EXECUTIVE SUMMARY

INTRODUCTION

This executive summary presents an overview of the main findings of the Environmental Impact Assessment (EIA) report for "Proposed project that is an Incinerator Plant by **Leo Waste Management (Private) Limited at Mouza Rakh Mad Kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur**." As a prerequisite to proceed with the incinerating activities, it is essential to conduct a thorough environmental assessment to identify the potential and actual threats associated with subsequent incinerating activities on the environmental settings as well as the socio-economic fabric of the area. The ultimate purpose of the assessment is to obtain an Environmental Approval by fulfilling all the legal requirements set under Punjab Environmental Protection Act, (Amended 2012) 1997.

Incineration is a waste treatment process that involves the combustion of substances contained in waste materials. Incineration of waste materials converts the waste into ash, flue gas and heat. The ash is mostly formed by the inorganic constituents of the waste and may take the form of solid lumps or particulates carried by the flue gas. The flue gases must be cleaned of gaseous and particulate pollutants before they are dispersed into the atmosphere. In some cases, the heat that is generated by incineration can be used to generate electric power.

Indeed, it is a legal requirement in Pakistan to obey the environmental laws during carrying out any developmental activities and get it approved from the concerned regulating agencies before embarking on the development activities. Provincial environmental legislation also requires similar environmental approvals from relevant provincial authorities (provincial environment departments). In addition, the aim of the EIA study is to ensure sustainable development in Pakistan. This EIA report provides an assessment of anticipated positive and negative environmental impacts of the proposed Project, along with the appropriate measures to further enhance the beneficial impacts and to mitigate any adverse impacts.

SALIENT FEATURES OF PROJECT

1.	Project title	An Incinerator Plant by Leo Waste Management (Private) Limited
2.	Location	Mouza Rakh Mad Kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur
3.	District	Kasur
4.	Name of Proponent	Mr. Muhammad Haider Ali S/O Muhammad Aslam Khokhar
5.	Address	R/O Bhikki road, Street No. 3, Muhallah Khokhar Town, Sheikhupura, District Sheikhupura
6.	Area of the project	The total area of the project is 7K-8M (40279 SFT).
7.	Type and category of project	Falls in Section G of Schedule II for EIA projects due to the cost, size and nature and overall severity and frequency of impacts.
8.	Nature of the Project	Project will be involved for incinerate of all and various types of wastes (including industrial, commercial, institutional, domestic, biomedical and other waste) at standard temperature and conditions.
10.	Availability of resources	all and various types of wastes (including industrial, commercial, institutional, domestic, biomedical and other waste).
11.	Source of electricity	WAPDA & Generator is available as backup at project site
12.	Manpower requirement	8-10 workers will be available at project site
13.	Water requirement	Only for drinking water is required. Water requirement during operational hours is estimated at 300 to 350 liters per day.
14.	Solid waste and its	Solid waste is estimated some sort of domestic which

	management	will also be incinerated with domestic waste.
15.	Wastewater and its treatment in proposed project	Wastewater will be reuse during construction activities as making material etc. while during operational phase wastewater will be domestic only which will be treated by septic tanks.
16.	Cost of project	Approximately 50 million in PKR

Environmental Consultants:

An Environmental Impact Assessment (EIA) study report has been prepared to identify and predict the significant environmental impacts likely to arise from the commencement of the project along with environmental impact statement followed by delineation of appropriate Environmental Management Plan and Environmental Monitoring Plan to check the implementation of the EMMP. Proponent of project has decide to conduct Environmental Impact assessment Study by environmental consultants, Ecosphiron Environmental Services, Office # 5, F-2, 9 Kashmir Block, Jalal Center, Allama Iqbal Town, Lahore.

Contact Numbers: 0301 4276787, 0322-4908520

Email Address: ecosphiron@gmail.com, manzoorahmad41@yahoo.com

Names	Designation	Roles and responsibilities
Ms. Shakeela Rani	Manager (Environmental legal)	Technical Support.
Mr. Manzoor Ahmad	Manager (Operations)	Baseline study/ Report preparation
Mr. Ahmed	Assistant Manager (Operation)	Logistic and report preparation
Mr. Ammar Hashmi	Finance Manager	Project Administrator
Miss Amna Bukhari	Sociologist	Technical Survey Conducting
Mr. Ali Raza	Field Coordinator	Assist for Baseline Study

A Brief Outline of Project:

An incinerator is a furnace for burning waste. Modern incinerators include pollution mitigation equipment such as flue gas cleaning. Project will be involved for incinerate of

all and various types of wastes (including industrial, commercial, institutional, domestic, biomedical and other waste) at standard temperature and conditions. Environmental protection, productivity improvement, employment generation, resource recovery, welfare needs of a huge population, and so on is also important with respect to waste management. Thus the problem of ascertaining the objectives of waste management in such cases is many faceted and in this regard, project is so worthy. The capacity of incinerator will be 1200 Kg/Hour.

The Major Impacts & Recommended Mitigation Measures

Evaluation of the site inspection and findings are the key sources to make a list of the positive and negative impacts on the environment of the surrounding of project site. Evaluating the key points is to reduce all negative impacts that are harmful to the surrounding environment in any form**.** The Positive impacts of the project utilization on economy and poverty can eradication and sustained economic growth of our country. The expected impacts from the project are mostly insignificant and others are of limited nature. In this regard possible improvements and mitigation measures have been taken. The study also shows that there will be no exploitation and consequential depletion of the local natural resources.

	POTENTIAL IMPACTS	**MITIGATION MEASURES**
1.	**Solid Waste Management**	
	Improper and unplanned solid waste dumping can cause environment, health and safety issues. It also can potentially deteriorate the living quality of the residents besides reducing the aesthetic quality of the entire scheme.	Solid waste generation from the construction activity and domestic sources will be disposed of properly. The solid waste from the construction activity will be re-used. As for domestic waste, at site there is already has a waste disposal system for handling of solid waste like sanitary workers of that area will collect the solid waste. SW Manager will be hired who will take care for all

		system regarding solid waste at the project site during construction and operational phase. The operational phase of the project will not produce any solid waste except domestic and some sort of project related which will comprise on wrappers, papers etc which will also be incinerate with domestic solid waste.
2.	**Wastewater Disposal**	
	Wastewater generated due to domestic/process activities result in the spread of vector borne diseases like dengue, malaria, as well as spread the nuisance of foul smell.	Wastewater during construction phase will be reused like for soil sprinkling and construction material making etc. The wastewater produced in the operation phase will be domestic as well.
3.	**Energy Conservation**	
	Excessive use of energy exerts more pressure on the already dwindling energy resources of the city/country.	Proponent is committed to install energy efficient machinery and equipments by implementing the modern technologies. Thus there is no fuel requirement and does not put pressure on the existing resources.
4.	**Noise Generation**	
	Noise emissions due to traffic and any activities create issues to the residents.	Any activity that leads to noise pollution is restricted. Noise suppression canopy will be installed over the machinery/equipments instruments to reduce the noise pollution. Modern technologies ensure the standards with the international standards of the noise pollution. In order to keep noise within the limits set under PEQs, the proponent will ensure regular monitoring by using the EPA

		approved methods, EPA certified laboratories will be involved in this regard. Records of monitoring will be maintained and shared with the EPA.
5.	**Emergency/Fire Hazards**	
	Emergencies e.g. fire incidents may lead to environmental, health and safety issues to the local residents.	During construction phase all emergency conditions will be prepared like fencing around the construction site etc. Emergency preparedness plans will be prepared for the operational phase. Call points at suitable locations are also mentioned because being in the industrial cluster. But during the operational phase the emergency preparedness plan will be followed.
7.	**Training of Staff**	
	Unskilled persons are not able to tackle environmental, health and safety related situations which may further aggravate any such issues and cause loss of human life and property.	Regular training of the staff will be conducted. Proper monitoring and reporting mechanism is developed where the team is responsible to communicate/report any illegal or hazardous situation to the team leader.
8.	**Social Impacts**	
	Problems regarding privacy of local community may arise due to invasion of outside population.	Though the chance of any improper social conduct are negligible due to the fact that the project site is an inside the industrial cluster. However, having a proactive approach, improper social behaviors e.g. staring and teasing is discouraged and any such incident report directly to the site in-charge. Workers will be hired from the local community to

		avoid social issues.
9.	**Transportation**	
	Transportation of raw material/waste for safety stuff manufacturing to and from the project site creates a probability of accidental spills and fire.	Transportation vehicles keep maintain in good conditions to avoid the chances of accidents. Demarcation of proper area onsite for parking of construction vehicles. During construction as well as of operational phase, vehicles will be entered into the project site according to schedule and need. Being in the industrial zone there is a demarcation and proper plan of incoming and outgoing of the vehicles.
10	**Terrestrial biodiversity**	
	Development should not disturb the biodiversity because biodiversity are the precious elements of the area	Following measures will be adopted in favor of biodiversity of that area. Project site is in industrial cluster where there is no biodiversity. Adopting a vegetation program that uses indigenous stocks of local vegetation Proponent is committed to plant the plants after completion of construction work for making the environment friendly and for aesthetic beauty as well.
11	**Health and safety**	
	Health and safety parameters are the key necessities of the any project in which minor negligence can have damage.	Following mitigation measures will be adopted; ➢ Enforcing site security ➢ Ensuring site safety ➢ Enhancing safety at site facilities

		➢ Establishing environmental controls ➢ Regulating transportation on-site
12	**Emergency preparedness plan**	
	Emergency preparedness plan is fundamental factor of any project site so that in case of any emergency conditions can be tackled.	For emergency preparedness plan there will be fire hydrants and fire extinguishers at certain points.
13	**Socioeconomic**	
	Socioeconomic factor comes in priority parameters because it's about surrounding people income.	By reducing socioeconomic problem following measures should be adopted; The site is in industrial zone but still the proponent is committed to give job opportunity to the locals of the area. ➢ Reducing potential exposure to emissions.
14	**Air Emissions**	
	By operating the incinerator, few gases can be emitted like particulate matters, dioxins etc.	Air emissions during construction phase will be usually from generator but generator would be maintained and up-to-date to control the air emissions. scrubbers will be used to control the air emissions like particulate matter while dioxins usually produce when temperature go beyond the limit and it happen when waste put more than capacity. So by keeping the all protocols, air emissions will be controlled in operational phase of the project.
15	**Vibration and Noise Pollution**	
	Vibration and noise pollution can be produced during construction phase and operational phase	The vibration and noise pollution during construction and operational phase will be

	if machinery will not be properly look after. The vibration and noise pollution can cause the trouble to surroundings.	controlled by grouting the machinery fully and generators will be kept in canopy and will be fully maintained.

Project will have all SOPs when will start. The general approach to Environmental Management Plan for the project, for the construction and operational phases of the Project has been presented, along with an outline plan for the project Environmental Management Plans (EMPs). Site specific and practically suitable mitigation measures are recommended to mitigate the impacts.

Proposed Monitoring:

For proposed monitoring, proper monitoring strategy will be adopted**.** The purpose of a monitoring strategy is to define the scope and focus of a grantee's monitoring efforts, including establishing a framework for determining the appropriate level of monitoring for sub recipients based on the resources available. A grantee's work plan should include time to conduct a risk analysis on each sub recipient as well as where and when the grantee will apply staff and travel resources for monitoring, training, or technical assistance of its sub recipients.

The environmental monitoring schedule at the project site will be decided as per condition will mention in the NOC. However the monitoring schedule for project activities will be evaluated on daily bases before labor will start work.

Monitoring at the proposed sites has been conducted for ambient air, Noise level and ground water and the reports demonstrated that results are within the limits prescribed by PAK-PEQS (2016). The values of these parameters are present in baseline study of project.

Conclusion

The Environmental Impact Assessment contains description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation

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

It is further concluded that all potential environmental concerns associated with the project have been adequately addressed, and no further study is required in this context.

The main persons involved in finalizing EIA report are following;

Ms. Shakeela Rani
(Environmentalist)

Mr. Manzoor Ahmad
(Environmentalist)

For the Proponent

I have reviewed the project EIA report and found the contents to be valid and true to the best of knowledge and belief.

Mr. Muhammad Haider Ali S/O Muhammad Aslam Khokhar
(Proponent)
An Incinerator by Leo Waste Management (Private) Limited, Kasur

Table of Contents

ANNEXURES

Annexure I	Glossary
Annexure II	List of Abbreviation
Annexure III	References
Annexure IV	List of Individuals carried out this EIA report Study
Annexure V	Proponents CNIC
Annexure VI	TORs
Annexure VII	Pictorial Presentation
Annexure VIII	Socioeconomic Survey Forms
Annexure IX	Property Documents

CHAPTER I
INTRODUCTION

1.0 Purpose

"Proposed project that is an Incinerator Plant by Leo Waste Management (Private) Limited at Mouza Rakh Mad kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur". The study has been carried out to estimate the potential environmental and social impacts, positive and negative, on the environment as well as socio-economic of the surrounding environment during construction as well as operational phase. This report intends to provide satisfactory mitigation measures to avoid/eliminate any chance of adverse environmental impact on the socio-cultural, economic and environmental components. This report also intends to fulfill the regulatory requirements set under Punjab Environmental Protection Act 1997 (Amended 2012) and its consequent legislative framework for IEE/EIA including the IEE/EIA Regulations 2000 and the guidelines drafted for IEE and EIA under numerous sectorial heads. The entire set of legislative framework requires any new development project to undergo an IEE or EIA based on the categorization of the project under Schedule I and/or Schedule II.

1.1 Identification of the Proponent

Contact Person

Mr. Mr. Muhammad Haider Ali S/O Muhammad Aslam Khokhar (Proponent)

Address of the Proponent:

R/O Bhikki road, Street No. 3, Muhallah Khokhar Town, Sheikhupura, District Sheikhupura

Identification of the Project:

"Proposed project that is an Incinerator Plant by Leo Waste Management (Private) Limited at Mouza Rakh Mad kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur".

1.2 Environmental Consultants:

The Environmental Impact Assessment (EIA) has been carried out by aptly skilled and duly qualified group of professionals working for the environmental consulting Services namely Ecosphiron Environmental Services, Lahore. The consulting team can be approached through the following contact details:

Ecosphiron Environmental Services

Office # 5, F-2, 9 Kashmir Block, Jalal Center, Allama Iqbal Town, Lahore

Contact No. 0301 4276787, 0322-4908520

ecosphiron@gmail.com, manzoorahmad41@yahoo.com

Names	Designation	Roles and responsibilities
Ms. Shakeela Rani	Manager (Environmental legal)	Technical Support.
Mr. Manzoor Ahmad	Manager (Operations)	Baseline study/ Report preparation
Mr. Ahmed	Assistant Manager (Operation)	Logistic and report preparation
Mr. Ammar Hashmi	Finance Manager	Project Administrator
Miss Amna Bukhari	Sociologist	Technical Survey Conducting
Mr. Ali Raza	Field Coordinator	Assist for Baseline Study

1.3 Nature and Size of Project

The project is "Proposed project that is an Incinerator Plant by Leo Waste Management (Private) Limited at Mouza Rakh Mad kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur". The project has been planned on the norms of sustainable designs and patterns provided under the legislative and sectorial guidelines of Environmental Protection Agency, Punjab. The total area of the project is 7K-8M(40279 SFT).

A total of 10-15 people will work on the project during construction phase will be almost 15-20 in operational phase. This is further explained under Environmental Impacts and Mitigation Measures for the project.

The whole project will require about 300-350 liters/day of water at project site for drinking etc.

No hazardous waste will be generated at the site. Only small quantity of waste is generated which is due to domestic practices. Proposed project is an incinerator where all kinds of waste will be incinerate and domestic waste which will be produce will also be here incinerate with domestic waste.

Along with the secondary facilities, the proponent of the project has planned provision of the basic facilities/utilities for the project. Provision of infrastructure for provision of telecommunication services will be developed to meet the future demand.

1.4 Eco-Friendly Features of the Project

Special feature of the project is its eco-friendly work. The basic idea of the concept is to create safe, modern as well as environmental friendly SOPs to ensure improved working conditions required by the potential users.

1.5 Location

The project is at Mouza Rakh Mad kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur.

The project site is surrounded by:

East: Rakhi Rohi Nalla

West: Madd Village

North: Open Land

South: Azargor Industry

1.6 Extent/scope of EIA Study

EIA is conducted under the legal framework of Punjab Environmental Protection Agency (PEPA). As per legal requirements, the Project will be reviewed in light of the provisions of Punjab Environmental Protection Act, (PEPA-2012) and IEE/ EIA Regulations 2000,

issued by Pakistan Environmental Protection Agency (Pak EPA) and adopted by the EPA Punjab.

Secondary information for this Study was collected from the relevant departments and literature to identify physical, socio-economic and environmental issues of the Project Area. Relevant information available with the proponent on the physical, technical and institutional aspects of the Project was also utilized. The EIA process followed all the complementary stages described in the guidelines for IEE/EIA preparation and review.

A brief flowchart exhibiting the different stages involved is in figure 1.1

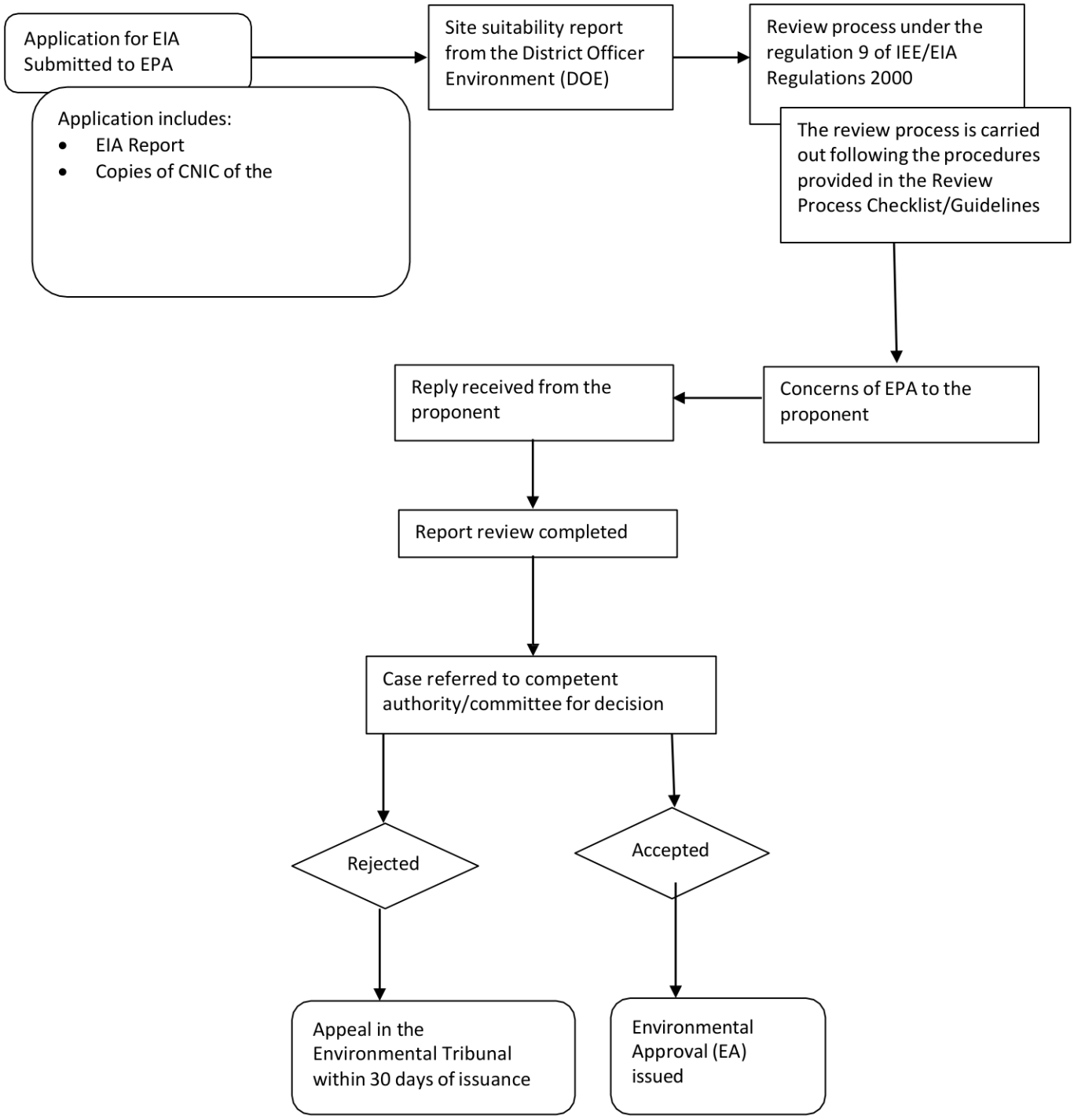


Fig 1.1: The EIA process flow chart

The format of this EIA covers the followings:

1.7 Structure of the Report

EIA report comprises following chapters:

Chapter 1: Introduction (A description of the project, proponent and consultants, the need for the project and the report and method of preparing it).

Chapter 2: Project Description (Full description of the relevant parts of the project and summary of project inputs and outputs).

Chapter 3: Policy, statutory, and institutional Framework (A description of the pertinent national & provincial legislations, regulations and policies that are relevant and applicable to the project and a demonstration of how the project conforms to these aspects).

Chapter 4: Description of the environment (Description of project area's existing physical, biological and socio-economic condition, including geomorphology and soils, water resources, air quality, flora, fauna and demography).

Chapter 5: Stakeholder Consultation (This chapter comprises on the public and stakeholder consultation with whom project related and about their life style different questions were asked).

Chapter 6: Project Impacts and mitigations (Presents an assessment of the project's impacts, suggested mitigation measures on the Physical, Biological and Socioeconomic environment, residual impacts and the monitoring requirements).

Chapter 7: Environmental Management Plan (Provides Environmental Management Plan& Environmental Monitoring Plan for the construction &operational phase of the project).

Chapter 8: Conclusions & Recommendations (Concludes the EIA report with a few recommendations to conduct the project in environment-friendly manner).

CHAPTER II
DESCRIPTION OF THE PROJECT

2.0 Type and Category of the Project

According to projects categorization for environmental assessment studies, the proposed project that is "Proposed project is an Incinerator Plant by Leo Waste Management (Private) Limited at Mouza Rakh Mad kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur falls in Section G of Schedule II for EIA projects due to the cost, size and nature and overall severity and frequency of impacts. This report is required to fulfill the legal requirements set under section 12 of the Punjab Environmental Protection Act, 1997 (Amended 2012). This section of the study renders a detailed account of the project and its salient features, such as location and various phases. Inputs and discharges relevant to different phases of the project, such as electricity & materials etc. have also been examined as a response to possible environmental concerns.

2.1 Objectives of the Project

Project will be involved for incinerate of all and various types of wastes (including industrial, commercial, institutional, domestic, biomedical and other waste) at standard temperature and conditions. Environmental protection, productivity improvement, employment generation, resource recovery, welfare needs of a huge population, and so on is also important with respect to waste management. Thus the problem of ascertaining the objectives of waste management in such cases is many faceted and in this regard, project is so worthy.

2.2 Alternatives Considered

Now a days development is going to be increased day by day rapidly due to which waste is also increasing and Incineration uses **combustion to make infectious medical waste harmless and reduce the waste mass and volume by more than 90 percent**. Proper

incineration can convert certain wastes into gases and incombustible solid residues (e.g., ash) that are relatively harmless. The project availability of land at the best convenient place and at reasonable price was yet the other considerations for the site selection. Availability of access roads, communication facilities, electricity, gas, basic infrastructure, sewer etc. was yet the other necessary requirements. Of course neat and clean environment was also the other consideration.

Keeping these requirements and their availability, the present site is the best suited for the construction of the project. The area is far away from the dense industrial activity. All the other basic infrastructural requirements are available at the selected site. Accordingly, the selected site is ideally suited for construction of the project. Keeping these considerations in mind three alternatives considered which were:
Alternative I – No Project: First option is always that there would be no project because project always make pollution and certain issues in regard of environment. And second thing is project would be reason for noise pollution and if population is near the project then it may cause the trouble for nearest population.

Alternative II "Proposed project is an Incinerator Plant by Leo Waste Management (Private) Limited, District Kasur: The proposed project is an incinerator where all sort of waste either its from industry, hospital or residential will be incinerator to ash. But the propose project will have issues regarding pollution and heat in the environment. However, this alternative was rejected due to the facts.

Alternative III availability of land & resources: by keeping in the mind, the modern life of every person leads to enough mess and waste and if waste will not be treated properly then everywhere will be waste burden only which will make life so polluted. The said project has land and resources where waste can be treated in appropriate manners.

Alternative IV Scope Of residential Area: Incinerators can decrease the quantity of waste by 95% and reduce the solid quantity of the original waste by 80-85% depending on the components that were in solid waste. Therefore incineration reduces the dependency on landfills. An incinerator is usually a container used for burning biological

refuse. It can also be an industrial plant designed for large-scale refuse combustion. Incinerators are used to safely dispose of solid, liquid, and gaseous wastes that result from manufacturing processes.

Alternative IV-Final Selection of Proposed Project that ia an Incinerator: Said project is an incinerator project and site for this project has been selected in open cum industrial area. The project site is an open plot and all fundamental necessities are available at the project site. The machinery of the incinerator system is a perfect system to incinerate the waste with complete SOPs. The temperature and noise issues can be resolved if system will be operation with all Sops. The basic advantage of the project is that it will reduce the waste burden and make the environment healthy. Project site is located in the open plot where in surrounding open plots are available which in surrounding industrial activities are carrying on. Thus project will not affect any biological life and nor involve for demolishing any structure and building. Thus project is located in ideal location and has number of advantages in context of environment.

In addition, many important criteria have been kept under consideration while making any decisions regarding site selection and project designs. The site should have adequate facilities for drainage, waste collection, run off prevention, communication, transportation, and electricity. These have been considered while selecting the choicest alternative. As for the design, different criteria were considered for finalization of a safe design. For this, a site where fundamental necessities are available will be feasible for project as well as will be good decision for project.

2.3 Location Plan/Map

Title of proposed project is "Proposed project is an Incinerator Plant by Leo Waste Management (Private) Limited at Mouza Rakh Mad kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur" which will start construction after getting environmental approval from EPA, Punjab. The said project is located in Lahore and project layout plan is attached herewith this report as annexure. The proposed project is surrounded by open land/industrial area. Exact coordinates of the project are given in Table: 1

Table 1: Project Co-ordinates

Coordinates	Location Type
East	Rakhi Rohi Nalla
West	Azgar Industry
North	Open Land
South	Madd Village

2.4 Land use on the site:

Proposed project site is about "Proposed project is an Incinerator Plant by Leo Waste Management (Private) Limited at Mouza Rakh Mad kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur" which is intended to start their project after getting environmental approval from EPA, Punjab. Layout plan of land is attached with this report as an Annexure. The total area of the project is 7K-8M(40279 SFT) and project is an open plot as mentioned below.

2.5 Road Access:

The proposed project site is near the main road. The said project surrounded by open area cum industrial area.

2.6 Vegetation features of the site:

At present, the Project Area is consisted of no bushes and grass or even small plant. The proposed project area has open plots on its right, left and back sides of the project site, while road is in front of the project site.

2.7 Magnitude of the Operation Including Capital Cost and Associated Activities

The proposed project intends on constructing "Proposed project is an Incinerator Plant by Leo Waste Management (Private) Limited, District Kasur" with total area of approximately 7K-8M(40279 SFT). The said project is open plot having total cost of the project as 50 million. It includes site survey, geotechnical investigations, infrastructure

work, structural work, electrical and mechanical works and Activities of construction includes the followings:

- Site clearing
- Demarcation of the Area for various facilities
- Infrastructure works (roads, water supply, sewerage and drainage, gas, electrical works etc.)
- Installation of street lights
- Plantation of plants and grass

2.8 Water Requirement

The surplus water during the construction phase of the whole project will be estimated to meet any unforeseen situation. The water demand will be fulfilled from ground water. Water demand for various uses has been estimated on the basis of WASA specifications. Water requirement for maintenance of green belts will be done on daily basis by ground water through pumps and pipes to avoid wastage of water. The water requirement for the construction phase will be 3000 gal/day while during operational phase water requirement will be 3500 gal/day. The water will be in operation phase for sake for cleaning and drinking purpose.

2.9 Wastewater Generation and Disposal

The management of the project will lay down sewer pipe line up to the main sewerage and will also construct septic tanks for primary treatment to affect the wastewater quality before its discharge in the main sewer.

2.10 Solid Waste Generation and Disposal

Estimated quantity of solid waste during construction phase is varied. The reason being, solid waste will have excavation material as major part of its overall composition. However, the earth material will be reused within the site eventually leaving zero waste due to excavation activities. Therefore, solid waste during construction phase will include

the solid waste generated due to workers activities. To get rid from solid waste, sanitary workers of this area will collect this waste.

During operational phase, solid waste will be domestic and waste which from different units and zones will be incinerating according to guidelines and SOPs.

2.11 Energy Demand

The energy will be supplied by WAPDA and generators will be installed as back up energy resource. The generators will be kept in canopy to keep the noise pollution lower.

2.12 Manpower Required

The man power during construction phase will be 10-15 persons, while 15-20 persons will perform their duties during operational phase of the proposed project for maintenance and management. Thus the project is source of employment for economic development activities of the area.

2.13 Proposed Schedule of Implementation

It is estimated that the entire project will take five to six months for completion of construction phase, if the activities go as per the plan.

Activities involved are:

- Land acquisition – already done (Land ownership documents are along with this report)
- Lay out plan of project (attached herewith this EIA report)
- Leveling of land
- Excavation for foundation building
- Work on pavements, roads, sewer system, electricity and telecommunication grid installation etc
- Construction of site
- All finishing work of the entire construction work will be furnished after last step.

2.14 Details of Restoration and Rehabilitation Plan:

2.14.1 Purpose and Scope:

The purpose of restoration and rehabilitation plan development is to structure individualized services that will enable the individual to obtain and maintain suitable employment, and/or to maximize independence in daily living. The structure of the plan allows the counselor and the individual to translate the findings of the initial evaluation into specific rehabilitation goals and objectives.

When starting a comprehensive rehabilitation project in informal settlements, the first thing to take into consideration is a comprehensive understanding of the parameters that characterize the project system.

2.14.2 Required Elements of Rehabilitation Plans:

- Program goal
- Objectives designed to meet the goal
- Anticipated completion dates
- Services to be provided
- Duration of services
- Service providers
- Evaluation criteria
- Evaluation schedule of at least once every 12 months

2.14.3 Advantages of the Project:

- Decreases Quantity of Waste.
- Efficient Waste Management.
- Production of Heat and Power.
- Reduction of Pollution.
- Incinerators Have Filters For Trapping Pollutants.
- Saves on Transportation of Waste.
- Provides Better Control Over Odor and Noise.
- Prevents the Production of Methane Gas.

2.15 Government Approvals

Acquisition of approvals for the said project does not required because said project will not generate wastewater or any other waste thus no need for any other approval and project is environment friendly at all aspects.

2.16 Safety Measures at Project Site

Through inspection processes, ensure project facilities are capable for healthy life. Develop and distribute clear-cut guidelines dealing with project's policy on safety. Every individual involved in the project should know what is expected and how to perform the assigned tasks. Get together of society members will be done for more improvement will be done. Further, if an unsafe work practice is noticed, corrective action should be taken immediately. Don't let production issues result in a disregard for safety.

2.17 Current Vegetation Features on Site:

At present, there are no plant even grass which will be cut off due to project construction. The proposed project area has open plots on its right and back sides of the project site, while Road is in front of the project site.

2.18 Process of Incinerator

Incineration is a waste treatment process that involves the combustion of substances contained in waste materials. Incinerators for waste incineration are commonly referred to as waste-to-energy facilities. Incineration of waste materials converts the waste into ash, flue gas and heat. In some cases, the heat that is generated by incineration can be used to generate electric power.

Latest Technology of Incinerator

Now an incinerator is a furnace for burning waste. Modern incinerators include pollution mitigation equipment such as flue gas cleaning. There are various types of incinerator plant design: moving grate, fixed grate, rotary-kiln, and fluidised bed.

Burn pile

The burn pile or the burn pit is one of the simplest and earliest forms of waste disposal, essentially consisting of a mound of combustible materials piled on the open ground and set on fire, leading to cause pollution. Burn piles can and have spread uncontrolled fires, for example, if the wind blows burning material off the pile into surrounding combustible grasses or onto buildings. As interior structures of the pile are consumed, the pile can shift and collapse, spreading the burn area. Even in a situation of no wind, small lightweight ignited embers can lift off the pile via convection, and waft through the air into grasses or onto buildings, igniting them. Burn piles often do not result in full combustion of waste and therefore produce particulate pollution

Burn Barrel

The burn barrel is a somewhat more controlled form of private waste incineration, containing the burning material inside a metal barrel, with a metal grating over the exhaust. The barrel prevents the spread of burning material in windy conditions, and as the combustibles are reduced they can only settle down into the barrel. The exhaust grating helps to prevent the spread of burning embers.

Moving grate

The typical incineration plant for municipal solid waste is a moving grate incinerator. The moving grate enables the movement of waste through the combustion chamber to be optimized to allow a more efficient and complete combustion. A single moving grate boiler can handle up to 35 metric tons (39 short tons) of waste per hour, and can operate 8,000 hours per year with only one scheduled stop for inspection and maintenance of about one month's duration. Moving grate incinerators are sometimes referred to as Municipal Solid Waste Incinerators (MSWIs).

The waste is introduced by a waste crane through the "throat" at one end of the grate, from where it moves down over the descending grate to the ash pit in the other end. Here the ash is removed through a water lock. The holes in the grate supplying the primary combustion air are visible. Part of the combustion air (primary combustion air) is supplied through the grate from below. This air flow also has the purpose of cooling the

grate itself. Cooling is important for the mechanical strength of the grate, and many moving grates are also water-cooled internally.

Secondary combustion air is supplied into the boiler at high speed through nozzles over the grate. It facilitates complete combustion of the flue gases by introducing turbulence for better mixing and by ensuring a surplus of oxygen. In multiple/stepped hearth incinerators, the secondary combustion air is introduced in a separate chamber downstream the primary combustion chamber. According to the European Waste Incineration Directive, incineration plants must be designed to ensure that the flue gases reach a temperature of at least 850 °C (1,560 °F) for 2 seconds in order to ensure proper breakdown of toxic organic substances. In order to comply with this at all times, it is required to install backup auxiliary burners (often fueled by oil), which are fired into the boiler in case the heating value of the waste becomes too low to reach this temperature alone. The flue gases are then cooled in the super heaters, where the heat is transferred to steam, heating the steam to typically 400 °C (752 °F) at a pressure of 40 bars (580 psi) for the electricity generation in the turbine. At this point, the flue gas has a temperature of around 200 °C (392 °F), and is passed to the flue gas cleaning system.

Fixed grate

The older and simpler kind of incinerator was a brick-lined cell with a fixed metal grate over a lower ash pit, with one opening in the top or side for loading and another opening in the side for removing incombustible solids called clinkers. Many small incinerators formerly found in apartment houses have now been replaced by waste compactors.

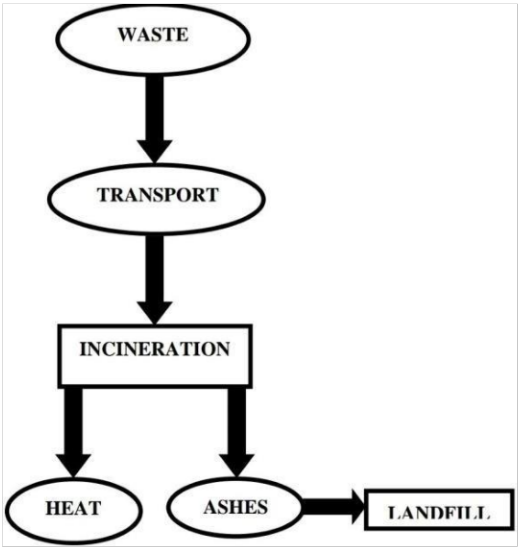
Rotary-kiln

The rotary-kiln incinerator is used by municipalities and by large industrial plants. This design of incinerator has two chambers: a primary chamber and secondary chamber. The primary chamber in a rotary kiln incinerator consists of an inclined refractory lined cylindrical tube. The inner refractory lining serves as sacrificial layer to protect the kiln structure. This refractory layer needs to be replaced from time to time. Movement of the

cylinder on its axis facilitates movement of waste. In the primary chamber, there is conversion of solid fraction to gases, through volatilization, destructive distillation and partial combustion reactions. The secondary chamber is necessary to complete gas phase combustion reactions. The clinkers spill out at the end of the cylinder. A tall flue-gas stack, fan, or steam jet supplies the needed draft. Ash drops through the grate, but many particles are carried along with the hot gases. The particles and any combustible gases may be combusted in an "afterburner".

Fluidized bed

A strong airflow is forced through a sandbed. The air seeps through the sand until a point is reached where the sand particles separate to let the air through and mixing and churning occurs, thus a fluidized bed is created and fuel and waste can now be introduced. The sand with the pre-treated waste and/or fuel is kept suspended on pumped air currents and takes on a fluid-like character. The bed is thereby violently mixed and agitated keeping small inert particles and air in a fluid-like state. This allows all of the mass of waste, fuel and sand to be fully circulated through the furnace.



Process Flow Diagram of Incinerator

Raw Material and Final Product

Raw material will be all sort of waste while final product will be ash. The capacity of incinerator is 1200 kg.hr.

CHAPTER III
STATUTORY REQUIREMENTS

3.1 General

Sustainable development and green economy is a concept that has emerged over the past decades to describe a new framework aimed at economic and social development while maintaining the long term integrity of the ecological system and environmental resources. The principal of sustainable development is in the process of being incorporated into the national policy and legislation through various statutory instruments. This chapter describes the current legal responsibilities of the proponent in context of environmental and sustainable development, and the institutions that exist in the country that may influence the environmental management of the project.

This section deals with the current policy as well as legal and administrative framework related to carrying out of Environmental Impact Assessment (EIA) of the project. An efficient and effective organizational structure is essential for successful implementation of the mitigation measures identified for the project. Like other projects, the project, before its implementation, is required to go through an Environmental Assessment, in accordance with the provisions of the Punjab Environmental Protection (Amendment) Act 2012.

3.2 Existing Legislation and Legal Framework

The Federal Ministry of Environment was responsible authority for policy making on environmental protection in Pakistan but after 18th Amendment in the Constitution, the Provincial Governments have taken over the subject of Environment. This IEE study has been carried out in the light of the policy guidelines of the Preparation of IEE/EIA Reports under the procedures and practices formulated by the Pak EPA and adopted by the Punjab Environmental Protection Agency (EPA).

3.3 Institutional Setup

3.3.1 Environmental Protection Councils

The Punjab Environmental Protection Council (PEPC) is the apex decision-making body of Punjab. It has been developed under the provision of Punjab Environmental Protection (Amendment) Act 2012. It is headed by Chief Minister of Punjab with other members. The purpose of IEE is basically to obtain Environmental Approval from the Environmental Protection Agency (EPA), Punjab in compliance with Pakistan Environmental Protection Act (PEPA) - 1997, now having been replaced by Punjab Environment Protection (Amendment) Act 2012.

3.3.2 Environmental Protection Agencies

Pak EPA has been established at the Federal level and EPAs are established at Provincial level also. In Punjab an independent Environmental Protection Agency is constituted headed by the Director General.

3.3.3 Environment Protection Department, Punjab

The Punjab Government has established Environment Protection Department (EPD) administratively controlled by the Secretary, Government of Punjab. The EPD has its independent Minister. According to the provisions of the Punjab Environmental Protection (Amendment) Act, 2012, EPD has a significant role in policy making and implementation of the environmental laws in the Punjab Province.

3.3.4 Relevant Legal / Institutional Framework

The applicable laws for the environmental study of the project are briefly given below. The proponent of the project will abide by the applicable laws and regulations.

A number of laws have been promulgated by the Government of the Pakistan to deal with the environmental and social aspects related to the implementation of various development projects in the country. In 1983, the Government of Pakistan issued an

Environmental Protection Ordinance (EPO) that was replaced by the PEPA, 1997, through an Act of Parliament. According to the 18th Amendment in Constitution, the PEPA 1997 has been confined to Federal Area and provinces have been allowed to formulate their own environmental legislation in the subject of environment. Under the PEP Act, it is mandatory to carry out IEE or EIA for all development projects. The Pak EPA has also framed guidelines for environmental assessment of projects in various developmental sectors, According to PEPA 1997; the National Environmental Quality Standards (NEQS) were established for effluents discharges and gaseous emissions of various Municipal and Industrial sources. The latest revision of NEQS as carried out in year 2000. Provincial Environmental Protection Departments are also working on the formulation and enforcement of environmental statutes and by-laws. The Pak EPA has issued several policies guidelines and adopted measures for streamlining the environmental assessment. Though, the need for environmental screening and assessment has received some weight during the recent past, strict implementation of the NEQS is still a dream to be realized. The applicable laws for the environmental study of the Project are briefly described below:

3.4 Pakistan Environmental Protection Order (PEPO) 1983

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO) 1983. It was the first legislation promulgated for the protection of environment. According to PEPO, 1983 it was necessary to carry out IEE / EIA for all development projects, but there were no IEE / EIA regulations under that ordinance.

3.5 Punjab Environmental Protection (Amendment) Act 2012

Section 12 of the Punjab Environmental Protection (Amendment) Act 2012 makes it mandatory for the proponent of a project to file with the Environmental Protection Agency either an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA), as the case may be, in respect of the project.

As per definition given in the Punjab Environmental Protection (Amendment) Act 2012, Initial Environmental Examination (IEE) means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory, and compensatory measures, formulation of environmental management & training plans & monitoring arrangements, and framing of recommendations and such other components as may be prescribed. The provision of Section 12 has been incorporated "as it is" in the new Punjab Environmental Protection (Amendment) Act, 2012.

3.6 National Environmental Policy 2005

Government of Pakistan has notified National Environmental Policy 2005, for different projects/aspects in which guidelines/priorities have been given to undertake/commence the projects having significant environmental impacts.

The National Environmental Policy (2005) provides a framework for addressing the environmental issues (particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of bio diversity, desertification etc.) confronting Pakistan. It recognizes the goals and objectives of the Pakistan National Conservation Strategy (PNCS, 1992), National Environmental Action Plans, and other existing environment related national policies, strategies, and action plans. It also provides broad guidelines to the Federal Government, Provincial Governments, federally administrated territories and local governments to address their environmental concerns and to ensure effective management of their environmental resources.

3.7 Review of IEE / EIA Regulations 2000

The Pak EPA has issued Review of the Initial Environmental Examination and Environmental Impact Assessment Regulations 2000, to review the Initial Environmental Examination (IEE) / Environment Impact Assessment (EIA) reports. Categorization of the projects for IEE and EIA is one of the main components of the Regulations. Projects

have been classified on the basis of expected degree of adverse environmental impacts. Projects type listed in Schedule I are designated as potentially less adverse effect, schedule I projects require an IEE and projects given in schedule II require EIA to be conducted.

Salient features of the Regulations are listed below:

- Categories of project requiring IEE and EIA are issued through two schedules attached with the regulations.
- A fee depending on the cost of the project has been imposed for the review of IEE and EIA.
- The submittal is to be accompanied by an application in prescribed format included as Schedule IV of the Regulation.
- The EPA is required to issue conformation of compliance within 15 days of receipt of request and complete documentation.
- The IEE / EIA approval for construction of the project will be valid for three years from date of accord.

3.8 Guidelines for the Preparation of IEE/EIA Reports

The Pak EPA has also framed Guidelines for the Preparation of IEE / EIA of projects in various developmental sectors.

3.9 The Punjab Local Government Ordinance, 2001

Schedules 4 and 8 of this Ordinance pertain to environmental pollution. There are not withstanding any specific provisions, every local government may perform functions conferred by or under the Punjab Local Government Ordinance, 2001, and in performance of such functions may exercise such powers, which are necessary and appropriate. Under the ordinance, the local councils are authorized to restrict projects causing pollution to air, water or land. They may also initiate schemes for improving the environment.

3.10 Pakistan Penal Code, 1860

This defines the penalties for violations concerning pollution of air, water bodies and land. Sections 272 and 273 of this Act deal with the adulteration of food or drink. Noise pollution has been covered in section 268, which defines and recognizes noise as a public nuisance. "A person is guilty of a public nuisance who does any act or is guilty of an illegal omission which causes any common injury, danger of annoyance to the public or the people in general who dwell or occupy property in the vicinity, or which must necessarily cause injury, obstruction, danger or annoyance to persons who may have occasion to use any public right".

3.11 The Land Acquisition Act, 1894

The Land Acquisition Act (1894) deals with the acquisition of private properties for public purposes. There are 55 sections in this Act mainly dealing with area notification, surveys, acquisition, compensation, apportionment awards, disputes resolution, penalties and exemptions.

Although quite old, this act laid out the legal basis for any property affected by a project and for compensating the effected owners of the land.

3.12 Factories Act, 1934

The clauses relevant to the project are those that concern the health, safety, and welfare of workers, disposal of solid waste and effluent and damage to private and public property. The Factories Act also provides regulations for handling and disposal of toxic and hazardous materials. Given that construction activity is classified as ‘industry’, these regulations will be applicable to the project contractors.

3.13 Labor Laws

Construction and operational activities during the course of construction may affect occupational health of workers. Employers are required to abide by labor laws in respect

of their own employees and also to ensure that contractors to follow the relevant labor laws and rules relating to safety of the workforce and creating a healthy working.

CHAPTER 4: BASELINE DATA & ENVIRONMENTAL PROFILE

4.1 General

The existing environment around the site of project has been studied with respect to physical, ecological and socio-economic resources. The existing information to establish a database for the IEE of the project was collected from different departments, review of previous studies and through the site visits carried in out in the project area.

4.2 Physical environment

The study examines the physical resources, topography, soil, climate, surface and ground water and geology of not only the project site but also the city as whole to assess whether the project under review can or does impact on any of these parameters. The description of physical environment of Kasur city and the project site is present in the following sub sections.

4.2.1 Geological Formation

The soil of the Kasur belongs to the typical alluvium of the Indo-Gangetic plains. The majority of the soils are loamy or sandy loam consisting of soil crust of different depths. Hardly any profile characteristics are observed; soluble soils are present in considerable amounts. The lower layer consists of kankar nodules. The soils have generally an alkaline reaction and are adequately supplied by phosphorus and potash, but are deficient in organic matter and nitrogen. Geologically the alluvium is divided into khaddar, i.e., the newer alluvium of sandy generally light colored and of less concretionary composition; and Bhangar, i.e., the older alluvium of the more clayey composition, generally of dark appearance and full of kankar. The soil differs in consistency from drift sand to loam and from fin silt to stiff clay. A few occasional pebble beds are also present. Layers of kankar in the Indo-Gangetic alluvium of the district are also observed.

4.2.2 Climate

Kasur's climate is a local steppe climate. There is little rainfall throughout the year. The Climate of Kasur is tropical. Except of few months of summer, Kasur is a suitable place to live.

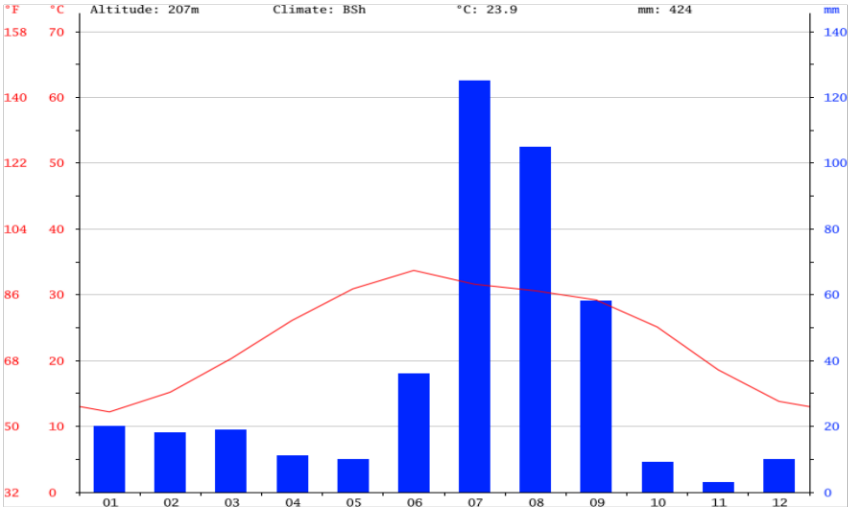


Figure 4.1: Climate Graph of Kasur

The people of Kasur have to experience extremes of temperature. The summers are really hot and the winters are very cold. There are three main seasons in Kasur, namely, summer, winter and rainy season. During the summers Kasur experiences heat waves.

Table: 4.1: Seasons in Kasur

Weather	Months
Autumn	Oct – Nov
Winter	Nov – Feb
Spring	Feb – Apr
Summer	Apr – Sep
Monsoon	July – Sep

4.2.3 Temperature

Kasur weather is hot and humid. The city experiences an extreme climate during the months of May, June and July, when the city witnesses summer season. The temperature in Kasur ranges between 40°C to 45°C, during the summer months. Kasur experiences winters during the months of December, January and February. The temperature during this season varies between 5°C to 8°C. Given below are the maximum and minimum temperatures of Kasur throughout the year:

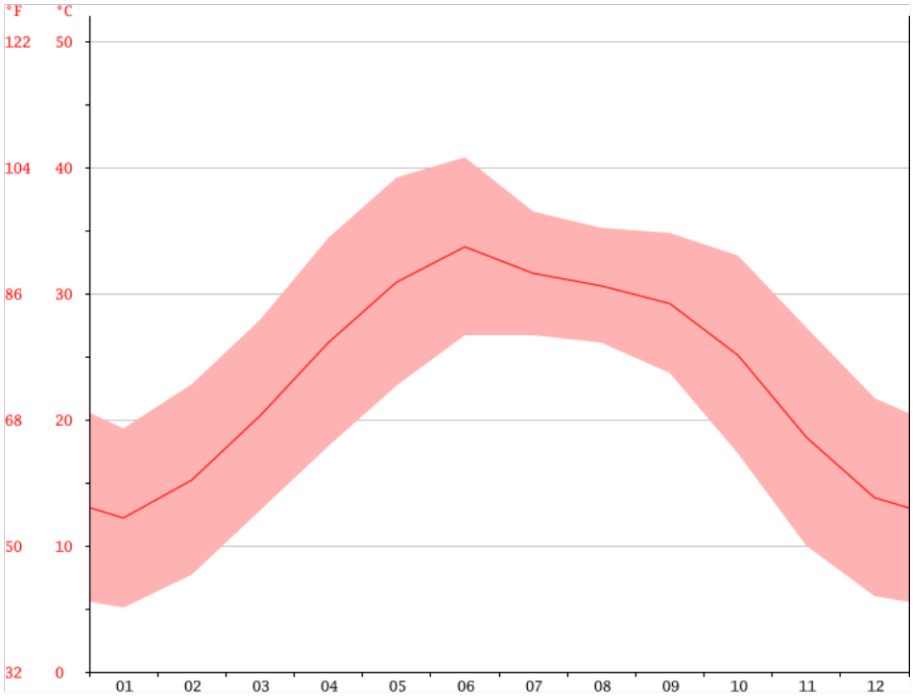


Figure 4.2: Average Annual Temperatures in Kasur

4.2.4 Rainfall

Kasur has a distinct rainy season, during which the weather is very humid. The rainiest months of the year are July and August, with June and September also gets some rain. During the rest of the year, barely any rain falls in Kasur.About 424 mm of precipitation

falls annually. Precipitation is the lowest in November, with an average of 3 mm. The greatest amount of precipitation occurs in July, with an average of 125 mm.

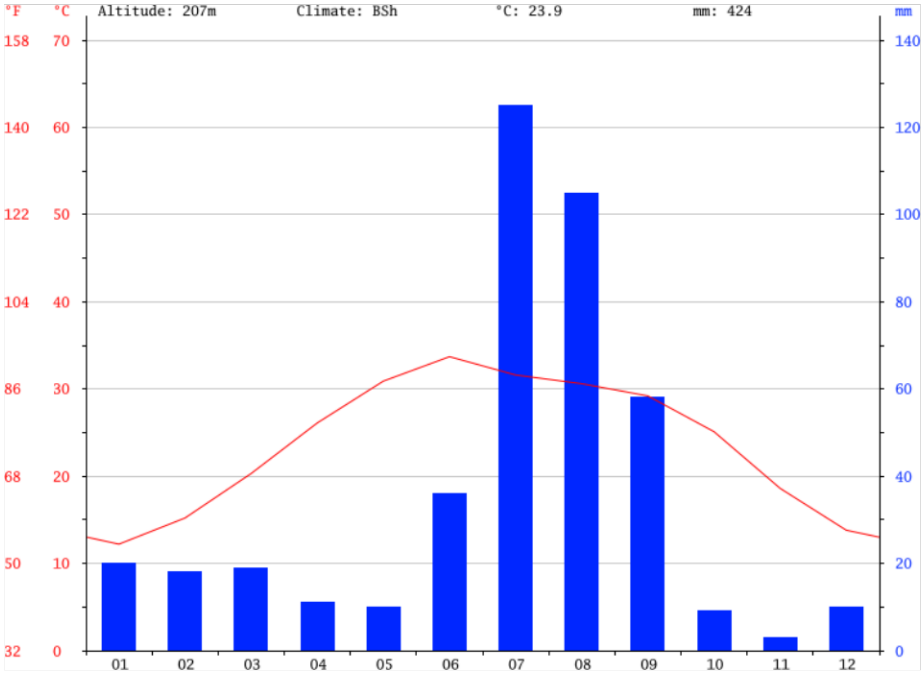


Figure 4.3: Average Yearly Precipitation in Kasur

4.2.5 Wind Direction

The Kasur region experiences westerly and north westerly winds during the winter and spring seasons, known usually as the dry stable times of year and southerly and south easterly winds during summer and monsoons. Wind speeds are low during winter picking up during spring season and peaking during the summer months.

4.2.6 Ambient Air Quality

Atmospheric pollution particularly in urban area has a strong impact upon daily life. Its economic growth and rising energy consumption are causing the increase in air pollution. The main sources of the air pollution are motor vehicles and industrial activities. SO_2,

NO_2, CO_2, CO, O_3 and Particulate Matter (PM) are investigated as the pollution indicators.

The overall air quality in the study area is of moderate nature. Dust particles along with oxides of nitrogen, sulphur and carbon are the major causes of air pollution in the ambient air quality.

It was however observed during the visit that environment of the project area is clean as the area is far away from the city Centre.

4.2.7 Water Resources

4.2.7.1 Surface Water

There are no surface water resources other than BRBD link Canal on which the proposed project is constructed. Which is non perennial the flow of water is only between April to October.

4.2.7.2 Drinking Water Quality

WASA (Water and Sanitation Agency) is providing drinking water to the residents of Kasur. WASA claims the quality of water conform to the Drinking Water Standards. The increase in population will have direct impact on the water sector for meeting the domestic, industrial and agricultural needs. Pakistan has now essentially exhausted its available water resources and is on the verge of becoming a water deficit country. The quality of water supplies in many cities of Pakistan is deteriorating fast. Over pumping of groundwater due to extended drought has affected the water quality adversely. Hand pump is installed on project site for drinking water purpose. There is no other source like WASA water supply on project site.

4.2.8 Noise Level

There are many a large, medium and small industries which are still working within city premises. Industrial activity and vehicular emissions are causing excessive noise in the city. The affluent areas of Kasur are quieter than rest of the city; the noise level in these

areas is still far higher than the standards set by the World Health Organization and the Pak-EPA. Noise pollution in the city is on the rise with most residents complaining that the noise is becoming a public nuisance. At project site through canopy noise level of generators controlled.

4.3 Ecological environment

Kasur is enriched with the presence of natural flora and fauna, although with the growing population and development activities, the presence of the same has been somewhat affected. There are no significant or well-shaped trees and shrubs on the project site as the site is located in plane land within the premises of project area.

4.3.1 Flora

Trees, also called the 'lungs' of the earth, are important for the restoration of the eco-system. People can benefit immensely from their survival and existence. Trees have also been a source of medicine for thousands of years and a refuge for various species of birds. Several species of the trees in Kasur are being used in medicine and provide excess raw material for Indian ayurvedics. Trees such as Neem, Bhaira, Harrar, Dhair and Moosri have great medicinal value and can be grown easily in the city. Many trees are found in the surrounding of the project area. Therefore there is no adverse impact on the flora. There is no Reserve Forest in the 5 km radius. No threatened or endangered species and no medicinal projects are present in the project area.

4.3.2 Fauna

With an increase in the rate of urbanization, the ecology of Kasur has been considerably affected and population of birds in Kasur has reduced to just 85 including the resident and migratory ones. Some birds and few animals like Buffaloes, cows, goats, donkeys, hen, rats, cats, dogs are present in the vicinity. Some reptiles like lizards are also present. No threatened or endangered species are found in the project site. Similarly no wildlife is present.

4.4 Socio economic

Social change is the consequence of almost any intrusion into the community life of any society. The intrusion can be in the form of any developmental projects or non-specific, less tangible forms such as increased exposure to other cultures, technological changes and so on. The social change that results from intrusion into community life can also be beneficial, but can have undesirable or negative outcomes. Even that change in the long run may have positive effect on the social wellbeing of a community. Social Impact Assessment is a methodology used for examining social change due to external sources, especially specific developmental projects, but also government policies, technological changes and social processes or anything that has a social impact.

The objectives of the given study are outlined as follow:

- To carry out the assessment of social impact.
- Acquire socio-economic data to evaluate and identify the project interventions.
- Assess needs of community related environmental concerns.
- To assess adverse and beneficial socio-economic and health impacts of the activity.
- To suggest remedial measures and solutions to improve socio-economic conditions.
- To analyze socio economic conditions of community, with special reference to environment and conservation of natural resources

4.4.1 Study Population

The target population was comprised of households around the project site which was a small village of Kasur.

Study Size

Therefore, approximately a total of 15 households of different socio-economic conditions were surveyed and their heads of households were our main respondents.

Study Instrument

Data collection tool was questionnaire; it was a 20- items based semi structured questionnaire.

4.4.2 Sampling Procedure for Questionnaire

4.4.2.1 Procedure

Before filling the questionnaire respondents were fully assured that their data will not be disclosed. They were told about the purpose of study. They were also told if they have any problem to understand the questions in questionnaire can ask**.**

4.4.2.2 Statistics Measures

After preparing the questionnaire, field surveys were conducted at 26-02-2017. The data selected from questionnaire was analyzed by using SPSS version 16. The data collected with the help of questionnaire was analyzed in SPSS to get the descriptions of current study. A part of questionnaire has been adopted from SF-36, a standard question to evaluate physic-social-health status.

4.4.2.3 Study Areas

Somehow at surrounding and nearer village was visited for socio-economic aspects. Detail of these sited are discussed below. These areas were surveyed by team of experts as per requirement of socioeconomic survey for Initial Environmental Examination Report of Hydropower Project.

4.4.2.4 Description of Tables:

In the following table, only frequency and percentage has been measured (by SPSS) of those parameters which are probably present in maximum quantity.

Table 4.2: Socioeconomic Questionnaire

Sr. #	Variables	Frequency	Percent (%)
1	Name & Address	-	-
2	Date	-	-
3	Address & CNIC	-	-
4	Age	89 (above 30 years)	89%
5	Education	93 (under metric)	92.8

6	Occupation	96 (Private jobs)	95.9
7	Marital Status	99 (married)	99
8	If married then no. of children	87 (> 4)	86.7
9	Total Family members	90 (< 5)	90
11	No. of earning members in family	88 (< 3)	88
12	Total income	97 (> 25 PKR)	96.3
13	Source of income	99 (Private jobs)	99

4.4: Respondent View about Project

4.5 Quality of life

No residential area is present near the project site; therefore, individuals and workers from neighboring areas were interviewed. The individual assessed from the neighboring communities of the project area were involved in agricultural practices and private jobs in nearby industries. Most of the people work in the shops or small units. Neighboring community inhabitants involved in different occupations were asked about their monthly income but most of them hesitated to tell and stated that they earn just enough to fulfill their basic demands. Regarding the project, almost all of the interviewed members were in favor of the project as it does not involve any chemical manufacturing or pollution causing operational activities which generate pollution. Data was also collected to assess the health status of the community members at the project site. Complaints about different diseases were also recorded during the study.

The diseases prevalent in the community were stomach disorders, fatigue, joint pain, diabetes and arthritis. But it was also observed that all these disease are commonly due to improper diet and water contamination.

4.4.1 Health facilities

The city of Kasur in Punjab Province of Pakistan is served by a number of private and government hospitals offering world class medical facilities. The rural and urban areas are served by various other medical centers and dispensaries offering modern medical facilities. The hospitals, dispensaries and medical centers in Kasur aim to provide the citizens best medical facilities and prevention from contagious and other harmful diseases. There is no health facility or any dispensary near the project area.

4.4.2 Transportation and Communication

Kasur is one of the most accessible cities of Pakistan and the only unique city of Pakistan where you can find Public and private Transport, 24 hrs a day and 7 days in a week.To fulfill the remaining needs of transport there are thousands of rickshaws and taxis which run on compressed natural gas to reduce pollution in the city and of course about 75 percent of the residents have their own conveyances. Public transport is not available inthe project area. Private transport is used by staff and workers and officials used their own conveyance.

4.4.3 Industrial Activities

Kasur trade and industries thrives on certain large-scale industries such as steel, textile, carpet and IT industries. Kasur is known as the industrial belt of Pakistan contributing the largest share in the GDP of the country. The city is home to 20% of Pakistan industrial producers; manufactures include textiles, rubber, iron, and steel. Handicrafts, especially gold and silver work, also flourish. The project area is present in a plain area and is surrounded by agricultural land.

4.4.4 Water Supply

The project will have an independent water supply system comprising storage tank of sufficient capacity. Water will be supplied to office and works through motor pump.

4.4.5 Telephone Facilities

Landline and Cellular telephone facilities are present in the project area.

4.5 Lab reports analysis

4.5.1 Ambient Air Quality Monitoring

Ambient Air Quality was monitored for the parameters according to Punjab Environmental Quality Standards (PEQS) 2016 i.e. Carbon Monoxide (CO), Sulphur Dioxide (SO_2), Nitrogen Oxide (NO), Nitrogen Dioxide (NO_2) and Particulate Matters (PM_{10}), Ozone (O_3), Carbon Dioxide (CO_2), Volatile Organic Compounds (VOC's), Humidity (%), Suspended Particulate Matters (SPM) and Humidity of ambient air at proposed site of 2.49 MW HydropowerProjectatBambawali-Ravi-Bedian *Canal* (BRB) at RD 510+600 within main Link canal in Kasur. This monitoring is carried out under standard time of monitoring i.e. 24 hrs. Monitoring reports are attached herewith Annexure

4.5.2 Ground Water Analysis

Ground water analysis was done for the parametersaccording to Punjab Environmental Quality Standards (PEQS) 2016 i.e. Alkalinity, Calcium, Carbonates, Total Coliform, Conductivity, Hardness as $CaCO_3$, Magnesium, Odor,pH, Sulfate, Sodium, Taste, Turbidity, Nitrogen/Nitrates, Lead and Mercury of the water samples collected from the proposed site of 2.49 MW HydropowerProject atBambawali-Ravi-Bedian *Canal* (BRB) at RD 510+600 within main Link canal in Kasur.. Results are obtained by ESPAK Laboratory are attached herewith Annexure.

4.5.3 Noise Monitoring

Monitoring of was done according to Punjab Environmental Quality Standards (PEQS) 2016 for proposed site of 2.49 MW HydropowerProject atBambawali-Ravi-Bedian *Canal*

(BRB) at RD 510+600 within main Link canal in Kasur.. Results are obtained by ESPAK Laboratory are attached herewith Annexure.

4.6 Conclusion

Comparison of potential adverse and beneficial impacts of the project shows that project will prove to be beneficial for the inhabitants of the Kasur city. The project will provide job opportunities for the local inhabitants as well as provide climate-friendly energy source, generating power without producing air pollution or toxic by-products. Hence improve their socio-economic status. Employment opportunities generated by the project include workers, helpers and guards. The overall socio-economic impact of the project is interpreted in relation to the existing environmental conditions.

The project, overall, does not have adverse impacts on the existing environment and people with due improjectation of the mitigation measures, there will be very insignificant adverse impacts on the socio-economic environment. The project has more beneficial impacts on the socio-economic environment than adverse impacts. In conclusion, it can be said that overall the project would have positive impacts on the socio-economic status of the workers the neighboring community inhabitants, because it is a green project and release less amount of GHGs because fuel is not used in the process.

CHAPTER V: STAKEHOLDERS CONSULTATION

5.1 General

Consultation with the stakeholders is a tool for managing two-way communication between the project sponsor and the affected public. Its goal is to improve decision-making and build understanding by actively involving individuals, groups and organizations, which have a stake in the project. This involvement increases project's long-term viability and enhances its benefits to locally affected people and other stakeholders.

In order to evaluate the socioeconomic and environmental impacts, field surveys are extremely essential. In addition to the surveys at the preliminary stage, consultation with the community and their active participation plays a vital role in successful implementation of the project. To identify the different types of stakeholders and ascertain their perceptions about the project were measured. A social impact assessment survey was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed in the following pages.

5.1.1 What is stakeholder engagement and why is it important?

Stakeholder engagement helps organizations to proactively consider the needs and desires of anyone who has a stake in their organization, which can foster connections, trust, confidence, and buy-in for your organization's key initiatives.

5.1.2 Proponent

Mr. Mr. Muhammad Haider Ali S/O Muhammad Aslam Khokhar is the proponent of "Proposed project which is an Incinerator Plant by Leo Waste Management (Private) Limited at Mouza Rakh Mad kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur".

5.1.3 The responsible authority

Mr. Mr. Muhammad Haider Ali S/O Muhammad Aslam Khokhar is also the responsible authority for the said project either its implementation, procedure with SOPs, manage the team or following Environmental protocols.

5.1.4 Other departments and agencies

The project is incinerator by Leo Waste Management (Private) Limited, Kasur which is an open land and proponent has applied for Environmental Approval while there is no further TMA which has been involved for map approval. Further project is no needed any Govt. department or agencies.

5.1.6 Environmental practitioners and experts

Environmental health practitioners are dedicated to protecting public health by monitoring and recommending solutions to reduce pollution levels. They use specialized equipment to measure the levels of contaminants in air, water and soil, as well as noise and radiation levels. For this sake Environmental lab was hired to measure the ambient air quality parameters, noise level and water analysis of the area. The results were within the limits set by EPA, Punjab (Lab reports are attached in file). Further during whole construction phase and in operational phase Environmental Expert will conduct the monitoring to access the quality of air etc.

5.1.7 Affected and wider community

The study carried out in almost 2km which made sure there is no population and community. Moreover project is located in open plot where no fauna and flora will be affected by the project activity during construction as well as during operation.

5.2 Objectives of Consultation

Public consultation plays a vital role in studying the effects of the project on the stakeholders and in the successful implementation and execution of the project. Public involvement is a compulsory feature of environmental assessment, which leads to better and more acceptable decision-making. The objective of the consultation with

stakeholders is to help verify the environmental and social issues that have been presumed to arise and to identify those which are not known or are unique to the operation of the project.

The important general objectives of the consultation process are:

- Information dissemination, education, and liaison
- Identification of problems and needs
- Collaborative problem solving
- Reaction, comment and feedback on the Project;
- Documenting mitigation measures proposed by the stakeholders

5.3 Methodology

The EIA Team carried out public consultations at various locations within and around the project site. The stakeholder's consultation during this phase of the work targeted the project area, administrative and private offices etc. near the project area:

- Selection of the stakeholders for consultation, reconnaissance of the project site and initial discussions with the neighboring villagers, drivers etc.
- Appraising the targeted stakeholders initially for the purpose of consultation and working out a schedule for holding regular consultation meetings
- Distribution of questionnaires to obtain opinions and concerns
- Meetings with the stakeholders through the participation of environmental consultants and social specialists and documenting the opinions of the stakeholders expressed during the meetings etc.

5.4 Categories of Stakeholders Consulted

The stakeholders contacted during the survey belonged to different categories of people as shown in the Table 5.1.

Table 5.1: Categories of Stakeholders Interviewed in the Project Area

Sr. No.	Stakeholder Category
1	Workers of Surrounding
2	General Public
3	Potential Distributors

5.5 Issues Discussed

Following issues were discussed during the stakeholder consultation:

- Overall activities of the project operational phase
- Possible impacts on natural vegetation, land and properties
- Possible mitigation measures
- Benefits or implications of the project specifically for the local people
- Education, lifestyle, jobs and salaries which directly reflects the people's life style living around the industrial area.

5.6 Findings of the Overall Discussion

- After making complete feasibility the site is being used for industrial activities.
- The project helps to provide a safe and environment friendly area for manufacturing of medicines. It enhance the socioeconomic conditions/values of the area
- Project increases revenue generation for the Government
- It create employment opportunities
- Local people should be given preference for employment in the project

Since the project is planned to be established in an existing industrial area. Majority of people favored the project in a sense that the project overcomes the increasing need medicines demand in market.

5.7 Socioeconomic Trends around the Project Site

Socioeconomic status (SES) is an economic and sociological combined total measure of a person's work and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation.

This chapter includes the information that how the present study has been conducted and what are the results of this socioeconomic survey in the surrounding areas of project.

5.8 Study Population

The target population was comprised of workers surrounding around the project.

Study Size

Therefore, approximately a total of 10 different socio-economic conditions were surveyed and nearby labor people are our main respondents.

Study Instrument

Data collection tool was questionnaire; it was a 15- items based semi structured questionnaire.

Sampling Procedure for Questionnaire

Procedure

Before filling the questionnaire respondents were fully assured that their data will not be disclosed. They were told about the purpose of study. They were also told if they have any problem to understand the questions in questionnaire can ask**.**

Statistics Measures

After preparing the questionnaire, field surveys were conducted. The data selected from questionnaire was analyzed by using SPSS version 16. The data collected with the help of questionnaire was analyzed in SPSS to get the descriptions of current study. A part of questionnaire has been adopted from SF-36, a standard question to evaluate physic-social-health status and project awareness.

Study Areas

Somehow at surrounding area was visited for socio-economic aspects. Detail of these sited are discussed below. These areas were surveyed by team of experts as per requirement of socioeconomic survey for Environmental Impact Assessment Report of project.

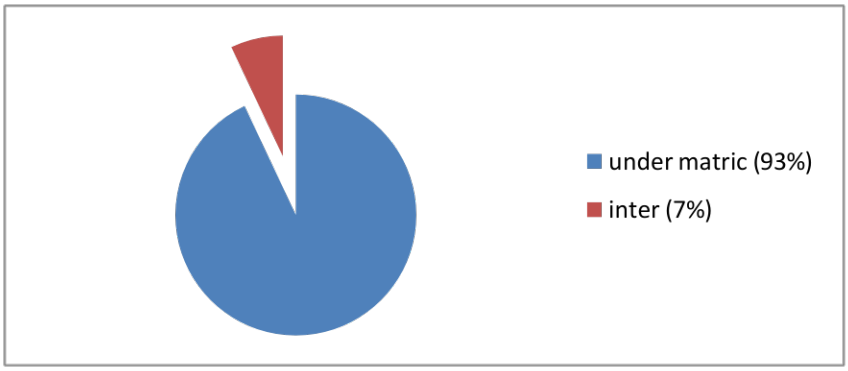
Description of Tables:

In the following table, only frequency and percentage has been measured (by SPSS) of those parameters which are probably present in maximum quantity.

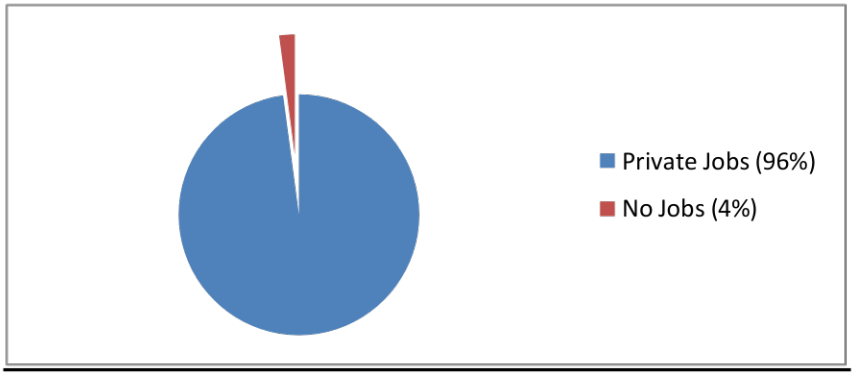
Sr. #	Variables	Frequency	Percent (%)
1	Name & Address	-	-
2	Date	-	-
3	Address & CNIC	-	-
4	Age	89 (above 30 years)	89%
5	Education	93 (under metric)	92.8
6	Occupation	96 (Private jobs)	95.9
7	Marital Status	99 (married)	99
8	If married then no. of children	87 (> 4)	86.7
9	Total Family members	90 (< 5)	90
11	No. of earning members in family	88 (< 3)	88

12	Total income	97 (> 25 PKR)	96.3
13	Source of income	99 (Private jobs)	99

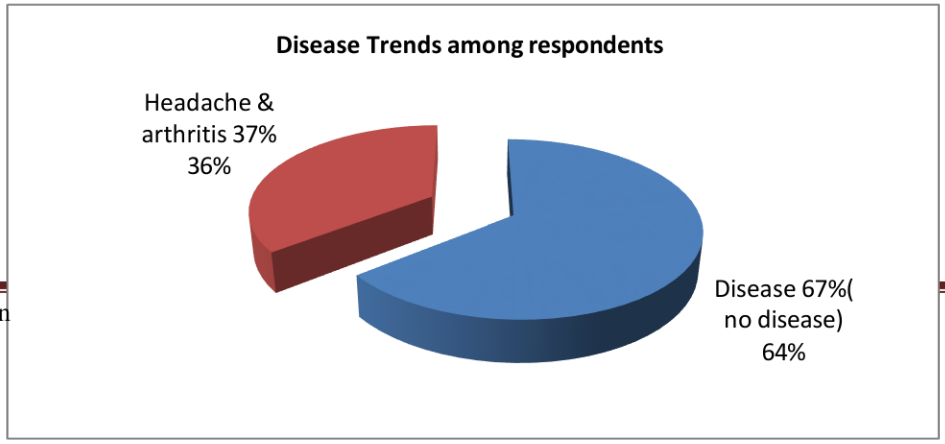
Table 5.2: Socioeconomic Questionnaire



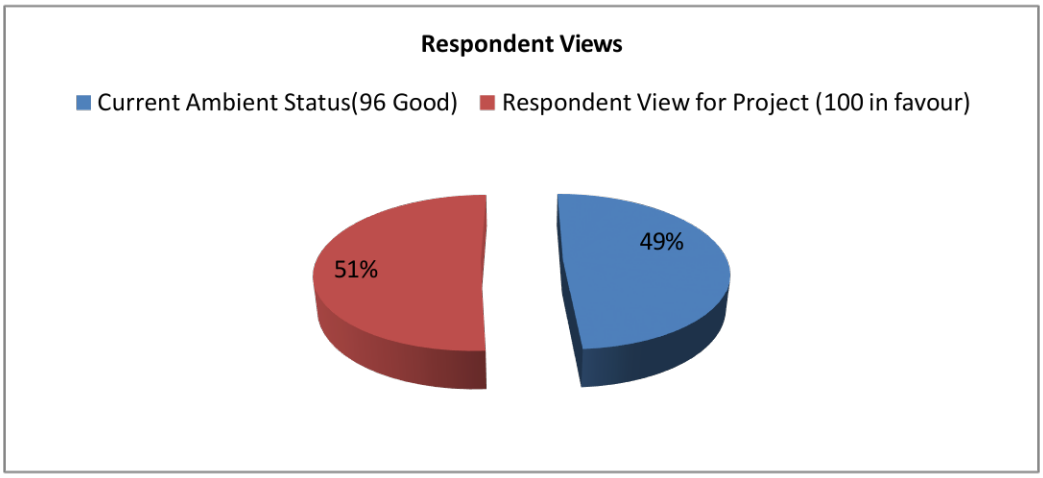
5.1 Graphical Presentation of Education around the Project Site



5.2 Trends of jobs around the project site



5.3 Health Status of Respondents



5.4 Respondent View about Project

5.9 Stakeholder Concerns and Recommendations

The finding of the community consultation has been addressed in various sections of EIA. Mitigation plan has been incorporated into EMP. The summary of consultation with various stakeholders is given below:

5.9.1 Project Approval

The community consultations demonstrated that goodwill towards the project proponent indeed exists. Approval for project activities by communities was evident. The consultations were considered a good gesture and were appreciated; especially by men and women. The poverty level is such that communities are looking forward to any

project proponent to improve their financial well-being to a great extent. Benefit from the project should be distributed judiciously and equitably among the primary stakeholders in the project area, and the proponent will continue to ensure that this principle is followed in this project and community development program.

5.9.2 Local Employment

Communities in the project area emphasized that local inhabitants should be given priority when employing people for related works and activities according to their skills.

5.9.3 Compensation

Compensation shall be paid for any damage if it is there. The compensation process should be transparent.

5.10 Findings and Conclusion

Results of socioeconomic survey showed that setting up a plant for disposal through incinerator of all and various types of solid waste (including industrial, commercial, institutional, domestic, biomedical and other wastes) on a vacant land and possesses by the proponent will be devoid of any serious environmental impacts, whatsoever, interalia for the following reasons:

- The building will be constructed on a vacant land
- The machinery will be installed after construction of building

CHAPTER 6: SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The potential environmental impacts related to the project have been studied in context of construction and operational phase of the project. Environmental protection measures are recommended to eliminate adverse impacts on environment or to reduce them to an acceptable level within the prevailing legislative and regulatory framework, although project has all mitigation measures and all conditions are environment friendly. These impacts are evaluated on the basis of magnitude, immediacy and sustainability. A careful consideration of project aspect, their potential environmental impacts and mitigation measures are proposed in this chapter. Evaluation criteria are as follow:

- Magnitude: Type of impact (direct, indirect, and cumulative)
- Immediacy: Temporal extent (during construction, after construction)
- Spatial extent: (local, widespread)
- Sustainability and Reversibility: Mitigability (fully, partially)
- Monitoring (fully, partially)

What is the problem

The Proposed project is an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur which will incinerate all sort of solid material and problem will not be until and unless protocols and SOPs will not be ignored. The problem can be if capacity of waste will be inserted in incinerator more than its capacity and temperature will not be maintained if.

When will problem occur and when it should be addressed

If temperature will be increased or emission will be happen more than fixed range then problem can be considered and it can be maintained immediately by following the SOPs and protocols.

Where problem should be addressed

There will be team who were addressed and well oriented with all procedure, SOPs, protocols and management rules. Every person in staff will be fully committed to his

duty. If any person feel problem in system then he will directly address this to managing director who will resolve the problem according to its ranked person.

How the problem should be addressed

- Clearly define the problem.
- Don't jump to conclusions.
- Try different approaches.
- Don't take it personally.
- Get the right people in the room.
- Document everything.
- Bring a facilitator.
- Develop your problem solving skills.

6.1 Environmental Problems Due to Project Location

Project location is at Mouza Rakh Mad kay Kalan, Outside Kamaiti, Tehsil Kot Radha Kishan, District Kasur. Environmental impacts due to project location have been studied and adequate mitigation measures have been proposed.

A detailed explanation of each potential impact is given in table;

Table .1: Environmental Problems/Mitigation Measures Due to Project Location

	POTENTIAL IMPACTS	MITIGATION MEASURES
1.	**Change in Land Use Pattern**	
	Any new intervention has its first and foremost impact of changing the land use pattern of the area. The impact of this nature is irreversible therefore site selection needs to have careful consideration of the impacts that may arise due to the changes in land use patterns.	The most essential factor adding to the feasibility of the project site was that it is within the battery limits of the industrial cluster thus reducing any energy loss in the transmission of electricity. In addition, current land use price and comparatively less environmental impacts associated with the location reinforce the feasibility of the site selected.
2.	**Pressure of Resources**	
	Yet another impact to be considered prior	Considering this very important factor, the site

	to site identification is the availability of already existing resources e.g. water, gas, electricity, etc. any new intervention can exert pressure and marginalize the existing community. This could eventually create a sense of deprivation among the already existing domain and may eventually result in social unrest.	identification was done after evaluating the extent of provision of resources. The water requirements, energy requirement, social services can be approached easily. The current location has also adequate resources for example gas, electricity, access roads alongside manpower with required skills and education being in the industrial cluster. The main pressure of resources at the project site is availability of raw material for the project which project towards suitability in regard of production.
3.	**Natural Hazards**	
	It is very important to assess the extent of damage any natural hazard e.g. earthquake, floods, landslides may cause. The geological formation of the capital territory is such that it has been categorized into earthquake zones.	The site identified within environmentally /geologically safe and does not fall in any of the earthquake zones in which the capital territory is divided.
4.	**Displacement of Local Community**	
	Displacement of local community can tend to create social issues and aggravate negative feelings from the existing population towards the project.	The land surrounded by industrial units cum open areas that does not require any displacement of local community.
5.	**Accessibility Issues to the Local Community**	
	Another important impact considered was obstruction or changes in the patterns of transportation and increase travel time/distance for the local community.	The project site is surrounded by industrial cluster and it is an already exist in industrial infrastructures cum open areas thus does not involve damage to any roads. Nature, size and scope of work also limit the extent of activities

		during operational phase.
6.	**Presence of Sensitive Areas**	
	Development interventions can degrade the quality and life expectancy of ecologically, socially and historically sensitive areas.	There are no sensitive areas of any nature (ecological, social or historical) in surrounding of the project area.
7.	**Availability of Existing Infrastructure and Services**	
	Unavailability of infrastructure can render the entire project void and impractical due to absence of important community infrastructure.	The project is well connected to the rest of the city through roads e.g. main road and health facilities to workers and also for the local people, and transport facilities available hence making the location ideal for the project.

6.2 Environmental Problems Associated With Project Construction &Operations

Provides a detailed overview of the environmental aspects and subsequent environmental impacts that may arise during project construction and operational phase. Appropriate mitigation measures are also proposed for the remedy of any such potential impacts.

Table 6.2: Environmental Impacts/Mitigation Measures during Construction & Operational phase

	POTENTIAL IMPACTS	MITIGATION MEASURES
1.	**Solid Waste Management**	
	Improper and unplanned solid waste dumping can cause environment, health and safety issues. It also can potentially deteriorate the living quality of the residents besides reducing the aesthetic quality of the entire scheme.	Solid waste generation from the construction activity and domestic sources will be disposed of properly. The solid waste from the construction activity will be re-used. As for domestic waste, at site there is already has a waste disposal system for handling of solid waste like sanitary workers of that area will collect the solid waste. SW Manager

		will be hired who will take care for all system regarding solid waste at the project site during construction and operational phase. The operational phase of the project will not produce any solid waste except domestic and some sort of project related which will comprise on wrappers, papers etc which will also be incinerate with domestic solid waste.
2.	**Wastewater Disposal**	
	Wastewater generated due to domestic/process activities result in the spread of vector borne diseases like dengue, malaria, as well as spread the nuisance of foul smell.	Wastewater during construction phase will be reused like for soil sprinkling and construction material making etc. The wastewater produced in the operation phase will be domestic as well.
3.	**Energy Conservation**	
	Excessive use of energy exerts more pressure on the already dwindling energy resources of the city/country.	Proponent is committed to install energy efficient machinery and equipments by implementing the modern technologies. Thus there is no fuel requirement and does not put pressure on the existing resources.
4.	**Noise Generation**	
	Noise emissions due to traffic and any activities create issues to the residents.	Any activity that leads to noise pollution is restricted. Noise suppression canopy will be installed over the machinery/equipments instruments to reduce the noise pollution. Modern technologies ensure the standards with the international standards of the noise pollution. In order to keep noise within the limits set under PEQs, the proponent will

		ensure regular monitoring by using the EPA approved methods, EPA certified laboratories will be involved in this regard. Records of monitoring will be maintained and shared with the EPA.
5.	**Emergency/Fire Hazards**	
	Emergencies e.g. fire incidents may lead to environmental, health and safety issues to the local residents.	During construction phase all emergency conditions will be prepared like fencing around the construction site etc. Emergency preparedness plans will be prepared for the operational phase. Call points at suitable locations are also mentioned because being in the industrial cluster. But during the operational phase the emergency preparedness plan will be followed and it is attached with annexed.
7.	**Training of Staff**	
	Unskilled persons are not able to tackle environmental, health and safety related situations which may further aggravate any such issues and cause loss of human life and property.	Regular training of the staff will be conducted. Proper monitoring and reporting mechanism is developed where the team is responsible to communicate/report any illegal or hazardous situation to the team leader.
8.	**Social Impacts**	
	Problems regarding privacy of local community may arise due to invasion of outside population.	Though the chance of any improper social conduct are negligible due to the fact that the project site is an inside the industrial cluster. However, having a proactive approach, improper social behaviors e.g. staring and teasing is discouraged and any such incident

		report directly to the site in-charge. Workers will be hired from the local community to avoid social issues.
9.	**Transportation**	
	Transportation of raw material/waste for safety stuff manufacturing to and from the project site creates a probability of accidental spills and fire.	Transportation vehicles keep maintain in good conditions to avoid the chances of accidents. Demarcation of proper area onsite for parking of construction vehicles. During construction as well as of operational phase, vehicles will be entered into the project site according to schedule and need. Being in the industrial zone there is a demarcation and proper plan of incoming and outgoing of the vehicles.
10	**Terrestrial biodiversity**	
	Development should not disturb the biodiversity because biodiversity are the precious elements of the area	Following measures will be adopted in favor of biodiversity of that area. Project site is in industrial cluster where there is no biodiversity. Adopting a vegetation program that uses indigenous stocks of local vegetation Proponent is committed to plant the plants after completion of construction work for making the environment friendly and for aesthetic beauty as well.
11	**Health and safety**	
	Health and safety parameters are the key necessities of the any project in which minor negligence can have damage.	Following mitigation measures will be adopted; ➢ Enforcing site security

		➢ Ensuring site safety ➢ Enhancing safety at site facilities ➢ Establishing environmental controls ➢ Regulating transportation on-site
12	**Emergency preparedness plan**	
	Emergency preparedness plan is fundamental factor of any project site so that in case of any emergency conditions can be tackled.	For emergency preparedness plan there will be fire hydrants and fire extinguishers at certain points.
13	**Socioeconomic**	
	Socioeconomic factor comes in priority parameters because it's about surrounding people income.	By reducing socioeconomic problem following measures should be adopted; The site is in industrial zone but still the proponent is committed to give job opportunity to the locals of the area. ➢ Reducing potential exposure to emissions.
14	**Air Emissions**	
	By operating the incinerator, few gases can be emitted like particulate matters, dioxins etc.	Air emissions during construction phase will be usually from generator but generator would be maintained and up-to-date to control the air emissions. Electrostatic precipitators will be used to control the air emissions like particulate matter while dioxins usually produce when temperature go beyond the limit and it happen when waste put more than capacity. So by keeping the all protocols, air emissions will be controlled in operational phase of the project.

15	**Vibration and Noise Pollution**	
	Vibration and noise pollution can be produced during construction phase and operational phase if machinery will not be properly look after. The vibration and noise pollution can cause the trouble to surroundings.	The vibration and noise pollution during construction and operational phase will be controlled by grouting the machinery fully and generators will be kept in canopy and will be fully maintained.

6.3 Risk Analysis Matrix

The impact associated and their risk score was calculated for each impact type to get an overall probability of severe impact that the project might cause during any stage of its existence. The stages have been categorized according to the guidelines and the Risk Analysis Matrix method has been employed to obtain the overall impact in terms of probability, likelihood, severity and overall magnitude of impact.

Table 6.3: Risk Analysis Matrix

Potential Impacts	**Magnitude**	
	Without EMP	**With an EMP**
Air quality	**---**	**-/0**
Waste generation	**---**	**-/0**
Traffic	**--**	**-**
Noise	**--**	**-**
Surface and water quality	**--**	**-/0**
Soil quality	**--**	**-/0**
Terrestrial biodiversity	**--/+**	**-/++**
Resource use	**--**	**-**
Health and safety	**---**	**-/+**
Landscaping and visual inspection	**---**	**-/+**
Socioeconomic	**-/+++**	**-/+++**

+++ High Potential Positive Impacts	**--- high potential negative impact**
++ moderate potential positive impact	-- moderate potential negative impact
+ low potential positive impact	- low potential negative impact
0 Neutral impacts	

6.4 Social Enhancement Measures

Socio-economic enhancement measures taken proposed project that is an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur are described below;

How to Measure Social Impact

- Decide on a framework.
- Identify your Metrics.
- Understand your attribution.
- Get the timing right. ...
- Value qualitative data. ...
- Recognize your own accountability. ...
- Be open to learning.

Impact measurement and management includes identifying and considering the positive and negative effects one's business actions have on people and the planet, and then figuring out ways to mitigate the negative and maximize the positive in alignment with one's goals. That why when socioeconomic Performa's and measurement taken then economic and health was assess of surrounding workers and locals.

Health and Safety Program

Health and Safety will be one of the top priorities at an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur and as a socially responsible organization, they actively seek to impart their best practices in the communities they operate in.

Additional Considerations

It is very importance to plan a project after evaluating its cumulative socio-environment and cultural impacts. The project is a unique venture in the identified locality as it will address the environmental, social and safety issues through establishing norms of operating within the area. The project is planned after keeping all the parameters of environment, health and safety for site identification, and operational phase. That's why the cumulative impacts of the project are negligible.

CHAPTER 7: ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

7.0 SCOPE OF ENVIRONMENTAL MANAGEMENT PLAN

Several measures have been identified in this EIA report to prevent or mitigate the adverse environmental impacts of Proposed project that is an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur. To ensure that these measures are incorporated in the construction & operational phase of the project, it is necessary to develop a comprehensive Environmental Management Plan (EMP). The plan addresses the mechanism through which the measures will be implemented; defines the responsibilities of the workers and the management; and lays down the required documentation, communication and reporting procedure.

Institutional Capacity

Its aims to enhance the capacity building of a system and project by the managing the sources to increase the efficiently effectively. The management work for continues improvement and development of the project to enhance the sustainability of project outcomes. It also includes the management worker and project associated persons to increase their moral by giving them training. Every associated person with the project being motivated with their duties and responsibilities to increase productivity of the project. The key motto is to decrease communication gap from top to bottom hierarchy.

A 8-10 person's team of unskilled and skilled workers will be hired. When they will hire, special orientation for two days in regard of work is presented.

7.1 General

This EIA provides the Environmental Management Plan (EMP) of the project for its construction and operational phases to keep it environment bargain as well as the monitoring plan to ensure the compliance of the established EMP.

Outline and key features of the EMP for construction and operational phase is presented.

7.2 Purpose and Objectives of the EMP

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified in the EIA.
- Define the responsibilities of the project proponent and staff.
- Means of effective communication of environmental issues between them.
- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

7.3 Management Approach

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

Proponent: The project proponent will undertake overall responsibility for compliance with the EMP. Proponent will carry out verification checks to ensure that the contractors are effectively implementing their environmental and social requirements.

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

7.4 Environment Management Plan for Construction Phase:

It lists all the mitigation measures identified in the EIA and the associated environmental or social aspect in line with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures.

Table 7.1 environment Plan (EM)

Environmental and social aspect	Measures	Responsibility

Construction Noise control plan	Periodic surveys will be conducted for the control of noise level from the sites where machinery will be installed. Workers on high noise machines will be provided with PPEs (ear plugs, ear muffs). Machines will be equipped with mufflers. Other noise control measures will be implemented	Administration/ construction Contractor
Dust emission control	During proposed project work of Proposed project is an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur involving construction, Water will be sprinkled on all the exposed sites to suppress the emission of dust whereas during installation of equipments& machinery, there will not be dust emission so on mitigation required	Administration/ Construction contractor
Vehicle and equipment exhaust control	All vehicles and other equipment used during the construction & installation will be tuned and maintained in good working condition in order to minimize the emission of pollution	Administration/ Construction Contractor
Water conservation plan	Groundwater being extracted for construction activities of Proposed construction project would be recorded, where possible, water would be recycled.	Administration
Community Safety Plan	Fence surrounding the site will be put in on during the construction to prevent	

	assesses. All entry points into the site will be staffed 24 hours a day with guards. No machinery will be left unattended particularly in the running condition.	Administration
Worker's safety plan	SOPs will be established for all activities on the site, workers will be trained and guided to follow SOPs and will be provided with necessary PPEs wherever required. Careful monitoring will also be carried out.	Construction contractor
Soil contamination	During construction vehicle activities, Spills trays will be provided and used at refueling locations. Emergency plan for the spill management will be prepared and inducted to the staff for any incident of spill. Fuel, lubricants and chemicals will be stored in the covered bounded area	Construction Contractor

7.5 Environmental Monitoring Plan

Environmental monitoring is a vital component of the Environmental Management Plan in protecting the environment is measured. The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation and planning corrective actions. The main objectives of the environmental monitoring during the construction phase will be.

- To provide a mechanism to determine whether the project construction contractors are carrying out the project in conformity with the EMP.

- To identify areas where the impacts of the project are exceeding the criteria of significance and, therefore, require corrective actions.
- To document the actual project impacts on physical, biological and socio-economic receptors, quantitatively where possible, in order to design better and more effective mitigation measures.

Following environmental record should be maintained:

- Periodic inspection reports of the site.
- Audit reports
- Incident record of all moderate and major spills and other incidents and accidents. The record will include.
    - Location of spill or battery limit of the accident
    - Estimated quantity of the amount of injury (as may be reported in LTI or LWI)
    - Spilled material or nature of injury or loss (temporary or permanent)
    - Restoration measures.
    - Photographs
- Description of any damage to vegetation, water resource, or community asset.
- Corrective measures taken, if any.
- Waste Tracking register that will records of all waste generated during the construction period. This will include quantities of waste disposed, recycled, or reused.
- Records of water consumption with use wise breakdown.

Survey reports, in particular, the following:

- Vehicle and equipment noise.
- Ambient noise survey reports
- Ambient level of PM

- Vendor data – all vendors disturbed by the project and compensation paid.
- Public infrastructure. Record of all damages and repair work undertaken.
- Employment
- Total number of unskilled, semi-skilled and skilled jobs offered during Construction.
- Name and domicile of the employed staff.
- Project and Community interface
- Record of community complaints and the measures taken to address them.
- Number of meeting held in various communities and data of persons who attended
- Environmental and social training records.

Table 7.2: Roles and Responsibilities for environmental Monitoring

Aspects	Proponent Responsibilities	Contractors Responsibilities	Relevant Documentation
Contracting	Ensure that the monitoring requirements are included in the contract between the proponent and the construction contractor	Understand the requirements and correctly estimate and report the required resources	Contract between the proponent and the contractor
Monitoring plan	Finalize the monitoring plan prior to the commencement of the construction		Revised monitoring plan
Resources	Ensure the availability of	Ensure the availability	Project budget

	resources for environmental monitoring	of resources for environmental monitoring and their efficient use without wastage	
Environmental staff	Designate an environmental manager for the project	Appoint officer dedicated to environment	Job description
Monitoring survey	Undertake the periodic (pre-planned) and unplanned) inspection and carry out the field measurement	Systematically observe and collect the data on the environmental performance	Inspection and survey reports
Environmental Audit	Conduct periodic audits of the construction site and commence third party audit	Conduct audits	Audit reports
Reporting	Ensure that periodic environmental monitoring reports are received		Periodic reports
Corrective action	Verify that activities are carried out complying with EIA/EMP	Carry out the corrective actions	Corrective action record
Maintenance of record	Maintain monitoring data and record of all incidents of environmental significance	Maintain monitoring data and record of all incidents of environmental significance	Environmental data base

Table 7.3: Environmental Monitoring

Potential activity and potential impact	Objective of monitoring	Parameter to be monitored	Measurements	Location	Frequency	responsibility
Disturbance due to noise from operational activity	To determine the effectiveness of the noise abatement measure on the sound level	Noise level near the receptor	Reading will be taken	At least three locations on the unit boundary and three locations at the receptor end	On three typical working days and one weekend	Environment Officer/ Manager
Waste collection storage and disposal	To check the availability of waste management system and implementation	Inspection of waste generation, collection, storage and disposal will be undertaken at each site of the project activity	Visual inspection	Construction on and operational site	Once daily	Environment Officer/ Manager
Water and other	To determine the	Leakages, spillages	Visual inspection and	At all points of use	On monthly	Environment Officer/

resources conservation	effectiveness of the water conservation techniques in practice	and wastages	record tracking		basis	Manager
Workers' safety	To check and evaluate the effectiveness of the workers' safety plan	Injuries	Injuries will be recorded	On site	Daily	HSE/ Construction contractor
Vehicle and equipment exhaust	To confirm the availability of exhaust control devices with the construction vehicles and equipment and their maintenance levels.	Air quality at different points around the vehicles and equipment	Readings will be taken	At least three points around the vehicles and equipment and three points at some distance downwind	On three typical working days	

7.6 Environment Management Plan for Operation Phase

This section outlines the aspects that will be covered in the EMP for the operational phase of the project, but also to enhance project benefits, and to introduce standards of good practice to be adopted for all project activities.

Table 7.4: ENVIRONMENTAL MANAGEMENT PLAN FOR OPERATION PHASE

Aspects	Potential Impacts/Risks	Proposed Mitigation Measures	Responsibility
Changes in land value	Economic losses/gains	Minor positive	-
Seismic Hazard	Damage due to earth quake	Selection of a design for structure that must be safe against earthquakes	Project Contractor
Change of Land use	Proposed project is an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur will be developed on open plot having open cum industrial area in the surrounding.	The land of the proposed project is an open land which will keep the intact of its surrounding. The proposed project will not make any changes in the project site.	Project Contractor
Traffic Movement	Movement of vehicles may result in traffic disruption if proper parking facilities are not provided.	Adequate parking facilities will be provided for the tractor-trolleys to bringing the waste material from different points to project site for incinerate.	Project Contractor
Additional load on Existing Utilities	Additional load on water supply, sewerage system, electricity ,telephone ,gas and solid waste system	All the effects and mitigations of these utilities have already been covered in previous sections and no any problem will create due to load on existing facilities.	
Disposal of Solid Waste	Dumping of waste material in the	The project site will be used for the incineration of the waste	Project Contractor

	surrounding area may limit use of land	which will be all types of waste and collected from different units. The waste will be incinerating here and domestic waste which will be produced will also be incinerating with residential waste material. Thus dumping of waste is not issue at the project site while ash which is end material after incineration will be dumped in the specified area pointed out at the project site.	
Air Quality/ gas emissions	Gases will be emit during running of incinerator which may cause the pollution around the project site	Plantation will be provided which will generate fresh oxygen; An air quality monitoring and improvement plan will be developed to keep the air pollution levels from generators etc. within the limits of Punjab Environmental Quality Standards (PEQS); Level of air pollution (as specified in the PEQS) will be monitored on regular basis; and vehicles with excessive smoke emissions will not be allowed to enter. The gases might be produced during the running of incinerator will be flue gases, dioxins and particulate matter. These gases will be produced if SOPs will not be	Project Contractor

		followed properly or incinerator will be used more than capacity. Thus by following protocols no gases will be emit. Moreover electrostatic precipitators will be installed to control the minor gases may evolve from the system.	
Noise and Vibration	Noise pollution due to increased machinery operation	Selection of up-to-date equipment and machinery with reduced noise levels ensured by suitable in-built damping techniques; Regular checkups and maintenance of the construction equipment; and use of appropriate muffling devices,	Project Contractor
Flora	Construction will involve cutting of bushes	Plantation of four saplings will be done in place of each uprooted tree to make project area environment friendly	Project Contractor
Fauna	There is no wildlife present in the Project area. Also, the local animals and bird species of the area are very much domesticated	No Impact	
Relocation of Utilities	No relocation of any public utilities is involved	No Impact	
Traffic Management	Disturbance to routine traffic moving on the Road	The waste loaded vehicles will be there at project site in working hours in curtain time period	Project Contractor

		which will not affect the traffic of the root. Moreover, area is already industrial at much extent where traffic managed traffic is observed.	
Poverty Alleviation	Proposed project is an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur will generate the employment opportunities to the population living in the surrounding areas.	Minor positive	-
Workers' Safety and Hygienic conditions	Health risks in case of unsafe and/or unfavorable work conditions	Enforcement of work safety measures such as wearing safety goggles, protective masks and boots and fixing of cautionary signs at designated sites during the operational phase of the Proposed project which is an Leo Waste Management (Private) Limited, Kasur, First aid box and emergency relief will be provided at the project to meet the emergency needs.	Project Contractor
Emergency Response	There are always chances of earthquakes and manmade disasters, fire, road accidents etc.	An Emergency Response Plan for earthquakes and manmade disasters will be developed by the Management. Emergency	Administration

		Response Plan.	
Socio-economic Impact	Emergence of new employment opportunities for the local people	Major positive	-

7.7 Communications and Documentation

An effective mechanism to store and communicate environmental information during the project is an essential requirement of an EMP.

MEETINGS

Two kinds of environmental meetings will take place during the project

- Kick-off meetings
- Weekly meetings

The purpose of the kick-off meeting will be to present the EMP to project staff and discuss its implementation and to discuss any event of environmental significance that has happened in the under-discussion industry or a similar industrial unit to investigate its route causes and develop its solutions. The purpose of the weekly meetings will be to discuss the conduct of the operation and environmental issues and their management. The proceedings of the meeting will be recorded in the form of a weekly environmental report.

7.8 Changes-Record Register

A change-record register will be maintained at the site, in order to document any changes in project design. These changes will be handled through the change management mechanism.

7.9 Environmental Training

Environmental training will help to ensure that the requirements of the EIA and EMP are clearly understood and followed by all project personnel in the court of the project.

Table 7.5: Training Program

Target audience	Trainers	Contents	Schedule
Selected management staff	Contractors	Key finding of mitigation measures	After every five months
All personnel	HSE Officer	Mitigation measures	Monthly
Technical Staff	HSE Officer	Waste disposal or sale out status, vehicle movement restriction and other mitigation measures	After every three months
Other staff	HSE Officer	Waste disposal, resource conservation and other mitigation workers	Monthly

7.10 Monitoring Plan

The monitoring of the EMP and the communication and documentation mechanism that will be employed during the operational phase will be based on the Environmental Management system (EMS) of the project proponents and the certification and legal bindings. The management system of the project proponents will be the same at the certified EMS in place at the company.

Table 7.6: Environment Monitoring

Potential activity and potential impact	Objective of monitoring	Parameter to be monitored	Measurement	Location	Frequency	responsibility
Disturbance due to noise from	To check whether the existing	Noise level near the receptor	Noise Measurement	At least three location	Quarterly	Environment Officer

operational activities	noise control measures are able to bring the sound level within prescribed limits.			on the plant boundary and three location at the receptor level		
Emission of exhaust gases and particulates which may pollute the environment	To determine the effectiveness of the air pollutants' abatement devices on the concentration of the likely pollutants	Source Emission parameter	PM and CO	Generator Exhaust	Monthly	Environment Officer/Manager
Waste disposal, procedure for waste collection, storage and disposal	To check the availability of waste management system and implementation	Inspection of waste generation, collection, storage, and disposal will be undertaken	Visual inspection	Entire Unit	Once daily	Administration Officer

		at each site of the project activity.				
Safety	To check and evaluate the effectiveness of the workers' safety plan and availability and access of first aid facilities	Injuries	Injuries will be recorded	Entire Unit	Daily	HSE

7.11 Environment Enhancement Measures & Environmental Budget

In order to enhance the environment, the following measures will be adopted:

1. Trees will be planted within the premises to beauty the surrounding area/Lahore.
2. A special budget will be designated for the environmental improvement of the environment on annual basis. The administration will be responsible for spending of this budget. The team leader will prepare the inventory of environmental improvement activities and communicate it with the rest of the team for implementation.

COST BREAKUP STRUCTURE FOR ENVIRONMENT

Sr. #	Items	Cost
1	Tree Plantation around the project site	40,000/-
2	PPEs	40,000/-

3	1st Aid Box	25,000/-
4	Safety Signs	20,000
	Total	125,000/-

7.12 ORGANIZATIONAL STRUCTURE & RESPONSIBILITIES

The organizational structure for the **Environment Management Plan** is outlined below:

- **Primary Responsibilities:**

  The primary responsibility for implementing EMP within the company lies with Chief Executive of Proposed project is an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur.

- **Operational Management and Control**

  Conducting the operational activities in the environmentally sound manner will be the responsibility of the concerned Manager.

- **Supervision and Monitoring**

  Senior Supervisor will be responsible for all environmental issues and for the implementation of EMP.

7.13 Compensation in Money Terms

The project lies in the open cum industrial area where no structure will move on for sake of project. There will be no any resource which will be demolished. Thus there is no need for such exercise where money would be compensated.

7.14 Replacement, relocation and rehabilitation

The project lies in the open cum industrial area where no structure or resource will be replaced. Thus there is no need to discuss the replacement, relocation or rehabilitation. Because there is no any stuff will be removed.

7.15 Equipment Maintenance Details

The equipments will be check on daily basis before start the work. All equipment will be well maintained and good in condition for getting the appropriate work in project.

CHAPTER VIII
RECOMMENDATIONS AND CONCLUSIONS

8.0 RECOMMENDATIONS

The Environmental Impact Assessment study and survey results are finally evaluated to recommend the following terms. The present EIA Report of "Proposed project that is an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur" meets the administrative and legal framework of the EPA Punjab.

- Implementation of EMP must be given top priority.
- During construction & operational phase create environmental awareness amongst the workers by training.
- Provide guidance to workers on use of PPEs and also make it compulsory for them to use PPEs during work.
- Installation of fire extinguishers in the premises.
- Use of equipment with low operating noise levels within PEQS limits and regular monitoring of machines used during operational phase.

8.1 Conclusion:

In view of the above it has been concluded that "Proposed project that is an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur" is environmentally friendly with sustainable design and has no adverse effects on environment. It is therefore requested to issue the environmental approval under section 12 of PEPA 1997 (Amended 2012) for the operation of the project.

8.2 Recommendation:

The Environmental Impact Assessment (EIA) study and survey results are finally evaluated to recommend the followings:

- The present EIA Report of "Proposed project that is an Incinerator Plant by Leo Waste Management (Private) Limited, Kasur" meets the administrative and legal framework of the EPA Punjab.
- Implementation of EMP must be given top priority.