ISP ENVIRONMENTAL SOLUTION (Pvt.) Ltd., LAHORE.

Project Site: Integrated Management Facility (IWMF) Shareef Complex Manga Road Link Moza Mal, Tehsil Raiwind, District Lahore

Prepared by:

ISP ENVIRONMENTAL SOLUTIONS Pvt. Ltd

Bhai Kot, Sundar-Raiwind Road opposite Gate No. 2, Sundar Industrial Estate, Lahore

0315-0484847

Email: infoisp2018@gmail.com

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LIST OF ACRONYMS

BHU	Basic Health Unit
BOD	Biochemical Oxygen Demand
BOQ	Bill of Quantities
COD	Chemical Oxygen Demand
CPEC	China – Pakistan Economic Corridor
DHQ	District Headquarters Hospital
EA	Environmental Approval
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency –Punjab
EPC	Environmental Protection Council
FESCO	Faisalabad Electric Supply Company Limited
GoP	Government of Pakistan
HW	Hospital Waste
HIV	Human Immunodeficiency Virus
IEE	Initial Environmental Examination
LAA	Land Acquisition Act
MT	Metric Tons
MSW	Municipal Solid Wastes
MW	Mega Watt
NCS	National Conservation Strategy
NDIR	Non Dispersive Infra-Red
NEQS	National Environment Quality Standards
NGOs	Non–Government Organizations
NOC	Objection Certificate
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
Pak–EPA	Pakistan Environment Protection Agency
PEPA	Punjab Environmental Protection Agency
PEQs	Punjab Environmental Quality Standards
PEPC	Pakistan Environment Protection Council
PHED	Public Health Engineering Department
PKR	Pak Rupees
PM	Project Manager
PPC	Pakistan Penal Code
PSDP	Public Sector Development Project
PSQCA	Pakistan Standards Quality Control Authority

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PTCL	Pakistan Telecommunication Limited
PTV	Pakistan Television
RAP	Resettlement Action Plan
RNR	Renewable Natural Resources
SFA	Social Framework Agreement
SPM	Suspended Particulate Matter
TMA	Tehsil Municipal Administration
VOC	Volatile Organic Compounds
WAPDA	Water and Power Development Authority
WHO	World Health Organization

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EXECUTIVE SUMMARY

Pakistan is getting lesser extent of waste management strategies and more waste that needed to be well sorted and managed. Waste is becoming increasingly complex due to changing technologies and increase in the services that in the community. There are many engineering approaches that help in disposing the waste off, but there is very lesser concern on reducing the waste coming from the community. The disposal of refuse is the matter of increasing concerns of municipalities and local government throughout the world. It is estimated that almost 18 million tons of garbage is produced in Pakistan every day and this estimate and this estimate is projected to grow to over 25 million tons per annum by the year 2025. Whereas Industrial waste stream data is yet not documented in the country. Provision of alternate solutions to industrial waste handling and processing is need of the hour. Whereas incineration of hazardous waste shall be the last option to get rid of extremely hazardous waste through controlled and complete burning in the incinerator (500 kg/hr) installed at ISPES Site.

For this ISP Environmental Solutions Pvt Ltd (ISP) has a keen objective and aim to reduce the environmental impact arising from the waste generation through source collection, proper transportation, handling, storage and reducing it in an environmentally sustainable manner and thus facilitating its clients with alternate waste disposal solutions as well as installation of incinerator (500 Kg) for controlled burning. For this ISP Environmental Solutions Pvt Ltd has to take environmental approval from the concerned department.

A. Title and Location of The Project

1 Title: **The title of proposed project is COLLECTION, TRANSPORTATION, STORAGE AND HANDLING OF INDUSTRIAL/HAZARDOUS WASTE AT INTEGRATED WASTE MANAGEMENT FACILITY" MANGA ROAD NEAR SUNDAR INDUSTRIAL ESTATE for M/S ISP Environmental Solutions (Pvt.) Ltd.**

Location: Shareef Complex Manga Road Link Moza Mal, Tehsil Raiwind, District Lahore

Name of the Proponent

For the proposed project the name of proponent is as follows;

Proponent: Dr. Zillay Mariam

Address: Bhai Kot, Sundar-Raiwind Road opposite Gate No. 2, Sundar Industrial Estate, Lahore

B. Name Of The Organization Preparing Report

Name: ISP Environmental Solutions (Pvt) Ltd

Office: Bhai Kot, Sundar-Raiwind Road opposite Gate No. 2, Sundar Industrial Estate, Lahore

Phone: 0315-0484847

Email: infoisp2018@gmail.com

C. Brief outline of the Proposal

The proposed project is collection, transportation, storage, handling and installation of incinerator (500 Kg/Hr) of hazardous waste at Integrated Waste Management Facility by ISP Environmental Solutions Pvt Ltd at Shareef Complex Manga Road Link Moza Mal, Tehsil Raiwind, District Lahore

The Project is to handle industrial hazardous waste from collection, transportation, storage, handling and incineration at Integrated Waste Management Facility (IWMF) for managing industrial waste along with its water handling facility and a scrap yard. The total area of the facility is 36,000 s industrial land.

ISPES shall collect, transport, handle, sort, store, shred, recycle and incinerate at a single facility for industrial hazardous waste handling and the entire system shall strictly avoid open burning of waste in order to follow sustainable development goals and act in the best interest of the national climate.

D. Project Impacts and recommendations for their mitigation

Table given below shows the project impacts; related with construction and operation of the Project. Accordingly, mitigation measures have also been proposed to manage the environment and for sustainable development.

Project Impacts and their Mitigations Measure

Impacts	Magnitude	Recommendation Measure	Responsible Authority
CONSTRUCTION/INSTALLATION PHASE			
Air Pollution Dust Generation, Gases emissions from vehicles and the waste	Minor	• Sprinkling of water on regular basis especially during dry climatic conditions • Periodic maintenance and management of all the construction machinery and vehicles.	Contractor/ Proponent
Solid waste Solid waste	Minor	• Conduct separate collection of construction and domestic waste to promote recycling and re-use • Dispose non-recyclable and hazardous waste material properly according to waste management rules	Contractor/ Proponent
Hazardous Waste Storage Area	Major	• Pre constructed halls shall be converted to store and handle industrial hazardous waste along with proper installation of fire extinguishers, safety markers, assembly areas and safe exits.	Contractor/ Proponent
Water Quality - Run-off water from construction area - Wastewater from camp site - Leakage of oil and chemical materials from construction activity	Minor	• Use of spill prevention trays and impermeable sheets to avoid contamination of the groundwater/surface water • septic tanks constructed with cemented wall to prevent the groundwater contamination	Contractor/ Proponent
Noise - Noise caused by	Minor	• Control noise through control of working hours and selection of less	Contractor/ Proponent

Impacts	Magnitude	Recommendation Measure	Responsible Authority
construction machinery - Vehicles used for mobilization of construction equipment and workers		noisy equipment. • Proper maintenance of vehicles and construction equipment	
OPERATIONAL PHASE			
Air Pollution During operation of the plant, and the movement of the vehicles in the facility for the movement of the waste in and out of the unit.	Minor	– Special plant with scrubber unit for the industrial and hospital waste is installed; – Properly trained staff operate the unit according to standard operating procedures; – The activity is based on biological treatment hence there is no air pollution during the operation. • There is no leakage of gases in all the process of the plant	Proponent
Solid waste The outdated storage tanks, organic and inorganic waste.	Moderate	• Dedicated waste segregation units/containers shall be built or placed • Use of the shredder to reduce the volume of the waste. Organic waste to some extent is directly disposed of in the in the MRF or sent for composting.	Proponent
Hazardous Waste Storage Area	Major	• Pre constructed halls shall be converted to store and handle industrial hazardous waste along with proper installation of fire extinguishers, safety markers, assembly areas and safe exits. • Properly trained staff shall be engaged prior to hazardous waste	Proponent

Impacts	Magnitude	Recommendation Measure	Responsible Authority
		handling • First aid training shall be provided to the entire staff for handling all situations	
Water Quality (20-30 Liters/Day for domestic purposes)	Moderate	• The water generation is of lesser extent and treated through the septic tank system and added to the main municipal stream.	Proponent
Noise Noise from Equipment/Machinery/Vehicles	Minor	• Proper maintenance of equipment and machinery. • Enhanced management to reduce machinery noise and exhaust and its impact on the surrounding environment. • Green belts around the project area, peripheral and internal areas.	Proponent
Health & Safety	Minor	– Prepare a manual for labor accident prevention including Health & safety training – Provide workers with appropriate protective equipment – Installing fire extinguishers in fire handling places – HSE department shall develop firefighting policy and conduct fire drills	Proponent

E. Proposed Monitoring

The monitoring program is designed to ensure that the requirements of the environmental approval awarded by the EPA are met. Monitoring Program (MP) provides important information that allows for more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters shall help to determine the extent to which project construction/operation activities shall cause environmental disturbance.

Sr. No.	Monitoring Parameters	Monitoring Mechanism	Frequency	Responsibility
DURING INSTALLATION				
1.	Dust Emissions	Ambient Particulate Matter Monitoring System.	Shall be carried out on half yearly basis.	Proponent/ EPA
2.	Noise Levels	Noise meter	On quarterly basis by a third party	Proponent/ EPA
3.	Gaseous Emissions	Emissions monitoring system. Monitoring of ambient air quality.	Shall be carried out on half yearly basis.	Proponent/ EPA
4.	HSE Plan	Health, safety and Environmental sector shall be monitored on daily basis	Daily	Proponent/ EPA
DURING OPERATION				
1.	Noise Levels	Noise meter	On quarterly basis by a third party	Proponent/ EPA
2.	Water Quality	Discrete grab sampling and laboratory testing of water samples.	As described by SMART	Proponent/ EPA
3.	Emissions	Emissions monitoring system. Monitoring of ambient air quality.	Shall be carried out on quarterly basis.	Proponent/ EPA
4.	Security	Security arrangements shall be made	Daily	Security personnel of Proponent
5.	HSE Plan	Health, safety and Environment shall be monitored on daily basis	Daily	EHS officer of Project Proponent

F. Environmental Management Cost

The cost for environmental management and monitoring shall be the part of contract of Contractor and Consultants respectively. However, a lump sum amount of Rs.1 million shall be allocated by the project proponent as cost for environmental training and monitoring for a period of two years during construction and operation of the project. The estimations are as followings;

G. Environment Management Cost

Environmental Component	Quantity	Amount PKR
(i) Tree Plantation	5000	100,000.0
(ii) Health and Safety Measures and Provision of PPEs	L.S.	600,000.0
(iii) Air and Water Quality & Noise Monitoring	L.S.	200,000.0
(iv) Environmental Trainings	L.S	100,000.0
Total Environmental Management and Monitoring Cost		**1,000,000.0**

H. Stakeholder Consultations

Public discussions were held with the inhabitant of the surrounding area. They are quite positive to the project and see the project as growing business and accomplishing towards the positive development in the area at local and in country as whole. The people observe strong positive impacts regarding the collection, transportation, storage and handling of industrial hazardous waste at Integrated Waste Management facility. EIA findings depict that people perceive overall positive social and environmental impacts by the project. Their attitude towards the project installation and execution is highly optimistic. Majority of the people are convinced for installation and execution of the project. As it has been evident from the facts that irresponsible and mishandling of waste (industrial & domestic) are the root cause of environmental degradation and this has now created irreversible damage to the environment on land, in water and air as well! Industrial revolution has now taken a new turn of sustainability in handling their processes which ultimately takes them to implementation of new techniques and strategies for a better management of waste produced during and after the product manufacturing.

I. Conclusion

All the relevant environmental impacts of the study have been identified based on the field survey and accordingly their mitigation measures were proposed in the report. The EIA was carried out keeping in view the national and international guidelines; and Pakistan's environmental laws/ act (Pakistan Environmental Protection Amendment Act 2012) and regulations (2000). In the light of the facts obtained from the project baseline study and control measures, it is envisaged that proper collection, transportation, storage and handling of industrial hazardous waste properly managed and disposed so least impact could be. created on the environment. This shall be useful for environment and has no adverse social and environmental impacts. The nearby industrial communities have a dire need for such services so as to fulfil the requirement of EPA in handling waste through sustainable approach. They have no issue with the installation of the project rather it is highly supported project because of present waste management condition, human health and disease risks in area. It has also been observed that such facilities are not developed by Government Bodies which creates issues for the industrial units to get rid of their waste in an environment friendly way. Such projects shall be fully supported in order to create specialized areas for the growing waste handling problems. Hence it is recommended for environmental approval.

2 INTRODUCTION

Hazardous-waste management, the collection, treatment, and disposal of waste material that, when improperly handled, can cause substantial harm to human health and safety or to the environment. Hazardous wastes can take the form of solids, liquids, sludges, or contained gases, and they are generated primarily by chemical production, manufacturing, and other industrial activities. They may cause damage during inadequate storage, transportation, treatment, or disposal operations. Improper hazardous-waste storage or disposal frequently contaminates surface water and groundwater supplies as harmful water pollution and can also be a source of dangerous land pollution. People living in homes built near old and abandoned waste disposal sites may be in a particularly vulnerable position. In an effort to remedy existing problems and to prevent future harm from hazardous wastes, governments closely regulate the practice of hazardous-waste management.

Hazardous-waste characteristics

Hazardous wastes are classified on the basis of their biological, chemical, and physical properties. These properties generate materials that are either toxic, reactive, ignitable, corrosive, infectious, or radioactive.

Toxic wastes are poisons, even in very small or trace amounts. They may have acute effects, causing death or violent illness, or they may have chronic effects, slowly causing irreparable harm. Some are carcinogenic, causing cancer after many years of exposure. Others are mutagenic, causing major biological changes in the offspring of exposed humans and wildlife.

Reactive wastes are chemically unstable and react violently with air or water. They cause explosions or form toxic vapours. Ignitable wastes burn at relatively low temperatures and may cause an immediate fire hazard. Corrosive wastes include strong acidic or alkaline substances. They destroy solid material and living tissue upon contact, by chemical reaction.

Rapid industrialization and disposal of refuse is the matter of increasing concern for municipalities and local governments throughout the world. It is estimated that almost 8 million tons of waste is producing in Pakistan every day. This figure refers to the municipal solid waste as industrial processed waste has neither been analyzed nor its data

is collected. As existing landfills (dumpsites) became filled to capacity and new landfills are very costly, the development of alternatives disposal methods is becoming critical. In addition, the refuse being dumped randomly contains considerable quantities of energy that can replace the conventional fossil fuels. Hazardous waste handling needs proper solutions so as to avoid the increasing pollution rate in the environment due to improper waste disposal and burning. Thus incineration of hazardous waste under controlled conditions and monitoring shall create a positive impact on the environment.

The development of the hazardous waste storage and handling facility at IWMF shall help significantly to reduce the bulk of MSW and Industrial waste size as soon as possible, otherwise with the decreasing availability of landfill capacity there shall be little suitable disposal facilities to handle the waste. Moreover, local contractors facilitate industrial units for their waste disposal at any random sites. This has created havoc in the environment and thus poor knowledge in the field has now led to suffer society. There is a need to act in time, taking into account the lead time required for project planning and preparation, as well as the relevant statutory and administrative requirements. Pakistan shall not be able to uphold the high standard of environmental hygiene that the local and international community expects of a world class city if there is no timely and adequate provision of appropriate waste treatment and disposal facilities.

For such self-sustainable process, the ISP Environmental Solutions Pvt Ltd has to collect, transport, establish an Integrated Waste Management Facility (IWMF) at a rental site located at Sharif Complex Manga Road Link Moza Mal Tehsil Rainwind Road District Lahore and the estimated cost of the project is 10 million PKR approximately. For this the Proponent has to take an environmental Approval from the concerned department.

Hazardous Waste Management is an important environmental, social and health problem, which requires definite attention by all concerned. This type of waste has worse impact on the community's health and environment because it contaminates the land, air and water. Hazardous waste all too often contains unpleasant, potentially dangerous substances, which, if improperly managed, could cause harm to health and the environment, especially if burnt in uncontrolled conditions.

In developing countries, including Pakistan, uncontrolled dumping is used for the disposal of solid wastes. These dumps are frequently allowed to burn either deliberately, as a means of volume reduction, or accidentally. The emissions from this type of uncontrolled burning can be noxious and harmful. Typical materials found in

the waste which contribute to these harmful emissions include certain plastics, batteries, paints, domestic chemicals, pharmaceuticals and many industrial wastes.

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The facilities provided by the project as it comes in operation are as follows:

- Minimizing risk for personnel, general public and environment
- Minimizing the amounts of waste using environmentally sustainable techniques including incineration, bioremediation, composting and
- Transportation of the waste through properly designed SOP from client to processing site.
- Establishment of a safe and proper area for the temporary storage, handling and processing and incineration of waste including drums, aluminum cans, plastics, product waste, processed industrial waste (sludge, organic waste, ash, tanneries waste, textile waste, pumice stone, paint waste, waste water and contaminated soil
- Proper waste treatment and disposal of industrial waste including solid and liquid through alternate solutions involving bioremediation and incineration.
- Use of appropriate Health, Safety & Environment management system.

It is strongly advised to use and apply these guidelines which provide detailed information on the Industrial Hazardous Waste. The proper segregation and collection of wastes as well as treatment and disposal methods and capacity building. In accordance with the Punjab Environmental Protection Act-1997 (amended in 2012), shall be strictly followed to manage all types of wastes. Rules shall be followed at all stages i.e. documentation, segregation, collection, transportation, storage, disposal, minimization and reuse. According to the rules Committees shall be formulate as under;

(a) <u>Waste Management Team</u>

a.	Health, Safety & Environment team	Members
b.	Head of Operations	Members
c.	Marketing Representatives	Members
d.	GIS/ Waste Tracking	Members
e.	Head of administration	Members
f.	Head of the sanitation staff	Members

g. Environmental Engineer Members

(b) Types of Industrial Hazardous waste

- Non-Risk Waste includes paper and cardboard, packaging, food waste, aerosols, cans, metal drums, ash and others
- Wood, Biomass, Rags, Shopper, Wrapper etc.
- Hazardous waste includes solid and liquid waste which are hazardous to the environment which includes industrial processed waste both organic and inorganic in nature. Chemicals, drums, processed waste including nicotine, tobacco, foodgrade chemicals, sludge, ash (biomass, coal), cosmetics, paints, acids, tanneries & textile waste, packed finished goods along with packaging, edible waste oil, batteries, metal rods & sheets and e-waste.

2.1 PURPOSE OF THE REPORT

The proposed project envisages the Collection, transportation, storage, handling and incineration of industrial/hazardous waste at ISP Environmental Solutions (pvt) Ltd Integrated Waste Management Facility (IWMF) at Sharif Complex Manga Road Link Moza Mal Tehsil Rainwind Road District Lahore. In accordance with the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000, SRO # 339 (1)/2000, the project for collection, transportation, storage, handling and incineration of industrial/hazardous waste and disposal of organic and inorganic waste falls in Schedule –II, Part-I "Waste Disposal" for which Environmental Impact Assessment (EIA) report is required for Environmental Approval.

According to the Punjab Environmental Protection Act (PEPA), Section 12 - Initial environmental examination, and environmental impact assessment: "No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Provincial Environmental Protection Agencies, as the case may be, or, where the project is likely to cause an adverse environmental effects an environmental impact assessment, and has

obtained from the Government Agency approval in respect thereof." It is this legal requirement from the Government of Punjab that this Environmental Impact Assessment (EIA) report has been prepared to get Environmental Approval (EA) from the Environmental Protection Agency, Government of Punjab, Lahore.

This report provides detailed basic information and facts of project; including especially among others environmental, economic, social, etc., enabling its assessment and justification that the project shall meet the requirements of environmentally sustainable practices; both during construction and regular operation stages; as desired under the Punjab Environmental Protection Act, 1997 (amended 2012), the National Environment Quality Standards and the rules and the regulations thereof. The other relevant regulations and guidelines considered while preparing this EIA report include:

- Policy and procedures for filing, review and approval of environmental assessments.
- Guidelines for the preparation and review of environmental reports.
- Guidelines for public participation.
- Guidelines for sensitive and critical areas.
- Detailed sectorial guidelines

Different environmental aspects like social, physical biological etc. and other related features of the project both during construction and its regular operations are highlighted in this EIA report. Measures necessary to be adopted to mitigate any environmental impacts on any part of the environment around are also described. All the important information is also provided as described under the format used to help decision makers, EPA Punjab in the present case, before issuing the desired Environmental Approval (EA).

2.2 IDENTIFICATION OF PROJECT AND PROPONENT

Govt. of the Punjab has directed the proponent to take environmental approval from the concerned department for construction and operation of the proposed site. The proposed project is the installation of Incinerator at Integrated Waste Management Facility (IWMF) for the disposal of Lahore.

Proponent: Dr. Zillay Mariam

Address: Bhai Kot, Sundar-Raiwind Road opposite Gate No. 2, Sundar Industrial Estate, Lahore

E-Mail: infoisp2018@gmail.com

2.3 DETAILS OF CONSULTANTS

Office: As Above

2.3.1 Persons Performing the EIA Study (Team Members)

The proponent has assigned the task of preparing EIA report to environmentalist own the company. The EIA study of the proposed project has been conducted according to Environmental Assessment Procedures, 1997, Review of IEE and EIA Regulation 2000 as prescribed by the Federal Environmental Protection Agency (Pak EPA), Government of Pakistan. The study team of M/S ISP Environmental Solutions Pvt Ltd which completed the EIA report consists of following experts as mentioned in **Table -1.1**.

Table - 1.1: Members Completed EIA Process

Name	Specialization	Designation
Ms. Zillay Mariam	Ph.D	Project Head
Mr. Gulfam Abid	M.Phil. Environmental Sciences	Head of Admin
Mr. Wajid Ali	M.Phil. Environmental Sciences	Director Operations
Ms. Saira Alamgir	MSc Environmental Engineering	Technical Head and HSE Officer
Mr. Fiaz Ahmad	BSc. Environmental Engineering	Environmentalist

Only the main roles of the team members are given. However, their role was not restricted to these, rather it also includes many other studies in their respective fields in the context of this EIA studies.

2.4 BRIEF DESCRIPTION OF NATURE, SIZE AND LOCATION OF PROJECT

The proposed project site is for collection, transportation, storage, handling and installation of incinerator for industrial hazardous waste at Integrated Waste Management Facility located at Sharif Complex Manga Road Link Moza Mal Tehsil Rainwind Road District Lahore**.** Geographical coordinates are 31°17'30.0"N 74°09'30.1"E The proposed project site exist in ibaren area.



Figure-1.1 Location of Project Site (Sharif Complex Manga Road Link Moza Mal Tehsil Rainwind Road District Lahore)

2.5 OBJECTIVE OF THE REPORT

Objectives to conduct this EIA are as following:

i. A legal binding in accordance to Punjab Environmental Protection Act-2012 (amended Act).

ii. To identify the potential environmental issues pertaining to the project.

iii. To evaluate the ability of the project in view of social acceptance and environmental soundness.

iv. To provide the maximum information to the proponent and other stakeholders about the existing environmental conditions and the implications of the proposed project.

v. Collection of available data, reports, drawings and other relevant information about area of proposed project.

vi. Review of applicable existing environmental legislation and Punjab environmental quality standards (PEQS).

vii. Propose mitigation measures to eliminate or to reduce the negative impacts to an acceptable level.

viii. Development of well-resourced environmental management and monitoring plans to identify mitigation strategies targeted towards avoidance, minimization and rehabilitation of the impacts.

2.6 EXTENT OF THE STUDY

In compliance with PEPA-2012 (amended act) requirements, an EIA report has been prepared by the environmentalist. This document covers all environmental impacts, due to proposed project, in and around the project area comprising the physical, ecological and socio-economic aspects together with identification of the potential positive and negative impacts. Any developmental activities outside the project area and establishment of the other factories outside the project vicinity have not been covered under this EIA study.

2.7 METHODOLOGY

The methodology adopted to carry out the EIA study of the proposed project was as follow:

a) Orientation

b) Planning of Data Collection

c) Data Collection

d) Site Inspection

e) Analysis of Maps

g) Desk Top Research

h) Public Consultations

i) Field Studies

j) Laboratory Analysis

k) Evaluation of Impacts and their analysis

l) Categorization of impacts based on their potential environmental significance and prescription of preventive / mitigation measures.

In addition to the evaluation and review of the available records, data and the facts for the previous project, detailed discussions were held with the concerned members of the project management as well as other project stakeholders.

Notes and proposals for measures to be taken to mitigate and compensate for any determined environmental impacts are contained in the Environmental Management Plan (EMP) as well as a Monitoring Plan, including all parameters that need to be measured, and the frequency of monitoring actions.

A comprehensive qualitative and quantitative methodology was adopted to conduct this study inter-alia in due compliance with the EIA requirements. The study included collection of both primary and secondary data regarding environmental status and other relevant factors. This EIA report has been accomplished after carrying out thorough visit to the proposed site and detailed investigation to identify the following Environmental areas of concern:

1) To achieve the desired environmental compliance standards; as per the national environmental regulatory requirements; as applicable to the project.
2) Plans and activities to prevent/mitigate any potential impacts and the gaps that could probably remain after implementation.
3) Any other points/steps to be taken which could be beneficial to mitigate environmental adverse impacts that may accrue both during construction and regular operation of the project.

A view of methodology for environmental assessment is given in following **Table - 1.2**.

Table - 1.2: Environmental and Social Assessment Process

Phase	Activities	Status	Responsibility
Screening and Scoping	Reconnaissance and initial site visit and consultations, identification of environmental and social issues & applicable safeguard environment policy, categorization and working out an action plan.	Carried out during the present EIA	Project Management (PM)
Impact Assessment	Identification of potential environmental and social impacts through site visits, stakeholders consultations, review of drawings, alternatives etc	during the present EIA	SHE Manager
Impact categorization	The significant potential impacts were tabulated and mitigation/preventive measures were prescribed	during the present EIA	Environmentalist
EMP Preparation	Stakeholders/Women consultation EMP Social Framework Agreement (SFA)	Carried out during/prepared as part of the present EIA	Environmentalist
Final EMP	Final version of EMP produced	Included in the present EIA	PM, HSE & Environmentalist

2.8 SCOPE OF THE STUDY

The purpose of this EIA study is identification of key environmental and social issues which shall likely arise during installation and operation of the power project along with the assessment of the significant negative impacts and mitigation measures to be adopted for their minimization.

The ultimate goal of this EIA report, among others, is also to produce an Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMP) for the Construction and Operation Stages of the proposed project. Compliance of EMP together with the provisions for mitigation measures for the significant negative impacts shall ensure the implementation of this project in an environmentally sustainable manner both at installation as well as Operation stages of the Project.

The EIA report ensures compliance to all national and local regulations enforced in Pakistan, especially Punjab for such report. While taking into consideration the corporate standards, it was further sought to ensure that the project under reference of this EIA report, is to be developed in a manner that is socially responsible and reflects sound environmental management practices.

This EIA report also discusses the legal and administrative framework within which the EIA has been prepared. A brief project description is included in the EIA report together with a description of the baseline environmental conditions and the actual environmental situation at the proposed site for the project.

The technical section of the report and the environmental baseline situation form the basis for the detailed impact assessment during construction and operation phases of the project.

Based on the findings of this report, an environmental management system has been devised, outlining necessary mitigation and compensation measures together with monitoring practices.

2.9 THE REPORT STRUCTURE

This EIA document is structured as follow:

Section–1: Introduction: Containing general information about the project and process of carrying out the study.

Section–2: The Project Description: Describes an overall detail of the works to be done.

Section–3: The Description of the Environment: Gives information on Physical, Biological and Social conditions collected through survey of the Project Area.

Section–4: Screening of potential Environmental Impacts and mitigation measures: Identifies various environmental impacts and their preventive actions. This makes the basis of the Environment Management Plan.

Section–5: Environmental management and monitoring program: Contai **Emergency Response Plan & Evacuation/Exit Plan:** ns comprehensive prescriptions regarding environmental impacts and their mitigation measures. This also includes institutional arrangements and Environmental Management & Monitoring Plan.

Section–6: Stakeholders Consultations: Explains the process of public consultation and disclosure of the project in related stakeholder. It makes this document a legal public document.

Section–7: Mitigation and impact Assessment: It deals with the major potential impacts which could occur during operational phase and how could amendments shall be done in design and monitoring for mitigation.

Section –8: Explains about the arrangements to avoid any natural or anthropogenic emergency.

Section –9: Health and Safety Plan, Health and Safety Plan (HASP) provide a general description of the levels of personal protection and safe operating guidelines expected of each employee or subcontractor associated with the environmental services being conducted at the site.

Section –10: Conclusion and Recommendation: Concludes the EIA report with some practical recommendation.

3 DESCRIPTION OF THE PROJECT

3.1 GENERAL

This section deals with project components, which are the part of the collection, transportation and handling of industrial hazardous waste to storage facility and its related activity. It also describes the category of the project, availability of resource, time and cost of the project, construction and operation equipment etc. The information presented in this section is based on project site survey, preliminary design report, and construction drawings..

3.2 TYPE AND CATEGORY OF THE PROJECT

The proposed project envisages the collection, transportation, storage, handling and incineration of industrial hazardous waste at Integrated Waste Management Facility at Sharif Complex Manga Road Link Moza Mal Tehsil Rainwind Road District Lahore in accordance with the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000, SRO # 339 (1)/2000, the project for IWMF falls in Schedule –II, Part-I "Waste Disposal" {Waste disposal and/or storage of hazardous or toxic wastes (including landfill sites, Toxic waste and waste water treatment ponds)} for which Environmental Impact Assessment (EIA) report is required for Environmental Approval.

Therefore, to fulfill the legal requirements of the Section-12 of the Punjab Environment Protection Act (amended 2012), the client is required to submit the EIA report in the Environmental Protection Agency, Government of the Punjab, Lahore to obtain the required Environmental Approval (EA).

3.3 OBJECTIVES OF PROJECT

The objective of the proposed project is to collect, transport, store, handle and incinerate industrial hazardous waste so as to minimize the amounts of waste by recycling, reuse, composting, smelting and incinerating thus reducing the amount of hazardous gaseous emissions to be released into air due to uncontrolled burning of waste thus providing proper solutions for waste incineration and disposal in environmentally sound manner and minimizing the risk for personnel, general public and environment. Various research and development work shall be conducted at site

in order to create awareness in the growing industry of waste management. Project shall focus on the complete and secure handling of hazardous waste through trained and well-equipped staff. Complete training onsite and offsite shall be provided to handle hazardous waste including sludge, nicotine, tobacco, chemicals, metal, glass, e-waste, paint, drums, cans, oil and ash. Trained staff shall be provided with complete set of information for handling, transportation, storage, incineration and ash handling.

3.4 ALTERNATIVES CONSIDERED, AND REASONS FOR THEIR REJECTION

Industries generate large amounts of waste that falls into different categories in which about 55% is general, non-hazardous waste comparable to domestic waste. The remaining 45% is considered hazardous material that may be infectious, toxic or radioactive, which shall be handled properly. Improper handling and disposal of wastes, especially hazardous may lead to significant impacts on human health as well as on environment.

3.4.1 Other Disposal Methods

The primary methods of treatment and disposal of industrial hazardous waste are:

- Incineration
- Composting (organic)
- Soil reclamation (through microbial degradation and addition of multiple waste beneficial for soil)
- Refuse Derive Fuel
- Bio-remediation/Phyto-remediation
- Landfill

3.4.2 A new Site or Contractors should be hired

If the project is not taken up at all then all the funds, efforts and inconvenience shall be saved and these shall become available for diversion to other projects of the proponent. No more land shall be required and no disturbance shall be caused at the proposed site to people through project construction process as the area selected was a paper and board mill previously. Further the recurring

cost of the maintenance of the project along with enhanced operational cost shall be saved.

3.4.3 Project Installation at the Proposed Site

The proposed project of ISP Environmental Solutions Pvt Ltd is an establishment of new incinerator (500 Kg/Hr) at Sharif Complex Manga Road Link Moza Mal Tehsil Rainwind Road District Lahore which has been abandoned almost eight years ago. ISP is emerging in the field of waste minimization in Pakistan and is owned and managed by a team of well experienced professionals and engineers, dealing with all kinds of contracts waste reduction. It has competent and dedicated team of Professionals, Directors, Members and Associates who are well qualified and experienced to undertake any type/magnitude of waste minimization projects. The qualified staff of the company is ever ready to accept new challenges and explore new horizons. The operational facility at Sharif Complex Manga Road Link Moza Mal Tehsil Rainwind Road District Lahore.

3.5 LAND USE

Currently, the land is barren and under no use due to infertility. The project area has a proper sewage drain flowing from the front side. As the site has been under no use for more than two decades and is now been taken on rent by ISP Environmental Solutions Pvt Ltd to develop Integrated Waste Management Facility for the hazardous waste handling and incineration facility.

Site has been chosen because of the growing need of the industry as industrial zones are now being developed in Lahore where no specific site has been provided for hazardous industrial waste as well as incineration of hazardous waste.

3.6 VEGETATION AROUND THE SITE

At present the project site and its vicinity have scattered vegetation but no species of significant ecological importance exist at or near the project site as it is a barren area.

3.7 ACCESS ROAD

The project site is present at Raiwind Road which is easily accessible from project site and condition of road is also good.

3.8 COST AND MAGNITUDE OF OPERATION

The project cost has been estimated about 10 million approximately. The total area of project site is 36,000 . The quantities have been worked out from the design drawings and project feasibility. The rates for cost estimates are based on construction work, contractor cost, and cost of the raw materials with 10% escalation for the year 2026-27. The activities to be carried out within a period of one to two years from the starting date.

3.9 SCHEDULE OF IMPLEMENTATION

It is planned that the following schedule of project implementation shall be adhered to, this is subject to the conditions that everything goes according to planning and no serious bottlenecks are encountered. The implementation stages of the project activity include:

1st Stage: The stage–1 comprises the onsite contouring studies and soil investigations.

2nd Stage: The stage –2 comprises the following task:

i- Lying of foundations excavation and commencement of erection work.

ii- Start of civil, electrical and mechanical work.

iii- Development of basic infrastructure.

iv- Fitting of instrumentation.

3rd Stage: The stage –3 comprises the following task:

i. Equipment erection completion.

ii. Completion of the basic infrastructures water supply system, electricity supply etc.

4thStage: The last stage shall be Commencement of regular operation.

3.10 DESCRIPTION OF THE PROJECT

The proposed project is collection, transportation, handling, storage and incineration of industrial hazardous waste at Integrated Waste Management Facility (IWMF) at Sharif Complex Manga Road Link Moza Mal Tehsil Rainwind Road District Lahore. The capacity of Incinerator is 500Kg per hour whereas IWMF is dependent upon the quantity and quality of the waste generated and received to the vicinity. Whereas industrial hazardous waste handling capacity is 500 tons per day at site. Project shall create a huge bench mark for resolving the waste management issue in a sustainable and practical way. It shall not only create jobs for the locals but product development through technology shall make the project viable.

The ISPES shall collect, handle, transports the municipal solid waste, industrial, hospital waste and Hazardous waste in closed waste collection vehicles to the ISP waste handling and incineration site. The ISPES shall get the waste weighed prior to entry in the premises of the site where all the incoming weighed vehicles shall be recorded.

3.10.1 Sorting Shed

The sorting shed shall be covered with iron sheet roofing, fans and adequate arrangements for the manual labor to work and sort the waste in a comfortable and environment friendly manner. Some specifications have been foreseen for a good implementation of the sorting installation system: enough space, manual sorting installations, screening installation, space to put the containers, possibility to remove the containers by truck or wheeled loader, possibility to feed the input hopper by wheeled loader or crane.

3.10.2 Hazardous Waste Storage Area

This building is closed on one side. The place has been designed to put a double screen and enough space for the residual waste at the end of the screen. There is enough space to remove the sieved compost from under the screen and the remaining

material by mechanical means.

3.10.3 Hazardous Waste Storage Site

Separate ware house is allocated for the storage of hazardous waste which shall be in lock and Key and fully aerated. This site shall be away from main building and admin block with firefighting equipment Trained staff shall be allocated for handling of hazardous waste along with well-equipped safety equipment. Staff shall be trained for emergency situations including firefighting, first aid or any other unforeseen situation.

3.10.4 Incinerator Details

The proposed project of ISP Environmental Solutions Pvt Ltd is collection, transportation, storage and handling of industrial/hazardous waste chemicals, used oil, drums (plastic/metal), batteries, e-waste, sludge, ash, tobacco, nicotine, tanneries and textile waste & organic waste, health care waste and installation of incinerator (500 Kg/Hr). Thermal oxidation through incinerator is one of the proven technologies for destruction of hazardous waste in all the forms i.e. solid / semi solid / liquid and gaseous, based on the feeding system, so as to render them innocuous in the form of non-toxic and non-hazardous residues. ISPES is emerging in the field of waste minimization in Pakistan and is owned and managed by a team of well experienced professionals and engineers, dealing with all kinds of contracts waste reduction. It has competent and dedicated team of Professionals, Directors, Members and Associates who are well qualified and experienced to undertake any type/magnitude of waste minimization projects. The qualified staff of the company is ever ready to accept new challenges and explore new horizons. The proposed facility is located Sharif Complex Manga Road Link Moza Mal Tehsil Rainwind Road District Lahore .

500 Kg per Hr incinerator shall be gas operated along with alternate fuels. The gas temperature in these incinerators reaches 1200+50 ^{O}C rapidly and is maintained until the end of the main burn cycle. The operating temperature of primary chamber is 600-850°C and for secondary chamber it is 850-1200±50°C. The system will be operated on Oil, Natural gas or LPG. The system also includes a cooling box, scrubber and induced draft fan. Dry Scrubber is included for cleaner emissions and legislation compliance. This, along with highly efficient automatic burners and timer controls are in accordance with international standards and ensures cleaner emissions during operations.

Sr No	Items with Specifications	Qty	Unit Price FOR	Total Price FOR
01	**MEDICAL INCINERATOR** **Model: Imported** **Manufacturer: GHE** **Country of Origin: Pakistan** **BURNING CAPACITY:** Continuous interval feeding with burning capacity of **500** Kg/Hour. **CONSTRUCTION:** • Rectangular shape dual chamber construction with frontloading door for manual waste feeding. • The steel sheet is 8-10 mm thick, externally painted withheat resistant paint. 0 • The internal surface of the incinerator is lined with non-cracking refractory bricks to withstand a temperature more than 1400^0C followed by thermal insulation. The lining thickness is 221 mm. SS for chimney. • The temperature of the outer surface remains below than 60^0C after operation of several hours. • Calorific value of the feeding waste: 3500 – 4000 kcal/kg. **PRIMARY CHAMBER (COMBUSTION):** • Rectangular shape Primary chamber is suitable for Pyrolytic combustion mechanism with the volume of 1.2m^3. • Having doors for waste feeding and ash removal. The sizeof the feeding door is large enough to feed the waste easily. • Blower centrifugal fan(s) are provided to inject air to burnthe waste and gases in combustion chamber. • Automatic electronically controlled air distribution andregulation systems are	01		

	provided. • The temperature remains more than 800°C during process. • Electrically controlled operated Natural Gas/LPGBurners. • Thermocouples to monitor the temperature of the primarychamber are installed. **SECONDARY CHAMBER (POST COMBUSTION):** • The post combustion chamber for flue gases with retention time of 2.0 seconds to burn further for ensuringsmokeless exhaust emissions is available. • Volume of secondary chamber is according to our designin rectangular shape. • Blower centrifugal fan(s) are provided to inject high pressure air to burn the waste and gases in post combustion chamber for ensuring proper burning of gasesbefore exhaust. These fans have an automatic servo controlled system for proper pumping of air according to the requirements.			

Sr No	Items with Specifications	Qty	Unit Price FOR	Total Price FOR
	• Automatic electronically controlled air distribution andregulation system is provided. • The temperature remains more than 1000^{0}C in secondary chamber during process for the complete oxidation of fluegasses. • Oxygen content of emitted gas is around 12 %. • Electrically controlled natural operated gas burner. • One Thermocouple to monitor the temperature of thesecondary chamber is available. **BURNERS:** • Single gas Operation Time i.e. Natural Gas. • Combustion and post combustion chambers with electrically operated burners suitable for natural gas. • Regulated automatically for controlling temperatureinside the chamber. • Automatic closing of burners with opening of respectivechamber's door is available. • Electrical safeties to prevent startup of burner unless itsshutter is fully opened. • Closure of burner's shutter on its switching off isavailable. • Protection from radiant fire bed. • Five burners for ensuring proper burning of waste andgases.			

	• Electrical power requirement 220V, 50Hz single phase.			
	Optional			
	FEEDING SYSTEM: • Semi-automatic; hydraulic, electro-mechanical system forcontinues side feeding system at regular interval is provided. The person/operator will not be exposed to direct heat. The system will be controlled through controlpanel.			
09	**CHIMNEY:** • Circular Stainless Steel self-supported flanged sections chimney with height 09 meters lined with manufacturesown design. • Proper port for taking sample of exhaust gases to monitoremission levels as per international standards provided with a cover to be opened and closed when necessary without affecting the chimney's function. The samplingport is in proper direction for easy usage. • The Minimum Exit velocity of the emission is around 12meters/Second.			

	GAS WASHER/ SCRUBBER • Stainless Steel integrated pass through type gas washingsystem with water sprayer for gas cleaning/washing is provided and will be attached with the incinerator plant. • Water saving system with re-circulating system andcooling tower. **WATER TREATMENT:** Water treatment unit to treat the water used for gas washing before opening it into main drain having settling tank (SS), to be operated manually is provided with unit.			
	CONTROLS: • Microcontroller based control box with hinged sealed door. • Pre-installed control circuitry should be rugged enough to withstand the temperature effect of the incinerator. • It should house the ignition burner timer, feed interval timer, shut down timer post combustion chamber temperature controller, and controls for burner, blower fans, gas washer etc. • Digital display of temperature and set timing parameters. • The control panel will be fitted with a functional synoptic view showing the operating situation of the whole installation • Emergency Shutdown button for shutting it off in case of emergency at appropriate site. • Electrical requirements 220V, 50Hz.			
	EMMISSION STANDARDS: Smokeless emission for at-least 99% running time is ensured. Combustion efficiency will be 99 %. The flue gases will remain within the limits of National Environment Quality Standard are ensured.			
	POWER REQUIREMENT: Three Phase operation 440, 50Hz.			

	ALARMS: **Audible and Visible Alarms available for any warning like temperature fall or in any fault.**			
	Siting: 1. The proposed siting requirements will address the impact of the facility on ambient air quality, visibility, soils, vegetation and other factors that may be relevant in determining that the benefits of the proposed facility significantly outweigh the environmental and social costs imposed as a result of its location and construction. 2. The incinerator will be sited in accordance with the topography and be compatible with premises in the neighborhood. 3. The proposed site will be duly approved by the competent Authority. 4. The incinerator will be housed in a suitable ventilated enclosure.			

3.10.5 Admin Block

In addition to the above facilities, there shall be an office block with all the facilities for the office staff. The office facility includes a small scale laboratory, toilets, kitchen facilities, and a prayers room for the labor. Sufficient space has been ear marked for parking of cars, motorcycles and bi-cycles of workers in front of the main gate.

3.10.6 Laboratory

Onsite laboratory shall be developed to conduct various tests on the windrows as required by SOPs, environment management plan and emission reduction monitoring plan.

3.11 RESTORATION/REHABILITATION AT THE END OF PROJECT LIFE

There shall be no any matter of rehabilitation as the proposed site is already rented by the project proponent. There shall not be any safety factors as applicable from time to time for such structures on all accounts. During entire construction period, necessary precautions shall be taken to ensure that no

damage is done to the ground water quality, basic infrastructures like sewer system, power transmission lines roads, private or public property and daily human life as well. Safety measures shall be adopted to avoid any harm to humans, property around, or the environment in the project area. Dust to be generated shall be minimized by constant sprinkling of water. After completion; all construction matrix, debris and garbage shall be removed off immediately from the site within the minimum possible time under safe conditions. Any minor spillover of these materials shall be cleared adequately. The land, if and where pitted shall be adequately leveled. On the whole, the project site and the area in its near vicinity shall be made neat and clean.

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4 DESCRIPTION OF ENVIRONMENT

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

4.1 PHYSICAL ENVIRONMENT/RESOURCES

The Sundar Industrial Estate has sole objective to develop and accelerate industrial pace with the establishment of heavy and large scale industries including paper, seed, leather, steel, stainless steel, chemical, pharmaceutical, rice, stone and marble grinding, textile, poultry and animal feed, flour, soap and many other industries. According to a few studies ceramics, steel, leather, textile, Pharmaceuticals, fertilizer are few of those major industries that are reason for the water pollution

4.2 GEOLOGY

Lahore is metropolitan city of Punjab province located at 31°17'30.0"N 74°09'30.1"E. Average elevation above sea level is 236 m; annual rainfall is 635 mm and most occurs in June to August.

4.3 SOILS

Soils form major relation with environment. They influence environment by their special qualities and more so through fertility. Soil should not be taken as a lifeless residual layer but it is a very dynamic element of environment in which very complicated physical, chemical and biological activities are constantly proceeding. In this way it is a dynamically changing and developing body. Soil scientists restrict the word soil or solum merely to the surface material, which has come to have distinct layers or horizon over the extended period of time. Soils have different meanings for different people. To a soil scientist it means the upper a few layers created through weather effect in which plants are grown .The solid portion of soil is both organic and inorganic. The organic part consists of both living and decayed plant and animal materials. The soils of the project area are fertile and rich in both organic and inorganic mass. However, due to replacement of the use of cow dung as organic manure, the soils are now suffering from depletion of humic acid and trace nutrients. Resultantly, the crop yield is on the decline.

4.4 METEOROLOGY

Pakistan extends from 240N to about 370 N with its western border lies close to 620 E, north eastern border extends to about 74/120 E and lies on the western margin of one of the major climatic regions of the world. Therefore, her climate is more continental. Reversal of wind system and variable character of monsoon are quite complex. A major part of Pakistan is dominated by dry climate; temperature and amount of rain fall determine type of natural vegetation in any area. These physical features have great bearing on climatology of the area like the entire country; the project area has also four seasons distinctly:

Cold weather season – December to March
Hot weather season – April to June
Monsoon season – June to September

Post Monsoon season – October and November

The mean monthly temperature of the Lahore district area (the project site) experiences the mean monthly temperature 26.80oC (minimum) and 41.0oC (maximum) during hottest month while mean monthly minimum temperature is registered to be 5.10oC and maximum temperature is 19.30oC during the coldest month. The area under reference falls in the tropical arid or desert climate region.

Table 3.1: Showing: Month-wise Mean Temperatures, Precipitation and Relative Humidity:

Month	Mean Temperature ^{o}C		Precipitation (millimeters)	Relative Humidity (%)
	Maximum	Minimum		
January	19.7	5.0	33.8	66.2
February	21.6	7.7	50.0	60.2
March	26.6	12.5	60.5	53.8
April	33.0	17.7	36.5	41.9
May	38.1	22.0	31.8	32.5
June	40.5	25.8	51.9	37.2
July	35.7	25.8	23.3	62.3
August	34.4	25.3	22.2	70.8
September	35.0	23.0	77.7	65.5
October	33.1	16.6	12.2	55.6
November	27.6	9.9	9.9	62.9
December	21.5	5.7	30.4	68.9
Annual Mean	**30.6**	**16.4**	**36.6**	**56.4**

(Source: Processing Centre, Pakistan Meteorological Department)

With the arrival of summer the area becomes heated and low pressure area is created. In the month of July atmospheric pressure rise 996.0 mili-bars in the area under reference. The major sources of the rain fall in the area include the Monsoon Rainfall (July, August & September), Western Depression Rainfall by western depressions and Thunderstorms Rainfalls (spring & autumn rainfall). The area receives 250 – 500 mm mean annual rainfall. The rainfall during July to December is registered between 200 – 400 mm and during December to March 50 – 100 mm.

4.5 LAND USE

Area around the project site is under agriculture use up to over large distances. A few small scale industries, including cotton yarn manufacturing, exist near the project site. The future trend is showing industrialization as encouraged by the Government also.

The land capability map of Punjab showing the Proposed Project Area is presented in Figure – 3.4. Environmental monitoring of site

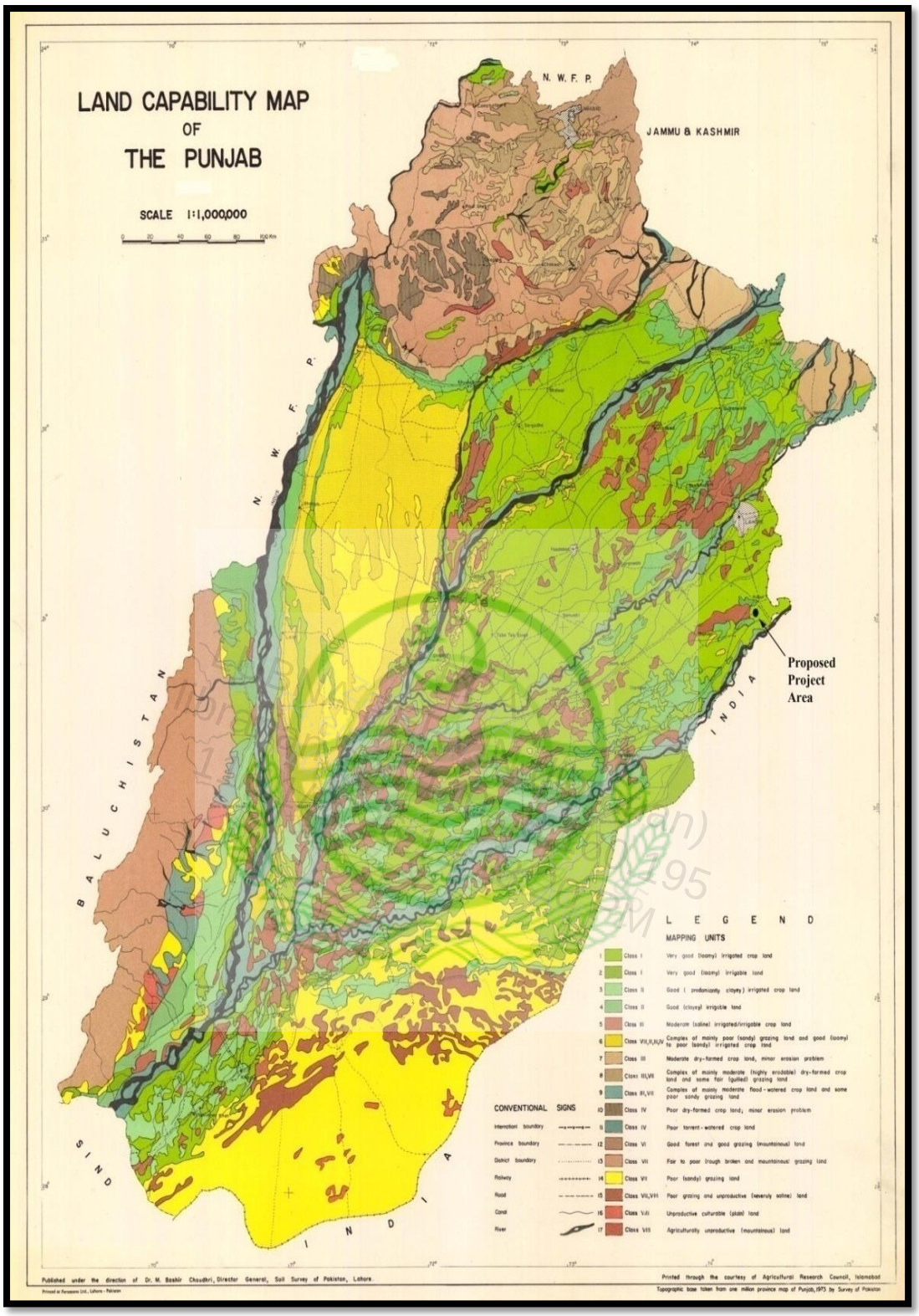

Figure – 3.4 land capability map of Punjab

4.6 AMBIENT/BASELINE ENVIRONMENT QUALITY

In order to assess the existing status of the environment regarding the project site, environmental monitoring was carried out on the project site area. The Environmental Monitored Baseline data are presented hereunder:

Table 3.2: Ambient Gaseous Monitored Data from Project Site

Reference Point	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	CO (mg/m^3)
Main Road	49.9	32.4	0.37
North Side of the Project	35.4	35.0	0.12
South Side of the Project	38.4	53.6	0.42
East Side of the Project	27.4	42.5	0.18
PEQS Limiting Values	**120.0**	**80.0**	**10.00**

Table 3.3: Ambient Particulate Matter Monitored Data from Site

Reference Point	Ambiant Particulate Matter ($\mu g/m^3$)
Main Road	66.3
North Side of the Project	45.9
South Side of the Project	63.9
East Side of the Project	62.4
Main Gate	75.2
PEQS Limiting Values	**550.0**

4.7 ECOLOGICAL RESOURCES

4.7.1 Biodiversity

Mainly a country's wilderness areas and scenic landscapes with their associated flora and fauna form natural capital of a country. Both collectively and within each level, the range or variety of the resources is referred to as the "Biological Diversity". The contribution of the "Natural capital" is recognized at three distinct levels including genera, species, and community -habitat and ecosystem.

Pakistan comprises of a total of nine major ecological zones and the term has relevance for each of Pakistan's administrative units—district, province, and particularly country. The greater the number of genera, species and habitats and ecosystems present within these units, the greater is the Biodiversity. It is in this background that the biodiversity of the area is discussed below:

4.7.2 Forestry

The area around the project site is all under industrial use. There is no forest of any type. Hiran Minar is situated at a distance of more than 63 kilometers from the site.

4.7.3 Wildlife

There is no wildlife of special mention in the project area because of serious shortage of water in its required form and non-availability of adequate habitat especially associated with large scale human interventions due to agricultural activities. However, on very limited scale the following birds and animals are founded here and there like in all over Punjab Province:

- Jackals
- Lizards

- Rats

Snakes

- Pigeons

Sparrows

- Crows

4.7.4 Fisheries and Aquatic Biology

There are no worth mentioning sources of fishery in the form of fresh water fishery or fishing ponds or else. The river Sutlej, entering Pakistan a few Kilometers away from the project site, carries virtually no water because of its entire consumption by India under the Indus Water Basin Treaty. There is not any water body worth reference where fish or aquatic life could be found.

4.8 NATURAL EVENTS HISTORY (EARTHQUAKES, FLOODS, VOLCANIC ERUPTIONS etc).

4.8.1 Earthquakes

As mentioned earlier under the heading "Seismicity," the project area falls in the category "minor to moderate damage, g factor: 0.03 to 0.8". There is no recorded history of any worth mentioning earthquake.

4.8.2 Floods

The area is neither listed in flood affected zones of Pakistan, nor has any flood worth mentioning been experienced. However, low intensity floods have been experienced only after very heavy rains.

4.8.3 Fires

There is no history of any worth mentioning fires in and around the project area and over long distances. There is no source of initiating fires in the area.

4.8.4 Storms

The area has no recorded history of any storm in the real sense.

4.8.5 Volcanic eruptions

There is no source of volcanic eruptions.

4.9 PUBLIC CONSULTATIONS/ DISCLOSURE

Public Consultations (PCs)/Public Disclosure (PD) were carried out through visits to the villages falling in the Project Influence area.

A fairly large number of people from each village were involved during PCs/PD. These people belong to political circles, religious leaders, educationists, counselors (members of the Local Self Government), headmen of the villages (representative of Government), small land holders, tenants, farmers, and landlords. Students, teachers, retired Government servants, heads/chiefs of various bradaries (castes), reformers (like NGOs) and general masses. In each village meeting, participants were fully apprised of the details of the project. After this, question/answer session was started. Replies to the questions by the participants were given by the team members and moderator.

4.10 SOCIO-ECONOMIC BASELINE CONDITIONS

4.10.1 General

This part deals with socio-economic and cultural aspects of the people living in the villages in the area of the project influence. It covers social set up, culture, basic facilities, income, employment, education, health, women status, traditions, archaeological, historical heritage etc. prevailing in the targeted villages.

4.10.2 Overview of the existing status of the people

Main topographic Characteristics, socio-cultural practices, socio-economic indicators, and environmental settings of these villages are virtually similar.

From caste point of view, overwhelming majority of the people come from Mewat Baradari (caste) followed by Kamboh and Jat Baradaries. Religiously, majority of them are Muslims. Joint family system is predominant. The people are basically conservative. Social cohesiveness, solidarity, religious and political harmony are the salient features of the people in these villages. Agriculture is the major profession, while some people are engaged in livestock holdings. Largely, land holdings are small and standalone cannot support life system. However, a small number of the people have big land holdings. These landlords dominate most of the population regarding politics, community decision making or else. Unemployment, low quality of life and poor health situation are prevailing. Primary level educational facilities for both boys and girls are available in almost all villages. Water for domestic use and electricity are available in all the villages. However, availability of roads and the transport are falling short of requirement. Therefore, people face many problems while traveling from one place to another. Medical and recreational facilities are either not available or they are substandard in quality. The people visit Lahore city to fetch most of their necessities and for complicated medical treatment. A large majority of the females of the villages have traditional status of a conservative society. Low literacy rate, insignificant participation in decision making, remote opportunities for earnings are the salient features prevailing among the women. Some women work in fields to supplement the income of their families. It is a male dominant society. Even under such non-conducive environment, females of the area are playing a very important and central role to maintain the whole socio-economic activities of their families.

4.10.3 Income and Employment

Agriculture, live stock holdings and labor are the main professions and sources of income of the people. People of the area have very low-income level. Therefore, majority of the people are engaged in a number of other professions to supplement their income. About 70% of the people depend on agriculture and livestock rearing and work as labor in factories in and around Manga Road.

4.10.4 Basic facilities availability

Basic facilities like water and electricity are virtually available to almost 100% of the people. Telephone faculty, in the form of mobile phone due to extensive network, is available to about every third person. Roads and transport are still lacking behind the requirements. Civic amenities like sewerage and market are not available in the majority of the villages.

4.10.5 Education

Educational facilities at primary level are available in almost 6 villages; while the rest of the area is deprived of any type of educational facility. For high school and college

level education people have to go to city. It represents an alarming situation of the area regarding educational facilities.

4.10.6 Medical facilities

Health facilities are virtually non-existent for both male and female population. A private physician is available in only two of the villages. People have strong belief in quacks. Virtually, 100% of the population of these villages is devoid of any worth mentioning health facility. This depicts an alarming situation regarding the health facilities in Study Area.

4.10.7 Recreational facilities

Organized recreational facilities are absent in all the villages under reference of this project. Mela (village fair) is the only activity that the people and the youth of the area enjoy. Open and level field of the village is usually used as a playground for various games especially cricket. Kabaddi (a local sport) and wrestling indigenous style are the other games.

4.10.8 Causes of rural to urban migration

Large percentages, about 65%, of the people have migrated to other areas in search of employment, and education. These are the significant factors for the migration. A significant number of young male populations have migrated from the villages to the urban areas of Lahore and Lahore to seek better prospects of income generation.

4.10.9 Status of conflicts

Religious, ethnic or tribal conflicts do not exist among the people of the Study Area. Negligible political differences are observed in a few villages. Religious and ethnic harmony among the people of the whole Study Area is salient feature.

4.10.10 Cultural and social status

The people are conservative in their life style. They practice their traditional social and cultural and moral values strictly in all walks of life. Marriages are arranged and they are very successful. Free mixing of male and female is not liked. This tendency shows that the people are "Change Resistant" in their behavior.

4.10.11 Family system

Joint family system (about 99%) is generally prevailing among the people of the whole of the Study Area.

4.10.12 Ethnic status

A majority (about 48%) of the people belong to the MewatBiradri, followed by Kumbho and Arian (about 16%). This shows social cohesiveness, solidarity, tolerance and harmony among the people of the study area. All people from various bradaries live in complete harmony without any distinction of caste.

4.10.13 Average size of land holdings

Majority of the people of all the villages have small land holdings ranging between 1 to 5 acres (0.5 to 2.0 hectares) which cannot support the livelihood of the people. Low income and insufficient resources indicate the poverty status of the people.

4.10.14 Status of women literacy and role in decision making

A vast majority (about 90%) of the females of the Study Area are illiterate. Virtually 100% of the females have no say in decision-making process. This is true of all villages

in Pakistan. Rather, elders have an edge even over youngsters in decision making and it is liked. Role of female is conventional and traditional i.e. almost all the females do housekeeping, some work in fields and are involved in animal rearing.

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5 SCREENING OF ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

5.1 GENERAL

This section identifies the potential impacts; related with design, construction and operation of the project on the physical, ecological and socio-economic domains of the environment.

Accordingly, mitigation measures have also been proposed to manage the environment and for sustainable development.

Strict environmental management shall be observed during the project construction and regular operation phases. Legal requirements of the PEPA and the NEQS Pakistan shall the rating standard for the activities. Compliance with the EMP and EM_TP, as per recommendations in this EIA report shall be adhered to with full spirit.

The project proponent is filing with the EPA Punjab, written Affidavit and Undertaking on judicial papers, that the project throughout its life shall operate under Environmental Management Order. Under these conditions the project at its all stages including from construction to regular operation shall go in compliance with the NEQS. The project activities shall neither adversely affect the population nor the environment around the project site as it is already an industrial zone.

5.2 ENVIRONMENTAL PROBLEMS DUE TO INSTALLATION AT PRESENT LOCATION OF PROJECT

Environmental problems related to location of the project are mostly in the areas of physical setting, socioeconomic setting, ecological setting and special areas. Field survey revealed that the impacts of the project due to its location are mostly insignificant in nature.

5.3 PROJECT DESIGN RELATED ENVIRONMENTAL PROBLEMS

The design of IWMF facility has sought to minimize any environmental potential impacts by ensuring that the project should be in according to the environmental standards. Local aesthetic value is another issue to be considered during project design.

5.4 ENVIRONMENTAL PROBLEMS ASSOCIATED WITH CONSTRUCTION

The construction shall also sometimes go round the clock, therefore, during all construction activities the followings shall be the major pollutants/wastes or project related pollution aspects:

Table - 4.1: Project Impacts Associated with Construction

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
Dust emissions likely to occur during the excavation of the top soil and loading and transportation of the construction waste.	Minor/Short Term	- Watering all active construction areas when necessary. - Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard. Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites. - Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites. - Fast growing trees shall be planted around the project area to act as a wind breaker to reduce the particulate matter. - Provision of PPEs to workers
Hydrology and water quality degradation due to Storm water runoff from the site and excavation.	Minor/Short Term	- Installation of septic tank. - The proponent shall prepare a hazardous substance control systems and emergency response plans that shall include preparations for quick and safe cleanup of accidental

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Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		spills.
Oil spills from machines to be used on site and vehicles.	Minor/Short Term	-The contractor shall control the dangers of oil spills during construction by maintaining the machinery in specific areas designed for this purpose hence shall not be a serious impact as a result of the construction.
Noise pollution due to the moving machines (mixers, tippers, communicating workers) and incoming vehicles	Minor/Short Term	- Install portable barriers to shield compressors and other small stationary equipment where necessary. - Use quiet equipment (i.e. equipment designed with noise control elements). Install sound barriers for pile driving activity. - Limit pickup trucks and other small equipment, observe a common sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible.
Workers accidents and hazards during construction.	Minor/Long Term but reversible	- Provision of appropriate and adequate Personal Protective Equipment (PPE) to employees. - Enforcement and proper use of PPE by all construction workers. - Provision of appropriate tools, equipment and machinery in sound working conditions to employees. - Proper arrangement of lighting to reduce accidents. - Development of clear policies

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Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		on treatment of injured personnel.

5.5 ENVIRONMENTAL PROBLEMS RESULTING FROM PROJECT OPERATION

Environmental problems relating to operation phase are insignificant, which are given in **Table - 4.2**.

Table - 4.2: Project Impacts Associated with Operation

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
Waste Water	Moderate/Long Term	Wastewater shall be treated through wastewater treatment plant. Discharge effluents should meet the effluent standards as per PEQs and shall reused in the process.
Air and Noise pollution	Minor/Long Term	Proper maintenance of facility equipment and machinery. Scrubbers shall be installed for air emissions.
Solid waste generation	Minor/Long Term	The waste shall be the ashes which shall be disposed off in environmentally sustainable manner after proper testing.
Occupational accidents and hazards	Minor/Long Term	- Proper PPEs shall be provided to workers and strictly advised for their usage. - Necessary health and safety rules shall be enforced by the management to ensure that all staff members adhere to these standards and are thus safe. - First Aid kits shall be

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		provided and staff members trained in first aid administration.

5.6 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

As described above the worth mentioning wastes shall be sewage and solid waste in the plant in the form of ashes. In order to enhance environment the following measures shall be adopted:

(a) Solid waste & effluent management

Solid wastes are likely to consist of ashes and organic waste from foodstuffs eaten by employees. The proponent shall address all waste in the following ways:

- Rain water disposal shall be done through adequate system to be provided at all levels of the project building.
- Sewage shall be discharged to the main sewerage system; after its treatment through septic tank and also getting the permission from the competent authority.
- Industrial Waste Water shall undergoes WWT system
- Sale of recyclables and reusable materials to minimize waste for disposal.
- Establishing a waste generation and collection register for tracking the disposal of waste.
- All hazardous chemicals shall be stored in original containers for ease of identification and handling.
- Hazardous solid waste of industries and hospital shall incinerate
- Information on use and handling of hazardous substances from the manufacturer's hazard data sheets shall be obtained and communicated to concerned workers.
- Appropriate PPE shall be provided, and usage at all times ensured, to the workers handling hazardous substances.
- An inventory register shall be kept and updated as appropriate.

(b) Fire Hazards/ explosions mitigation

The risk of fire and explosions emerged to be of paramount concern to the neighbors of the proposed project. The following measures shall be put in place to reduce the likelihood of fires and explosions and to considerably manage such situations in case of occurrence;

- Fire extinguishers, fire hydrants and fire alarms shall be provided at convenient locations within the facility. These shall be regularly inspected and maintained by a reputable fire security company.
- Fire drills shall be conducted at least biannually to ensure that workers are conversant with the action to take in the event of fire or explosions.
- Fire awareness materials shall be placed in strategic locations within the facility to educate the workers and customers on what to do in the event of fire.
- An elaborate emergency response plan shall be developed to address the risks associated with the facility's operations.
- Leak detection devices shall also be installed at appropriate areas to warn on leakages that are likely to trigger fires. Workers shall be trained on handling accidental spillage of flammable substances that may also trigger fires.
- No smoking signs shall be displayed as appropriate and measures taken against those not adhering to this order.

(c) Health and safety

- PPEs shall be provided at all stages of project cycle to all workers and it shall be ensured they use them at all time.
- A policy on health and safety at the workplace shall be developed.
- All the employees shall be trained on safety and health.
- A health and safety audit shall be conducted annually as required by the occupational health and safety department.

- PPES for Hazardous waste collection and disposal :

1. Hazmat body suit (Dupont Tychem 6000)
2. Respirex Hazmax Boots (Chemically resistant certified to EN 13832-3)
3. Dupont Gloves (Dupont NP570 CT)
4. 3M Half face masks (Model: 3M 2135)
5. Safety Goggles (3M/2890)



Well-equipped waste hazardous waste collection vehicle



Fully equipped human resource for hazardous waste collection

6 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

This EMP describes the mitigation and management measures to address the environmental issues during construction, its regular operation and decommissioning phases of the proposed project.

6.1 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The objectives of the EMP are as follow:

- To outline functions and responsibilities of responsible persons.
- To state standards and guidelines, which are required to be achieved in term of environmental legislation.
- To outline mitigation measures and environmental specifications which are required to be implementation for all phase of the project in order to minimize the extant of environmental impacts and to manage environmental impact associated with the proposed project.
- To prevent long term or permanent environmental degradation
- To identify training requirement at various levels.

6.2 INSTITUTIONAL CAPACITY

Project Proponent shall be responsible for Monitoring and Evaluation, but Environment Team (of the proponent) shall responsible to monitor EMP implementation in the field and reporting to the Project Proponent. The Project Proponent shall integrate monitoring reports in the main monthly reports of the project. The Environment Specialist of Supervision Consultant shall carry out a final evaluation at the end of the Project. In addition, for external monitoring, proponent is to engage an independent agency (an NGO, an academic institute or an individual consultant) to conduct 3rd party validation of EMP implementation. District Office of the EPA at the project area shall monitor the overall activity at the site.

6.3 TRAINING SCHEDULE

In order to effectively operate the EMP all the staff to be engaged in this activity should be trained extensively.

The person to handle waste including hazardous, non-hazardous shall be extensively trained to handle his job capably. Training program should include use of monitoring instruments, data generation, processing, interpretation,

recording and presentation. Training of the workers should be done on quarterly basis.

6.4 EQUIPMENT MAINTENANCE DETAILS

The storage facility shall have a sizeable inventory of equipment that shall be purchased from specialized vendors (ATI, France).

6.5 ENVIRONMENTAL BUDGET

The total cost for the environmental management is estimated as 2.5 million Pak Rupees both during construction and its regular operation. The estimations are as followings;

Table - 5.1: Environment Management Cost

Environmental Component	Quantity	Amount PKR
(i) Tree Plantation	800	400,000.0
(ii) Health and Safety Measures and Provision of PPEs	L.S.	300,000.0
(iii) Air and Water Quality & Noise Monitoring	L.S.	200,000.0
(iv) Environmental Trainings	L.S	100,000.0
Total Environmental Management and Monitoring Cost		**1,000,000.0**

6.6 ENVIRONMENTAL MANAGEMENT PLAN

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

6.6.1 Construction Phase

This section of EMP provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within the construction phase are specified. These specifications shall form part of the contract documentation and therefore, the contractor shall be required to comply with the specifications to the satisfaction of the project Manager and Environmental Control Officer, in terms of the construction contract.

6.6.2 Operation and Mitigation Phase

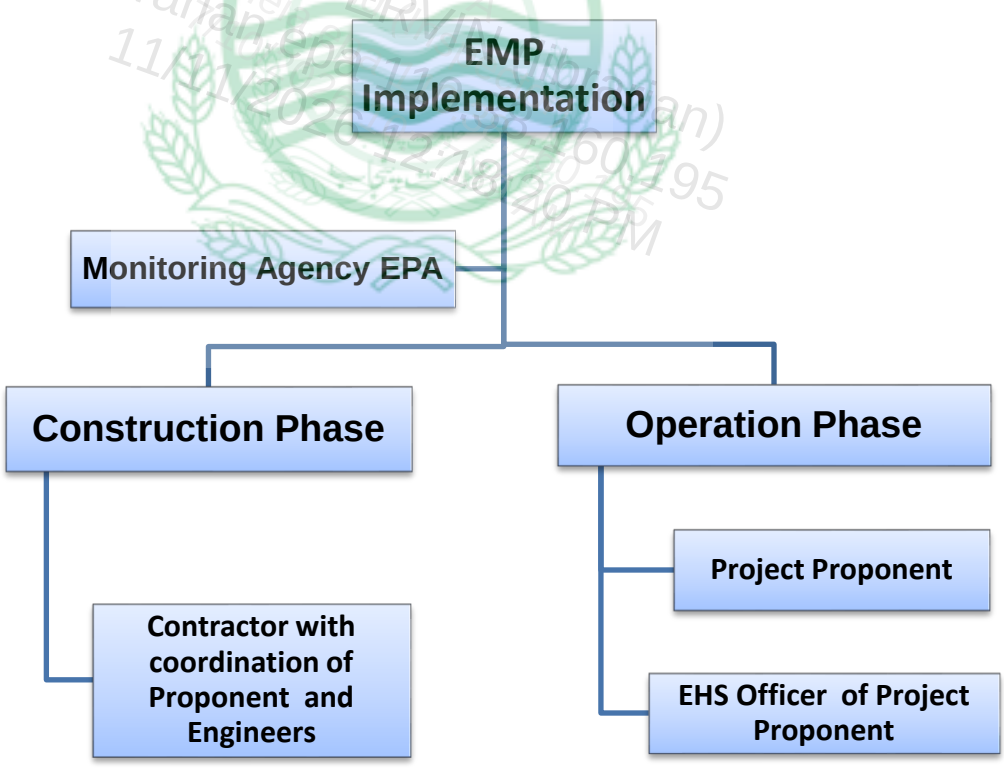
This section of EMP provides management principles for the operation and maintenance phase of the project. Environmental actions, procedure and responsibilities are required from proponent within the operation and maintenance phase are satisfied.

6.6.3 Decommissioning Phase

This section includes principles for the decommissioning phase of the project. This section of the EMP shall be required to be revised and updated at the time of decommissioning.

The EMP is a dynamic document which shall be updated as required on a continuous basis. Any amendments made, must be submitted to both the Environmental Officer and Project/Plant Manager for approval prior to implementation.

6.6.4 Organogram for implementation Environmental Management Plan (EMP)



Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	**Supervision**	**Monitoring**
ENVIRONMENTAL MANAGEMENT PLAN						
Construction Phase						
1.	**Air Quality**	– Compliance with prescribed NEQs to control air pollution	– Necessary measures like sprinkling of water on regular basis especially during dry climatic conditions should be taken to limit pollution from dust and other windblown materials. – Periodic maintenance and management of all the construction machinery and vehicles – Waste burning shall not be allowed.	During Construction Phase by Contractor with coordination of Proponent staff	Engineers & Supervision Consultants	Proponent/ EPA
2.	**Water Quality**	– Control of groundwater or surface water pollution from construction activities	– Use of spill prevention trays and impermeable sheets to avoid contamination of the groundwater/surface water – Furthermore, septic tanks shall need to be constructed which	During Construction Phase by Contractor with coordination of Proponent staff	Engineers & Supervision Consultants	Proponent/ EPA

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	**Supervision**	**Monitoring**
			shall be cemented to prevent the groundwater contamination – Proper disposal of waste material on dumping sites to avoid leachate generation and contamination of groundwater/surface water – Prohibit illegal dumping of waste – The contractor shall repair / replace / compensate for any damages caused by the Construction activities to the drinking water source/s.			
3.	**Waste**	– Proper & safe handling and disposal of construction related waste – Compliance with applicable waste	– Ensure prevention of inappropriate disposal of waste material. – Conduct separate collection of construction and domestic waste to promote recycling and re-use. – Dispose non-recyclable and hazardous waste material	During Construction Phase by Contractor with coordination of Proponent staff	Engineers & Supervision Consultant	Proponent/ EPA

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	**Supervision**	**Monitoring**
		management rules for hazardous and non-hazardous waste disposal – Implementation of waste management plan	properly according to waste management rules – Proper disposal of waste on agreed site as per agreed method. The area to be leveled and contoured after disposing excess material. No waste or debris shall be thrown in the nearest canal water or other water bodies – Contractor shall prepare waste management plan related to construction activities; get its approval from site engineer and ensure its full implementation.			
4.	**Noise**	– Compliance with prescribed NEQs to control Noise pollution	– The contractor shall strictly follow the NEQS for ambient noise – Control noise through control of working hours and selection of less noisy equipment. – Prohibit use of pressure horns	During Construction Phase by Contractor with coordination of Proponent staff	Supervision Consultant	Proponent/ EPA

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	**Supervision**	**Monitoring**
			– Provision of acoustic enclosures (hood and shrouds) on generator – Proper maintenance of vehicles and construction equipment. – Minimize/avoid unnecessary use of pneumatic drills and other noisy machinery – The personal protective equipment (PPE) shall be provided to the construction workers and its usage shall be made mandatory			
5.	Materials Management	– Safe and secure environment for construction workers	– Stockpiles shall not be situated such that they obstruct natural water pathways – Stockpiles shall not exceed 2m in height unless permitted by Concerned Engineer on site – If stockpiles are exposed to windy conditions or heavy rain, they	During Construction Phase by Contractor with coordination of Proponent staff	Supervision Consultant	Proponent/ EPA

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	**Supervision**	**Monitoring**
			shall be covered either depending on the duration of the project. Stockpiles may further be protected by the construction of low brick walls around their bases – All substances required for vehicle/ machinery maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site – Hazardous substances / materials are to be transported in sealed containers or bags – Spraying of insecticide shall not take place under windy conditions			
6.	Workers Health & Safety	– Prevention of any possibility of work site accident /impact on	– Provision of Personal Protective Equipment to the workers – Provision of first aid box at work site to cope with emergency situation	Contractor	Engineer & Supervision Consultant	Proponent/ EPA

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	**Supervision**	**Monitoring**
		worker's health	– Safety training to the workers – Safe driving training to the drivers – Adequate safety signs on site – Provide training regarding proper handling and use of chemicals/ paints – Install fire extinguishers at fire handling places – Inspect and ensure that any lifting devices, such as cranes, are appropriate for expected loads – Any loss of public/ private property shall be compensated by the contractor – Regular checks should be carried out to ensure a contractor's is following safe working procedures and practices.			
7.	Socio-economic	– Prevention of conflicts among	– Contractor's activities and movement of staff to be restricted	Contractor with coordination of	Supervision	Proponent/

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	Supervision	Monitoring
	Impacts	locals and make the project socially acceptable – Empowerment of locals to possible extent – Increase in employment and business opportunities for locals.	to designated construction areas – The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous all the time – Lighting on the construction site shall be pointed downwards and away from oncoming traffic. – The site must be kept clean to minimize the visual impact of site – Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors – Noisy activities must be restricted to the times given in the Project Specification or General Conditions of contract – The Contractor are responsible	proponent staff	Engineer	EPA

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	Supervision	Monitoring
			for ongoing communication with those people that are interested in / affected by the projects – Employ local residents as much as possible – Promote communication between external workers and local people (e.g. join local events).			
8.	Clearance of site from extra / surplus material and construction equipment	– Restoration of site to a similar condition prior to the commencement of the work or to a condition agreed with the project management and landscaping of the site	– Timely removal of waste from the site to avoid congestion at work place. – Construction waste should be collected and disposed separately from other waste. – Care shall be taken during handling and disposal of waste. – Contaminated soil (if generated) due to accidental spills shall be removed and transported to suitable site for disposal. – Avoid mixing of hazardous waste	Contractor	Supervision Engineers	Proponent/ EPA

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	**Supervision**	**Monitoring**
			with non-hazardous waste. – Safe transportation of construction equipment from the site. – The contractor must ensures that all structure, equipment, materials and facilities used or created on site for/or during construction activities are removed. – Empty/available space shall be covered with grassy lawns. – Use of native vegetation as a part of landscape. Ornamental plant species like roses, jasmine, and seasonal flowers can be used in proposed landscaping, which is a common practice in this part.			
Operational Phase						
1.	**Air Quality** Exhaust flue gases	Compliance With Emission gas standards, Ambient	– Relevant legislative and PEQs design requirements shall be	EHS officer of Project Proponent	Environment Consultant	Project Proponent/

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	**Supervision**	**Monitoring**
		air quality (PEQs) standards, Prevention of air pollution in surrounding area;	adhered to where appropriate. – The Material Recovery Facility (MRF) has no significant environmental impact on air as the most of the waste is collected in storage bags and directly poured to the hooves of the RDF plant. – Use of the face masks and the adequate PPEs shall be provided for safety measures; – properly trained staff operate the MRF facility according to standard operating procedures; – the flue gases are properly treated (e.g. with the help of water scrubbers) before their release to the atmosphere; – The services that are		hired by Project Proponent	EPA
2.	**Water Quality**	– Compliance	– Domestic water generated	EHS officer of	Environment	Project

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	**Supervision**	**Monitoring**
		with Wastewater standards of PEQS	from the plant shall be treated through septic tank system and added to municipal sewer. – To carry out water analysis periodically.	Project Proponent	Consultant hired by Project Proponent	Proponent/ EPA
3.	**Waste**	– Compliance with waste management rules – Management of waste, especially hazardous waste – Prevention of inappropriate waste disposal	– Proper testing and in compliance with standards before disposal. – Recyclables that shall be sorted and efficiently separated from the waste shall be sold to the local vendors and other relevant industry.	EHS officer of Project Proponent	Environment Consultant hired by Project Proponent	Project Proponent/ EPA
4.	**Noise & Vibration**. Noise from vehicles	– Compliance with prescribed PEQs to control Noise pollution	– Enhanced management to reduce machinery noise and exhaust and its impact on the surrounding environment.	EHS officer of Project Proponent	Environment Consultant hired by Project	Project Proponent/ EPA

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	**Supervision**	**Monitoring**
			– Green belts around the project area, peripheral and internal areas. – Growing of tall tree species, green barrier, can have good noise reduction effect.		Proponent	
6.	**Work environment (including work safety)** – Labor accidents due to handling heavy loads; working at heights; electric shocks – Diseases caused by air pollutants, water pollutants, and	– Prevention measures against labor accidents and health problems	❖ **Labor accidents** – Prepare a manual for labor accident prevention including safety education and training. – Provide workers with appropriate protective equipment. – Keep lifting devices well maintained and perform maintenance checks as appropriate. – Use equipment that protects against electric shock. ❖ **Environment Pollution** – Observe related standards and	EHS officer of Project Proponent	Environment Consultant hired by Project Proponent	Project Proponent/ EPA

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility		
				Implementation	Supervision	Monitoring
	noise from the operation – Fire Hazards		provide workers with appropriate facilities. ❖ **Fire Hazards** – Installing fire extinguishers in fire handling places – Developing firefighting organization and implementing fire drills			

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6.7 WASTE MANAGEMENT PLAN

In the waste management plan a Industrial clients shall show the waste collection points for every departments and sited for storage the central storage facility to avoid any risk associated with waste. Proper list of waste generated shall be along with the DSMS in case of hazardous waste to be handled by the company field staff.

6.7.1 Waste Segregation

The hazardous waste shall be transported to ISPES Integrated Waste Management Facility where waste shall be stored in a receiving hall and then waste shall be segregated into various categories prior to incineration. Organic waste after separation shall be transferred to a compost plant to convert into an organic soil conditioner, while inorganic portion of the waste shall be further sorted as recyclables and non-recyclables , chemicals, metal, glass, finished goods, nicotine, hazardous chemicals, paint etc shall be incinerated

6.7.2 Waste Collection

For domestic and industrial waste collection waste bins are installed outside the houses, commercial markets, hospitals and malls to collect garbage from the bins. Big size containers are also placed outside commercial markets, plaza and Shopping Malls. The workers who collect this waste shall be provided with protective gloves, mask, cap, apron and long shoes. The waste bins shall be emptied twice daily and containers once a day.

6.7.3 Waste Transportation

Waste transportation is of two types. Firstly, Domestic waste shall be collected through specially designed vehicles from households, restaurants, hospitals, commercial markets and Malls. Secondly, industries hazardous waste sending their waste in properly closed containers with documented proofs at incineration site for environment friendly treatment. This waste then shall be transported to respective storage room. Transportation routes shall be mentioned on the maps.

6.7.4 Waste Storage

Industrial and domestic waste shall be stored in separate storage room. The room shall be signed by hazard and non-hazardous waste and mentioned that this room has hazardous waste. Storage room shall be separated from the main building and near to the main road or treatment plant. The entire waste shall be kept under controlled condition to avoid any soil contamination precautionary measures shall be taken immediately. A weighing machine shall also be provided in the storage

room for weighing of waste before handing over the team of waste treatment. The proper record shall be maintained on the register.

6.7.5 Waste Disposal

Finally the waste treated in an environment friendly manner using specified method by following all the rules and regulations.

6.8 ENVIRONMENTAL MONITORING PROGRAM

The monitoring program is designed to ensure that the requirements of the NOC awarded by the EPA are met. Monitoring Program **(MP)** provides important information that allows for more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters shall help to determine the extent to which project construction/operation activities shall cause environmental disturbance. Following is a tentative plan for environmental monitoring;

Table - 5.2: Environmental Monitoring Plan

Sr. No.	Monitoring Parameters	Monitoring Mechanism	Frequency	Responsibility
DURING INSTALLATION				
1.	Dust Emissions	Ambient Particulate Matter Monitoring System.	Shall be carried out on quarterly basis.	Proponent/ EPA
2.	Noise Levels	Noise meter	On quarterly basis by a third party	Proponent/ EPA
3.	Gaseous Emissions	Emissions monitoring system. Monitoring of ambient air quality.	Shall be carried out on quarterly basis.	Proponent/ EPA
4.	HSE Plan	Health, safety and Environmental shall be monitored on daily basis	Daily	Proponent/ EPA
DURING OPERATION				
1.	Noise Levels	Noise meter	On quarterly basis by a	Proponent/ EPA

			third party	
2.	Water Quality	Discrete grab sampling and laboratory testing of water samples.	As described by SMART	Proponent/ EPA
3.	Emissions	Emissions monitoring system. Monitoring of ambient air quality.	Shall be carried out on quarterly basis.	Proponent/ EPA
4.	Security	Security arrangements shall be made	Daily	Proponent
5.	HSE Plan	Health, safety and Environmental shall be monitored on daily basis	Daily	EHS officer of Project Proponent

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7 INVOLVEMENT OF STAKEHOLDERS/PUBLIC CONSULTATION

Stakeholder consultation is a means of involving all primary and secondary stakeholders in the project's decision-making process in order to address their concerns, improve project design, and give the project legitimacy. Stakeholder consultation, if conducted in a participatory and objective manner, is a means of enhancing project sustainability. Community input (both of knowledge and values) on socioeconomic and environmental issues can greatly enhance the quality of decision-making. Stakeholder consultation was therefore conducted in the project area not only to satisfy the legal requirements of the EIA process in Punjab province but also to improve and enhance the social and environmental design of the project.

7.1 OBJECTIVES OF STAKEHOLDERS CONSULTATION

The process of public participation and consultation was endorsed in the United Nations Conference on the Environment and Development (UNCED) in 1992 through one of the key documents of the conference named as Agenda 21.

Agenda 21 is a comprehensive strategy for global action on sustainable development and deals with issues regarding human interaction with the environment. It emphasizes the role of public participation in environmental decision-making for the achievement of sustainable development.

A study was carried out with the broad objective to evaluate the impact of the project on the local population through public consultation process. The specific impact assessment aims were:

- Promote better understanding of the project, its objective, and its likely impact
- Identify and address concerns of all interested and affected parties of project area.
- Provide a means to identify and resolve issues before plans are finalized and potentially costly delays development commences, thus avoiding public anger and resentment.
- Encourage transparency and inculcate trust among various stakeholders to promote cooperation and partnership with the communities and local leadership.

7.2 PUNJAB ENVIRONMENTAL PROTECTION ACT 2012 (AMENDED ACT)

Public consultation is mandated under Punjab's environmental law. The Provincial Agency, under Regulation 6 of the IEE-EIA Regulations 2000, has issued a set of guidelines of general applicability and sectorial guidelines indicating specific assessment requirements. This includes Guidelines for Public Consultation, 1997 (the 'Guidelines'), that are summarized below:

a) Objectives of Public Involvement

To inform stakeholders about the proposed project, to provide an opportunity for those otherwise unrepresented to present their views and values, providing better transparency and accountability in decision making, creating a sense of ownership with the stakeholders.

b) Stakeholders

People who may be directly or indirectly affected by the proposed project shall clearly be the focus of public involvement. Those who are directly affected may be project beneficiaries, those likely to be adversely affected, or other stakeholders. The identification of those indirectly affected is more difficult, and to some extent it shall be a subjective judgment. For this reason it is good practice to have a very wide definition of who should be involved and to include any person or group who thinks that they have an interest. Sometimes it may be necessary to consult with a representative from a particular interest group. In such cases the choice of representative should be left to the group itself. Consultation should include not only those likely to be affected, positively or negatively, by the outcome of proposed project, but should also include those who can affect the outcome of a proposal.

c) Mechanism

Provide sufficient relevant information in a form that is easily understood by non-experts (without being simplistic or insulting), allow sufficient time for stakeholders to read, discuss, consider the information and its implications and to present their views, responses should be provided to issues and problems raised or comments made by stakeholders, selection of venues and timings of events should encourage maximum attendance.

d) Timing and Frequency

Planning for the public consultation program needs to begin at a very early stage; ideally it should commence at the screening stage of the proposal and continue throughout the EIA process. In particular for present project the consultation was carried for six consecutive days.

e) Consultation Tools

Some specific consultation tools that can be used for conducting consultations include; focus group meetings, needs assessment, semi-structured interviews; community meetings and workshops.

f) Important Considerations

The development of a public involvement program would typically involve consideration of the following issues;

- objectives of the proposal and the study;
- identification of stakeholders;
- identification of appropriate techniques to consult with the stakeholders
- identification of approaches to ensure feedback to involved stakeholders; and
- Mechanisms to ensure stakeholders consideration are taken into account.

7.3 CONSULTATION PROCESS

Primary stakeholders were consulted during informal and formal meetings held in the project area. The consultation process was carried out in the Punjabi and Urdu languages. During these meetings a simple, non-technical, description of the project was given, with an overview of the project's likely human and environmental impact. This was followed by an open discussion allowing participants to voice their concerns and opinions. In addition to providing communities with information on the proposed project, their feedback was documented during the primary stakeholder consultation. The issues and suggestions raised were recorded in field notes for analysis, and interpretation.

By reaching out to a wider segment of the population and using various communication tools such as participatory needs assessment, community consultation meetings, focus group discussions, in-depth interviews, and participatory rural appraisal; present EIA involved the community in active decision-making. This process shall continue even after this IEE has been submitted, as well as during future EIAs in which similar tools shall be used to create consensus among stakeholders on specific environmental and social issues.

In the Secondary stakeholder consultations were more formal as they involved government representatives and local welfare organizations, NGO's consulted during face-to-face meetings and through telephonic conversations. They were briefed on the EIA process, the project design, and the potential negative and positive impact of the project on the area's environment and communities. It was

important not to raise community expectations unnecessarily or unrealistically during the stakeholder consultation meetings in order to avoid undue conflict with community's leaders or local administrators. The issues recorded in the consultation process were examined, validated, and addressed in the EIA report.

7.3.1 Points Discussed

Following points were discussed during the public consultations:

- Project components, its activities and impacts.
- Needs, priorities and reactions of the affected population regarding the proposed Project.
- Grievances redress procedures.
- Entitlement checklist development for the affectees of the Project.
- Evaluation criteria of the buildings.
- Basis for determining the rates of the land, houses, and other infrastructures.
- Compensation framework for the Project affectees.
- Compensation criteria to be followed for the payment to the affectees.
- Role of the affectees in implementation of the project.

7.4 STAKEHOLDER CONSULTATION TECHNIQUE

In recognition of the diversity of views within any community, it is very important to obtain a clear understanding of the different stakeholders and to analyze their capacity and willingness to be involved in some or all of the project and its planning process. It is important to be aware of how different power relations can distort participation. It is also important to examine how community skills, resources, and 'local knowledge' can be applied to improve project design and implementation. All of this can be achieved by careful use of the various tools of Stakeholder Consultation. Therefore, the following participatory techniques were employed during stakeholder consultations:

- Informal meetings with communities.
- Focus Groups with participants in communities.

In the consultation process for EIA, following key stakeholders were consulted:

- Local communities,
- Men

- Women and
- Community's elders attended meetings.

Meetings with stakeholders consisted of community consultation meetings, focus group discussions, and in-depth interviews with men and limited focus-group discussions with women.

7.4.1 Proponent

All possible impacts and mitigation measure related to the project were discussed with the proponent and management. They assured to take all suggested mitigation measures to control any discrepancy arose by the project and to make the project environment friendly.

7.4.2 The Responsible Authority

The ISPES intends to ensure all the safety and environmental measures shall be the responsible authority to take all measures prior to start the project and during operation.

7.4.3 Other Departments and Agencies

For the impact analysis detailed with the management, local community, educational institutes, health institutes, hospitals and NGOs. All issues were discussed related to implementation of the project. Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders in the area.

7.4.4 Environmental Practitioners and Experts

Team of Integrated Environment Consultants visited the project site, had discussion with stakeholders and consulted with the local people of nearby and other villages to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to employment, own businesses, doctors, some in abroad, in Army, teaching, in agriculture etc. women were also consulted for their point of view regarding the betterment of the area by this project, some of them communicated but according to social value of the area they mostly hesitate to communicate comfortably and get pictured. People provide the massive information about the project and have positive remarks regarding the project development.

7.4.5 Government Representatives

The consultations were carried out with the local government officials and officials of the following departments:

- Ministry of Health
- Environment Protection Department
- Forestry
- Fisheries
- Irrigation
- Wild Life

The officials of Wildlife and Forest department perceived that the employment opportunities and business development would be the positive impacts on the community and people during the construction phase of the proposed project. Among the perceived negative impacts during construction phase of the project include especially road blockage, dust emissions, noise and nuisance due to heavy traffic. All officials of project study area were in favor of the project. They expect many positive, conducive and constructive impacts on socio-economic life of local community regarding jobs, business opportunity and social structure development. They were in opinion that project would improve area development through development of existing infrastructure etc. The project shall also raise their level of awareness, initiate cultural diffusion, activate social mobility and bring social change regarding various aspects of their life.

The officials from Fisheries and Irrigation departments appreciated the proposed activity. They also expressed that the jobs and business opportunities for the local community shall be increased due to project activities and that the infrastructure shall developed that automatically lead to the development of the project area. They also expressed the concern that most of the unskilled and skill jobs should be provided for the local communities.

7.4.6 Affected and Wider Community

There is no affected community present in the area of proposed project. Consultant's team has consulted with the inhabitants of different villages. The remarks of people are positive regarding the project and people foresee positive impacts like employment opportunities, business, development of the area etc.

8 IMPACT ASSESSMENT AND MITIGATION

8.1 PROBLEM AND ITS OCCURRENCE

On the basis of the findings of the EIA, it is concluded that the project shall not pose any adverse impact on the local population and the environment. A proper management plan shall be prepared in case of any accident like;

- Any health hazard to workers/other persons during construction or operation phase.
- Gaseous emissions to the environment.
- Inappropriate waste handling.

As mention above that the project shall not pose any adverse impacts to the environment. An assessment of impact during construction and operation phase is given in **Table - 7.1**, which indicates the impact and their magnitude.

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Table - 7.1: Anticipated Impacts and their magnitude of the Proposed Project

Environmental Components / Components/ Activities	Physical Environment												Biological Environment							Social Environment					
	Agricultural Lands	Soil (Erosion/Stability)	Housing	Cultural/Religious Properties	Infra structure	Mineral Resources	Downstream River Flows	Flooding	Surface water quality	Ground water quality	Air quality	Noise	Aquatic Ecosystem	Wetland Ecosystem	Terrestrial Ecosystem	Endangered Species	Natural Flora	Wildlife	Disease Vectors	Public Health/Safety	Land Use	Communication System	Employment	Community Stability	Cultural and Religious Value
Construction Phase																									
Construction Camp	MA	LA	O	O	O	O	O	O	O	LA	LA	LA	O	O	O	O	O	O	LA	O	LA	O	LB	O	O
Incineration Facility Site	LA	LA	O	O	O	O	O	O	O	O	LA	LA	O	O	O	O	O	O	O	O	O	O	LB	O	O
E&M of Equipments	O	LA	O	O	O	O	O	O	O	O	LA	LA	O	O	O	O	O	O	O	LA	O	O	MB	O	O
Vehicular Movement	O	LA	O	O	O	O	O	O	O	LA	LA	MA	O	O	LA	O	O	O	O	LA	LA	O	O	LA	O
Operation Phase																									
Solid Waste	LA	LA	O	O	O	O	O	O	O	LA	O	O	O	O	O	O	O	O	O	LA	O	O	O	O	O

Environmental Components / Components/ Activities	Physical Environment												Biological Environment							Social Environment					
	Agricultural Lands	Soil (Erosion/Stability)	Housing	Cultural/Religious Properties	Infra structure	Mineral Resources	Downstream River Flows	Flooding	Surface water quality	Ground water quality	Air quality	Noise	Aquatic Ecosystem	Wetland Ecosystem	Terrestrial Ecosystem	Endangered Species	Natural Flora	Wildlife	Disease Vectors	Public Health/Safety	Land Use	Communication System	Employment	Community Stability	Cultural and Religious Value
MRF operation	O	O	O	O	O	O	O	O	O	O	LA	LA	O	O	O	O	O	O	O	LA	LA	O	O	O	O
Equipment and Supplies	O	O	O	O	O	O	O	O	O	O	O	LA	O	O	O	O	O	O	O	O	O	O	MB	O	O
Fire Fighting Arrangement	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	HB	O	LB	LB	MB	O
Health and safety	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	HB	O	LB	LB	MB	O

LA: Low Adverse MA: Medium Adverse HA: High Adverse NA: Not Applicable O: None or Insignificant

LB: Low Beneficial Medium Beneficial HB: High Beneficial ND: Not Determinable

8.2 WAYS OF ACHIEVING MITIGATION MEASURES

8.2.1 Changing in Planning and Design

a. MRF facility must be designed to appropriate standards and be properly installed and commissioned by competent persons.

b. The installation/construction of instruments and the facility shall be carried out by an accredited Company.

c. The materials used for the construction of the filling shed must be non-inflammable material.

d. The facility must be fitted with adequate safety and monitoring control devices and operated by skilled persons.

e. Any amendments made, must be submitted to concerned authorities for approval prior to implementation.

8.2.2 Improved Monitoring and Management Practices

There shall be a suitable program of monitoring and maintenance. There shall be proper firefighting and health and safety plan (Details in Section-5). Any improvement in monitoring and management practices shall be addressed to concerned authorities.

8.2.3 Compensation in Money Terms

There is no compensation in money terms as the land is already owned by the Project Proponent. Land documents are submitted for the same.

8.2.4 Replacement, Relocation and Rehabilitation

There shall be no any matter of replacement, relocation and rehabilitation as the proposed site is already owned by the project proponent. There shall not be any let regarding safety factors as applicable from time to time for such buildings on all accounts.

9 EMERGENCY RESPONSE PLAN & EVACUATION/EXIT PLAN

9.1 OBJECTIVE OF EMERGENCY RESPONSE PLAN

Emergency preparedness helps to minimize the human suffering and economic losses that can result from emergencies. It should be understood that the size and density of projects, as well as their access and location, have a bearing on the degree of planning necessary for emergencies. It is therefore strongly recommended that the constructor ensure that a member of staff on site assist in developing the emergency response plan.

9.2 SCOPE OF EMERGENCY RESPONSE PLAN

This plan assesses risk, assign role and responsibilities and give the major steps to be followed in any emergency situation. Its increases understandings of workers and officials in handling different emergency situations which may occur at project area.

9.3 EMERGENCY SITUATIONS

Following emergencies may occur at workplaces:

- fire
- fuel spillage
- gas leaks
- explosions.
- injury from machinery and equipment.
- fall, climbing accident .
- emergency as a result of environmental conditions (e.g., heat, cold, wet, snow, wind, lightning, bushfires, floods) emergencies requiring evacuation
- hazardous substances and chemical spills .
- internal emergencies such as loss of power or water supply and structural collapse .
- serious injury events or medical emergencies.
- bomb threats
- Civil disorder or criminal acts such as robberies and shootings.

9.4 GENERAL EVACUATION PROCEDURE

It is not always necessary to evacuate a unit/plant during an emergency. A power outage, for instance, does not necessarily call for evacuation of a unit. The overall safety of the unit must first be evaluated: lighting, hazardous materials, ventilation systems, and other hazardous operations. If the unit can be safely

occupied, evacuation is not necessary. In the case of evacuation the workers in the effected zone receive instructions from their supervisor or designated person. As per instruction the workers shall immediately leave their places of duty and assemble at the assembly point.

- Area supervisor should roll call the employees to ensure all are out of danger zone.
- On receiving first information of emergency situation the administrative head should contact the Security Officer to ensure that alarm system is activated or not.
- After assessing the emergency situation Security Officer or designated person instruct through telephone to initiated the emergency response procedure and call the responsible personnel at site.
- Administrative Head may also call the external help like fire brigade, police, bomb disposal squad, ambulance etc. and communicate with them.
- Security Officer after consulting the Administrative Head may order the evacuation of workers from affected area.

If evacuation is ordered, follow these procedures:

- Stay calm, do not rush, and do not panic.
- Safely stop your work.
- Gather your personal belongings if it is safe to do so.
- If safe, close your door and window, but do not lock them.
- Use the nearest safe stairs and proceed to the nearest exit. Do not use the elevator.
- Wait for any instructions from emergency responders.
- Do not re-enter the building or work area until you have been instructed to do so by the emergency responders.

9.5 FIRE EMERGENCY RESPONSE PLAN

In the case of fire emergency, following emergency response steps shall be followed:

- When any employee notice fire or smoke he must immediately decide if the nature of fire is such that he could take action on his own or verbal call for help.

- If it is considered to be beyond the scope of individual control the alarm should be raised.
- The Security supervisor should immediately reach that area and simultaneously called for the emergency response procedures.
- After the alarm called for fire emergency all the members of fire squad should reach the affected area and take instruction of Fire Master.
- If fire reaches the raised alarm state the members are allowed to leave the area except one guard for the main gate to guide the external Fire Brigade helpers.
- Off-duty key personnel and security staff shall also report immediately for duty.
- Equipment shall be removed from the affected area.
- The nearest hospital should be informed for possible causalities.
- In addition of fire-fighting, supervisor should ensure all the flammable articles are removed.

9.6 SPECIAL FIRE EMERGENCY RESPONSE AND FIRE-PROTECTION PRECAUTIONS

- **"Joint Code of Practice"** includes fire protection measurements and compliance with the regulations and requirements is to tackle with fire emergency in power generation facility.
- **Fire-Resistant Materials**- To ensure the stability of a power generation facility in the event of a fire, the supporting structure and ceilings must be resistant to fire. The characteristic "fire resistant" must be defined in the applicable standards. However, this means that the requirements to be met by fire resistant parts can easily differ from one country to the next, depending on the standards applied. The same holds true for the inspection procedures specified for verification.
- **Fire Compartments** Fire can also spread via the outer facade if windows have been shattered by the heat so it is perfectly appropriate to use fire resistant glazing, Partition walls, ceilings must be fire resistant and made of noncombustible materials.
- **Doorways** should at least be sealed with tightly closing, fire-retardant doors; any other openings required in the walls must be sealed in an equivalent manner.
- **Partition walls** in corridors should reach right up to the structural ceiling.

- **Smoke vents** must be installed at the top of all stairwells; internal stairwells must be equipped with a mechanical, automatically activated ventilation system connected to an emergency power supply. If a fire breaks out, excess pressure must be generated in the stairwells to prevent the ingress of smoke.
- **Ventilation and Air-Conditioning Systems**- Ventilation and air-conditioning systems must be installed in such a way that fire or smoke cannot be transmitted to stairwells and other floors or fire compartments.
- **Fire Fighting**- Fire extinguishers, fire-fighting water to every point on floor and an automatic sprinkler system is the most effective protective measure for fighting and controlling a fire.
- **Supportive Services**-One electrician, one mechanic and four general workers (for salvage operations) shall be arranged to ensure the necessary services to unaffected areas continue and removal of any equipment etc. which may be affected by the incident.

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10 HEALTH AND SAFETY PLAN

10.1 INTRODUCTION

This Health and Safety Plan (HASP) provides a general description of the levels of personal protection and safe operating guidelines expected of each employee or subcontractor associated with the environmental services being conducted at the site. HASP Supplements shall be generated as necessary to address any additional activities or changes in site conditions which may occur during field operations.

10.2 HEALTH & SAFETY RULES OF THE SITE

All site personnel shall adhere to General Safety Rules, during site operations. In addition, the housekeeping and personal hygiene requirements shall also be observed.

10.2.1 Housekeeping

During site activities, work areas shall be continuously regulated for identification of excess trash and unnecessary debris. Excess debris and trash shall be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time shall debris or trash be intermingled with waste PPE or contaminated materials.

10.2.2 Smoking, Eating, or Drinking

Smoking, eating and drinking shall not be permitted inside any controlled work area at any time. The workers shall first wash hands and face immediately after leaving controlled work areas (and always prior to eating or drinking).

10.3 PERSONAL HYGIENE

The following personal hygiene requirements shall be observed:

Water Supply

A water supply meeting the following requirements shall be utilized:

Potable Water- An adequate supply of potable water shall be available for personnel consumption. Potable water can be provided in the form of water bottles, water coolers, or drinking fountains. Where drinking fountains are not available, individual-use cups shall be provided as well as adequate disposal containers. Potable water containers shall be properly identified in order to distinguish them from non-potable water sources.

Non-Potable Water **-** Non-potable water may be used for hand washing and cleaning activities. Non-potable water shall not be used for drinking purposes. All containers of non-potable water shall be marked with a label stating:

Non*-Potable *Water

Not* Intended *for Drinking Water Consumption

Toilet Facilities

A minimum of one toilet shall be provided, with separate toilets maintained for each sex except where there are less than 5 total personnel on site. For mobile crews where work activities and locations permit transportation to nearby toilet facilities on-site facilities are not required.

Washing Facilities

Employees shall be provided washing facilities (e.g., buckets with water etc.) at each work location. The use of water and hand soap (or similar substance) shall required by all employees following exit from the Exclusion Zone, prior to breaks, and at the end of daily work activities.

10.4 HEAT AND COLD STRESS

Heat and cold stress may vary based upon work activities, PPE/clothing selection, geographical locations, and weather conditions. To reduce the potential of developing heat/cold stress, be aware of the signs and symptoms of heat/cold stress and watch fellow employees for signs of heat/cold stress. For additional requirements, refer to Heat Stress, and Cold Stress. Site personnel shall be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim and the prevention of heat stress shall be available.

10.5 STOP WORK AUTHORITY

All employees have the right and duty to stop work when conditions are unsafe, and to assist in correcting these conditions. Whenever the site person determines that workplace conditions present an uncontrolled risk of injury or illness to employees, immediate resolution with the appropriate supervisor shall be sought. Upon issuing the stop work order, the site person shall implement corrective actions so that operations may be safely resumed. Resumption of safe operations is the primary objective; however, operations shall not resume until the Safety Professional has concurred that workplace conditions meet acceptable safety standards.

10.6 PERSONAL PROTECTIVE EQUIPMENT

The purpose of personal protective equipment (PPE) is to provide a barrier, which shall shield or isolate individuals from the chemical and/or physical hazards that may be encountered during work activities. The PPEs to be provided are as follow:

- Safety Helmets
- Face Masks
- Ear Plugs
- Gloves
- Boots etc.

10.7 FIRST AID FACILITY

Adequate first aid facility shall be available at the site.

11 CONCLUSION AND RECOMMENDATIONS

Based on the study conducted for Environmental Impact Assessment (EIA) of the project, the following recommendations are made:

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

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

ANNEX-A

11.1 Analysis Reports

- Drinking Water
- Ambient Air Quality Monitoring
- Noise Level
- Soil Analysis

12 REFERENCES

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

a. Information and data provided by project proponents;
b. Project Pre-feasibility Study Report;
c. Technical Design Data related to the project.
d. Information gathered through discussions with the project related persons of the project proponent;
e. Information collected from the Technical documents of various suppliers of machinery/equipment.
f. National Environment Quality Standards for Ambient Air November 2010;
g. National Environment Quality Standards Noise Levels November 2010;
h. National Environment Quality Standards for Drinking Water November 2010:;
i. Pakistan Environmental Protection Act, 1997;
j. The Punjab Environmental Protection (Amendment) Act 2011 covers aspects related to:
    - The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;
    - Establishing complete regulatory and monitoring bodies, policies, rules, regulations and national environmental quality standards; and
    - To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible

bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.

k. Environment related Laws in Pakistan and the Province of Punjab;

l. Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2000;

m. Google earth, maps.

n. Guidelines for Public Consultations - These guidelines cover:

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

o. workplace safety and health act 2011

p. Land Acquisition Act (LAA) of 1894

q. The forest Act 1927

r. Pakistan Penal Code, 1860

s. Provincial Wildlife Act, 1974

t. Drugs Act 1976

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13 TERM OF REFERENCES

1. The Consultant is required to carry out an Environment Assessment Study of the Project as required under section 12 of Pakistan Environmental Protection Act 1997/ Punjab Environmental Protection Act 2012.
2. The Study should be comprehensive and should cover all aspects which are envisaged under the relevant national and provincials laws & regulations including but not limited to:
    - Identification and recommendation for suitable solution/treatment/mitigation measures of emissions and effluents such as waste water and sludge etc in accordance with Punjab Environmental Quality Standards (PEQS).
    - Identification and recommendation for suitable solution/treatment/mitigation measures of solvents, oils (tar), hazardous waste, organic compounds, steam, flue gases, particulate matter and chemical compounds harmful for the environment and other substances leading to air, noise, water and soil pollution in accordance with PEQS.
3. The Study should be acceptable to the relevant national and/or provincial authorities (relevant authorities) in Punjab.

GLOSSARY

Air Quality	Measurement of the pollutants in the air; a description of healthiness and safety of the atmosphere.
Compensation	Includes cash payment, deferred payment, a bond, an insurance policy, stipend, payment in kind, rendition of services, grant of privileges and disturbance money, entitlement to special treatment by government and semi government entities, grant of alternative land, grant of import licenses and business, trade and commercial facilities in addition to the rehabilitation and resettlement of an affected person.
Consultation	Consultation refers to two-way transfer of information or joint discussion between project staff and the affected population. Systematic consultation implies a sustained and rigorous sharing of ideas. Bank experience shows that consultation often yields the best resettlement alternatives, fruitful procedures for continued participation, and independent information on actual conditions for implementation.
Coordinates Contaminate	Each of a group of numbers used to indicate the position of a point, line, or plane to make impure, pollute
Disclosure	The action of making new or secret information known
Disruption	Disturbance or problems which interrupt an event, activity, or process.
Environmental Management	Attempt to control human impact on and interaction with the environment in order to preserve natural resources
Evaluation	The making of a judgment about the amount, number, or value of something; assessment.
Genotoxic waste	Waste includes cytotoxic drugs and outdated materials, vomitus, faeces or urine from patients treated with cytotoxic drugs or chemicals and materials such as syringes and vials contaminated from preparation and administration of such drugs.
Geology	A science that studies rocks, layers of soil, etc., in order to learn about the history of the Earth and its life
Ground Water	Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solid content of 10,000 milligrams per liter or less, and are not "exempted aquifers."
Hazardous	Substance or material, which could adversely affect the safety of the public, handlers or carriers during transportation
Household	People residing under one roof, using the same hearth and operating as a single economic unit.
Impact	Effect on someone or something.

Land Acquisition	The process whereby a person is compelled by a public agency to cede all or part of the land a person owns or possesses, to the ownership and possession of that agency, for public purpose in return for compensation.
Mitigation	The action of reducing the severity, seriousness, or painfulness of something.
Non-Risk Waste	Waste includes paper and cardboard, packaging, food waste, aerosols and others.
Occupational Health	Maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs
Project Area	The area specified by the funding and/or implementing agency according to the Official Gazette Notification and includes the areas within the administrative limits of the Federal or a Provincial Government.
Proponent	A person who advocates a theory, proposal, or course of action.
Rehabilitation	Include all compensatory measures to re-establish; at least lost incomes, livelihoods, living and social systems. It does not include the payment of compensation for required assets.
Resettlement	Means all measures taken to mitigate any and all adverse impacts, resulting due to execution of a project on the livelihood of the project affected persons, their property, and includes compensation, relocation and rehabilitation.
Risk Waste	Risk Waste means infectious waste, pathological waste, sharps, pharmaceuticals, genotoxic waste, chemical waste and radioactive waste.
Social Environment	It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact.
Scope	The extent of the area or subject matter that something deals with or to which it is relevant
Stakeholders	Include affected persons and communities, proponents, private and public businesses, NGOs, host communities and EPA.
Topography	Details of the surface features of land. It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth.