	Remarks
1	Total Coliforms	----	ND	SMWW 9222 B	-----
2	Fecal Coliform Bacteria	Must not be detectable in any 100mL sample	ND	SMWW 9222 H	Within Limits
3	E. Coli	Must not be detectable in any 100mL Sample	ND	SMWW 9222 H	Within Limits
4	Taste	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
5	Odor	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
6	pH*	6.5-8.5	7.3	SMWW 4500H⁺B	Within Limits
7	Turbidity	<5 NTU	ND	SMWW 2130B	Within Limits
8	Color	≤15 TCU	ND	SMWW 2120 C	Within Limits
9	Total Dissolved Solids (TDS)*	<1000 mg/L	621 mg/L	SMWW 2540C	Within Limits
10	Total Hardness as $CaCO_3$*	<500 mg/L	312 mg/L	SMWW 2340C	Within Limits
11	Residual Chlorine	0.2-0.5 mg/L	ND	SMWW 4500-Cl B	----
12	Chloride (as Cl^-)*	<250 mg/L	33 mg/L	SMWW 4500Cl^-B	Within Limits
13	Fluoride (F^-)*	≤1.5 mg/L	0.3 mg/L	U.S. EPA 9214	Within Limits
14	Cyanide (CN^-)	≤0.05 mg/L	ND	SMWW 4500 CN^- F	Within Limits
15	Nitrate (NO_3^-)	≤50 mg/L	ND	SMWW 4500NO_3^-B	Within Limits
16	Nitrite (NO_2^-)	≤3 mg/L	ND	SMWW 4500NO_2^-B	Within Limits
17	Phenolic Compounds (as Phenols)	NGVS	ND	SMWW 5530 C	----
18	Aluminum (Al)	≤0.2 mg/L	ND	SMWW 3111	Within Limits
19	Antimony (Sb)	≤0.005 mg/L	ND	SMWW 3111	Within Limits
20	Arsenic (As)	≤0.05 mg/L	ND	SMWW 3114 B	Within Limits
21	Barium (Ba)	0.7 mg/L	ND	SMWW 3111	Within Limits
22	Boron (B)	0.3 mg/L	ND	SMWW 4500-B B	Within Limits

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CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)

Reference Number: ESPAK/00481P/25/GW/04642/00786 **Date:** 26/05/2025

Name of Industry / Client: A.T Waste Management

S. No	Parameters	Limit Values (DW-PEQS)	Concentration	Method / Equipment Used	Remarks
23	Cadmium (Cd)	0.01 mg/L	ND	SMWW 3111	Within Limits
24	Chromium (Cr)	≤0.05 mg/L	ND	SMWW 3111	Within Limits
25	Copper (Cu)	2.0 mg/L	ND	SMWW 3111	Within Limits
26	Lead (Pb)	≤0.05 mg/L	ND	SMWW 3111	Within Limits
27	Manganese (Mn)	≤0.5 mg/L	ND	SMWW 3111	Within Limits
28	Mercury (Hg)	≤0.001 mg/L	ND	SMWW 3112	Within Limits
29	Nickel (Ni)	≤0.02 mg/L	ND	SMWW 3111	Within Limits
30	Selenium (Se)	0.01 mg/L	ND	SMWW 3114 B	Within Limits
31	Zinc (Zn)	5.0 mg/L	0.4 mg/L	SMWW 3111	Within Limits

DW-PEQS: Punjab Environmental Quality Standards for Drinking Water Quality, 2016
SMWW: Standard Methods for the Examination of Water and Waste Water, American Public Health Association, American Water Works Association, Water Environment Federation
USEPA: United States Environmental Protection Agency
NGVS: No Guideline Value Set
ND: Not Detected

- Laboratory tests and measurements were carried out at 25 ± 5 °C and ≤75 % Relative Humidity conditions unless required otherwise.
- Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

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- **Only parameters marked with asterisk (*) are ISO 17025:2017 accredited.**
- **Report Limitation: This report is not valid for court cases, Environmental Protection Orders, Compliance Report for Operational Phase Approvals, or any regulatory action under Punjab Environmental Protection (Smog Prevention and Control) Rules 2023 etc.**

1. **Sample Analyzed By:** Samahir Khalid (Analyst (Chemical)); Nageen Arshad (Analyst (Chemical)); Sumra Manzoor (Analyst (Chemical)); Zirwa-tuz-Zahra (Analyst (Chemical)); Khizra Bano (Analyst (Microbiology))
2. **Name of Chief Analyst with Seal:** Muhammad Arfan
3. **Signature of Incharge of the Environmental Laboratory:**

Name: Imran Malik
General Manager
Date: 26/05/2025

ENVIRONMENTAL SERVICES PAKISTAN (PVT) LIMITED ★ ESPAK

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ANNEXURE-F

GOOGLE EARTH MAP


of "Battery Recycling Unit" Within premises of A.T Waste Management
7.10"N, 74°13'33.20"E
Legend
Shaheen Grinding Rd
Battery Recycling Unit
Great Yuemei Textile

ANNEXURE-G

STAKEHOLDER' CONSULTATION FORMS

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Muhammad Shahid

Residence: Chah Mochi Wala, Addu

CNIC: 32303-0248161-1

Gender: ☑Male ☐Female

Male

Qualification: Middle

Procession: Factory Worker.

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☑	☐	☐	☐	☐
Will the project increase the importance of the area?	☐	☑	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☑	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☐	☑
Will the project cause any type of pollution in the area?	☐	☐	☐	☐	☑

Signature of Interviewed

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Shaukat Hussain

Residence: Alipur, Basti Nawan Arain Muzaffargarh

CNIC: 32302-1537369-1

Gender: ☑Male ☐Female

Male

Qualification: Matric

Procession: Factory Worker.

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☑	☐	☐	☐	☐
Will the project increase the importance of the area?	☑	☐	☐	☐	☐
Will the project help to improve the living standards of the area?	☑	☐	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☑	☐	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☐	☑
Will the project cause any type of pollution in the area?	☐	☐	☐	☐	☑

Signature of Interviewed

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Muhammad Azam

Residence: Basti Arc, Kot Addu, Muzaffargarh.

CNIC: 32303-5343641-1

Gender: ☑Male ☐Female

Male

Qualification:

Procession:

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☑	☐	☐	☐
Will the project increase the importance of the area?	☐	☑	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☑	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☑	☐	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☑	☐	☐	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed

M. Azam

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Muhammad Rafique

Residence: Chak 94/15-L Mian channu, Khanewal

CNIC: 36104-6683016-3

Gender: ☑Male ☐Female

Qualification: Male

Procession: Middle

Industrial Worker.

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☑	☐	☐	☐	☐
Will the project increase the importance of the area?	☑	☐	☐	☐	☐
Will the project help to improve the living standards of the area?	☑	☐	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☑	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed محمد رفیق

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Tamoor Saqib

Residence: Ward No. 10, Street 2, Farooqia, Alipur Muzaffargarh

CNIC: 32301-8434822-1

Gender: ☐Male ☐Female — Male

Qualification: Matric

Procession: Industrial Worker

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☑	☐	☐	☐	☐
Will the project increase the importance of the area?	☑	☐	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☑	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☑	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed تموور عاقب

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Wajid Mehmood

Residence: Tehsil Tala Gang, Distt. Chakwal

CNIC: 37203-0802930-7

Gender: ☑Male ☐Female

Male

Qualification: Middle

Procession: Industrial Worker

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☑	☐	☐	☐	☐
Will the project increase the importance of the area?	☑	☐	☐	☐	☐
Will the project help to improve the living standards of the area?	☑	☐	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☑	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Pervaiz Masih

Residence: Chak No.62 Chamyapur, Lahore

CNIC: 35202-5587764-5

Gender: ☑Male ☐Female

Male

Qualification: Un-educated

Procession: Sanitary worker

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☑	☐	☐	☐
Will the project increase the importance of the area?	☐	☑	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☑	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☑	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Khalid Masih

Residence: Chamrupur Lahore

CNIC: 35202-9615296-1

Gender: ☑Male ☐Female

male

Qualification: Primary.

Procession: Sanitary worker

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☑	☐	☐	☐	☐
Will the project increase the importance of the area?	☑	☐	☐	☐	☐
Will the project help to improve the living standards of the area?	☑	☐	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☑	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Noman Aslam

Residence: Bhaiwala, Bhobatian chowk Lahore

CNIC: 35202-2459307

Gender: ☒Male ☐Female

Male

Qualification: Primary.

Procession: Sanitary Worker

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☐	☐	☐	☐
Will the project increase the importance of the area?	☐	☐	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☐	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☐	☐
Level of satisfaction?	☐	☐	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☐	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☐	☐

Signature of Interviewed نعمان اسلم

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Muhammad Aamir

Residence: Ghazi Ghat Kot Adhu

CNIC: 32303-7776067-3

Gender: ☐Male ☐Female
Male

Qualification: Middle

Procession: Industrial job

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☑	☐	☐	☐
Will the project increase the importance of the area?	☐	☑	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☑	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☑	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Muhammad Imran

Residence: Chak Mochi Wala, Muzafargarh

CNIC: 32303-3405330-3

Gender: ☑Male ☐Female

Male

Qualification: Primary

Procession: Factory job

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☑	☐	☐	☐
Will the project increase the importance of the area?	☐	☑	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☑	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☑	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Muhammad Khurram

Residence: Izmir Town, Canal Bank Road Lahore

CNIC: 35202-1806045-3

Gender: ☑Male ☐Female

Male

Qualification: Primary

Procession: Factory Worker

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☑	☐	☐	☐
Will the project increase the importance of the area?	☐	☑	☐	☐	☐
Will the project help to improve the living standards of the area?	☑	☐	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☑	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Muhammad Tanveer

Residence: Izmir Town, Canal Road Lahore

CNIC: 35202-8582185-7

Gender: ☑Male ☐Female

Male

Qualification: Primary

Procession: Factory Worker.

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☑	☐	☐	☐
Will the project increase the importance of the area?	☐	☑	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☑	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☑	☐
Level of satisfaction?	☐	☑	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☑	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed

Signature of Interviewer

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "A.T Waste Management (Battery Recycling Division)"

Hudaira Drain Raiwind Road Lahore.

Name: Ali Hassan

Residence: Ali Raza Abad, Raiwind Road Lahore

CNIC: 35202 – 2822802 – 3

Gender: ☑Male ☐Female

Male

Qualification: Primary

Procession: Factory Worker

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☑	☐	☐	☐
Will the project increase the importance of the area?	☐	☑	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☑	☐	☐	☐
Will the project affect the environment of the area?	☐	☑	☐	☑	☐
Level of satisfaction?	☐	☐	☐	☑	☐
Will the project affect the plant species of the area?	☐	☐	☐	☑	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☑	☐

Signature of Interviewed

Signature of Interviewer