# Installation of Wastewater Treatment Plant at Macca Sugar Mills (Pvt.) Limited, District Kasur

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT,

## February, 2022



Proponent: Syed Asim Hassan Shamsi


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# EXECUTIVE SUMMARY

## 1. Introduction

This executive summary presents an overview of the main findings of the Environmental Impact Assessment (EIA) report of project **Installation of Wastewater Treatment Plant at "Macca Sugar Mills (Pvt) Limited, Chak 65, Manga Road, District Kasur".** The project will include the Installation of Wastewater Treatment Plant at Macca Sugar Mills (Pvt) Limited in which the waste water of Macca Sugar Mills will be treated. Its main objective is to preserve the water quality of natural water resources and provide pollution free hygienic environments & minimize the environmental footprint.

Environmental Impact Assessment (EIA) of the anticipated project has been conducted in accordance with the Punjab Environmental Protection Act, 1997 (as amended 2012). The process for conducting environmental assessment and the results of EIA are described in this document.

## 2. Salient Features of Project

| | |
|---|---|
| **Proponent Name:** | Syed Asim Hassan Shamsi S/O Syed Ali Afzal Shamsi **(Group Admin Manager)** |
| **Project Title:** | Installation of Wastewater Treatment Plant at Macca Sugar Mills (Pvt.) Limited |
| **Project Location:** | Chak 65, Manga Road, District Kasur. |
| **Consultant Name:** | Elite Environmental Solutions (EES) Pvt. Limited |
| **Total Area:** | 02 Kanal |
| **Source of Water:** | Ground Water |
| **Source of Power:** | WAPDA |
| **Current Status of Project:** | Proposed |
| **Total Cost of the Project:** | 45.8 Million approx |

## 3. Project Objectives:

The main objectives of establishing of Project are as under:

- To improve quality of wastewater
- Elimination of pollutants, toxicants and many such types of pollutants.

- Preservation of water quality of natural water resources
- Prevention of harmful diseases
- **Reuse water** - To make wastewater usable for other purposes & high-quality effluent can be reclaimed, reducing plant operating costs.
- **Convert wastewater into green energy** - valuable biogas can be generated from wastewater via anaerobic digestion, resulting in a source of money-saving renewable energy.
- **Become an environmental steward** - Provide pollution free hygienic environments & minimize the environmental footprint.

**4. Environmental Consultant:**

An Environmental Impact Assessment (EIA) study report has been prepared to identify and assess the significant environmental impacts likely to occur due to proposed plant construction and operation along with environmental impact statement followed by delineation of appropriate Environmental Management Plan as well as the monitoring requirements. Macca Sugar Mills (Pvt.) Ltd. has engaged M/S Elite Environmental Solutions Pvt. Limited located at House No.12, V-Lane, Street No.06, Cavalry Ground, Lahore to conduct EIA of the proposed unit to meet the afore-mentioned targets, and to get Environmental Approval from Punjab Environmental Protection Agency.

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**5. Description Of The Environment**

The baseline secondary data of the Study and Project Area was collected from different sources including available literature, information by the proponent and the concerned government departments while the first-hand surveys (baseline primary data) and field information were known through investigations by the trained socio-environmental team of the consultants. The baseline environmental conditions of the project area are measured in terms of physical, ecological and socio-economic resources. The project area is open land. The study area has flat topography with alluvial plains. The climate of the area is a typical version of a humid subtropical, with hot summers accompanied by a monsoon season and mild and wet winters. There is no any faunal and floral species present in the project area that are declared endangered or protected by the Government of Pakistan.

## 6. Major Impacts And Recommended Mitigation Measures

Both positive and adverse environmental impacts of the proposed project has been identified by comparative analysis in all phases of the proposed project with respect to the baseline conditions of the study area, however very few or low adverse impacts are observed whereas no significant impacts and unsustainable situations are identified. The major impacts foreseen during construction and operation phase of the proposed project are as following:

**Table 1: Major Impacts and Recommended Mitigation Measures**

| Sr. No. | Major Impacts | Mitigation Measures |
|---|---|---|
| 1 | Air pollution may occur be due to exhaust emissions during construction and operation activities. | Water suppression and covered transportation and storage of the construction materials. However, during operational proper mitigation measures will be followed resulting in minimum air emissions. |
| 2 | Noise may be produced due to construction and operation activities, utilities and transportation activities (transportation of raw materials and finished products). | Avoiding or reducing noisy activities or limiting the noise sources far away from the sensitive areas. |
| 3 | Land contamination may occur due to improper disposal of waste. | Proper waste management plan should be followed during construction, operation and decommissioning phase. |
| 4 | Water Pollution due to improper discharge of waste water. | Water treatment should be done through already installed Activated sludge Process before its final disposal. |
| 5 | Health and safety issues to workers during construction and operation phase of the project. | Provision of Personal Protective equipment, good housekeeping and training of workers. |

## 7. Environmental Management & Monitoring Plans

The development of the EMP is to make some person responsible for implementing the mitigation measures as identified so that smooth implementation of the mitigation measures can be assured hence enhancing the positive impacts of the proposed project and reducing the anticipated adverse environmental impacts of the project.

Monitoring plans have also been included to ensure the compliance of the EMP by contractors and other responsible authorities. The proposed monitoring for the project is:

**Table 2: Proposed Management and Monitoring Plan**

| Sr. No. | Impact | Project Activity | Monitoring Mechanism | Frequency | Monitoring Authority |
|---|---|---|---|---|---|
| | Construction and Operational Phase | | | | |
| 1 | Air emissions and dust | Air quality will deteriorate due to transportation and construction activities | Monitoring for the air quality as per PEQS, 2016 | Quarterly | EMC |
| 2 | Water pollution | Water quality will deteriorate due to construction and operational activities | Monitoring for waste water & drinking water quality as per EPA PEQS, 2016. | Quarterly | EMC |
| 3 | Noise pollution | Construction activities, utilities and transportation activities | Monitoring for noise level as per PEQS, 2016. | Quarterly | EMC |
| EMC: Environmental Management Committee | | | | | |

## 8. Conclusion and Recommendation

Results of this EIA study shows that adverse environmental impacts of the construction as well as operation phases of the proposed project Installation of Wastewater Treatment Plant at Macca Sugar Mills (Pvt.) Limited, at Chak 65, Manga Road, District Kasur" on the physical as well as biological environment will be of little or no eventual consequence because of their mitigable character. Almost all the identified adverse impacts are also reversible in nature and can be made good by implementing the mitigation measures and the environmental monitoring program as are suggested in this EIA report. As against the environmental impacts, the socioeconomic benefits of the project are of immense advantage and beneficial for the community and local industry of the area.

It is recommended that the proponent should obtain an environmental approval (No Objection Certificate) from the Punjab-EPA before proceeding further into the construction activities as per regulatory requirements.

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# CHAPTER 1: INTRODUCTION

## 1.1 General

This Report presents the Environmental Impact Assessment (EIA) of Project "Installation of Wastewater Treatment Plant at "Macca Sugar Mills (Pvt.) Limited". For this purpose, the proponent has decided to engage Environmental Consultants, **M/S Elite Environmental Solution Pvt. Limited** (Environmental Consultancy Division). The purpose of this study is to identify the environmental baseline i.e. physical, biological and socio-economic/cultural conditions and assess all possible impacts arising during the construction and operation phases of the project along with the proposal of adequate mitigation measures and formulation of Environmental Management Plan (EMP) for implementation of the project in environment friendly manner.

The report provides relevant information, as required under the officially approved format to help the decision makers; i.e. EPA, understand the environmental feasibility of the project before issuing the Environmental Approval.

## 1.2 Objectives of EIA

The primary objectives of the EIA are:

- To determine and document the state of the environment of the project area to establish a baseline in order to assess the suitability of the Project in that area.
- To identify pre-construction, construction and operation activities and to assess their impacts on environment.
- To provide assistance to the proponent for planning, designing and implementing the project in a way that would eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in cost effective manner.
- To present mitigation and monitoring Plan to smoothly implement the suggested mitigation measures and supervise their efficiency and effectiveness.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.

## 1.3 Identification of the Project and Proponent

| Name | Address |
|---|---|
| Syed Asim Hassan Shamsi S/O Syed Ali Afzal Shamsi **(Group Admin Manager)** | House No.873-N, Mohallah Pounach Road, Samanabad, Lahore. |

- **Nature & Size of Project**

The proposed project under study is titled as Installation of Wastewater Treatment Plant at Macca Sugar Mills (Pvt.) Limited that will involve the treatment of wastewater which discharge from sugar industry. The area for project is 2 Kanal.

- **Location of Project**

The proposed project site is located at Chak 65, Manga Road, District Kasur.

- **Cost of the Project**

The total cost of the project is 45.8 Million approx. including construction, infrastructure, Labor and machinery cost.

## 1.4 Details of Consultants

For the preparation of the EIA Report of the proposed project, the proponent has hired the services of the environmental consultants; M/S Elite Environmental Solutions (Pvt.) Limited Team comprising of Environmental Engineers, Chemical Engineers and Environmental Experts has worked on this report. Elite Environmental Solutions (Pvt.) Limited is one of the pioneers Environmental Consultancy Companies in Pakistan with an unrivalled reputation for providing expert, tailored services and solutions. Elite Environmental Solutions (Pvt.) Limited provides the environmental services, litigation and consultancy to clients both industry and government.

Elite Environmental Solutions (Pvt.) Limited is providing quality services in various environmental sectors i.e.

- Environmental Assessment Reports i.e. IEE/EIA
- Baseline Studies
- Environment Management Plans (EMP)
- Designing of Emission Control Equipment
- Waste Water Treatment Plant (WWTP) Designing
- WWTP Construction Supervision, Commissioning and Operations
- Establishing Bottled Water Plant based on RO or UF
- Lab testing (Drinking Water & Waste Water Analysis, Soil Analysis, Sludge Testing, Petroleum/ Lube Oil Testing, Fertilizer Analysis, Pesticides in Water, Soil, Fertilizer, Coal, Coke Analysis)
- Monitoring and inspection
- Environmental modelling

➢ **Contact Details**

| | |
|---|---|
| **Chief Executive** | Engr. M. Nawaz (C.E.) |
| **Address** | House No.12, V-Lane, Street No.06, Cavalry Ground, Lahore |
| **Contact No.** | +92 300 6509353 |
| **Manager Operations (EPA Visiting Person)** | Engr. Iram Shahzadi |
| **Contact No.** | +92 300 4580827 |

**Study team:**

The following table lists the names of experts involved in the making of EIA report:

**Table 1.1: Study Team**

| Name | Profession | Qualification | Professional Experience | Roles |
|---|---|---|---|---|
| **Mr. Muhammad Nawaz** | Operational Manager | BE Chemical Engineering | 10 Years | • CEO<br>• IEE report Review<br>• Assessment of physical and socioeconomic baseline conditions at the Project Site. |
| **Mr. M Iqbal** | Senior Environmentalist | M.Phil. Env. Sci. | 7 Years | • Capacity building & training<br>• Conducting and monitoring of health assessment surveys<br>• Environment health risk assessment and management |
| **Mr. Qaiser** | Senior Environmentalist | B.S Env. Sci. and M.Phil. Sociology | 6 Years | • Collection of baseline data.<br>• Public consultation.<br>• Preparation of survey tools including socio-economic survey tool and environmental checklist. |
| **Ms. Farwa Batool** | Environmental Engineer | MS Environmental Engineering | 5 Year | • IEE report writing<br>• EIA report writing<br>• Assessment of physical and socioeconomic baseline conditions at the Project Site. |
| **Mr. M Hafiz Tahir** | Environmentalist | BS. Environmental Sciences | 4 Year | • IEE report writing<br>• EIA report writing<br>• Impacts assessment and proposed their mitigation measures. |
| **Ms. Iram Shahzadi** | Environmental Engineer | MSc Environmental Engineering | 4 Year | • IEE/EMP report writing<br>• EIA report writing<br>• Assessment of physical and socioeconomic baseline conditions at the Project Site.<br>• Impacts assessment and proposed their mitigation measures |

## 1.5 Scope of Study

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

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

## 1.6 Methodology

Methodology of preparing EIA report follows:

### 1.6.1 Scoping

The key activities of this phase include:

**Project Data Compilation:** A generic description of the activities relevant to environmental assessment is compiled with the help of the proponent.

**Published Literature Review:** Secondary data on weather, water resources and vegetation, and other relevant environmental features of the project area and the similar projects, is reviewed and compiled.

**Legislative Review:** Information on relevant legislations, regulations, guidelines, and standards is reviewed and compiled.

**Identification of Potential Impacts:** The information collected is reviewed and potential environmental issues are identified.

**Identification of Mitigation Measures:** Mitigation measures are identified for all the likely impacts in order of preference for avoiding the impacts altogether, minimizing their frequency or extent and compensating or rectifying the losses; as may be found practicable in the project.

**Selection of Alternatives:** Based on the potential impacts and the cost required to mitigate them, most crucial project employing the best available technology at the most feasible site is selected.

**Scoping Meeting:** A scoping meeting was held to share this basic level of project information with all the project stakeholders before the information is incorporated into the report, so that some improvement can be sought out in the data as may be necessary, better or more friendly alternatives can be selected, and better and more practicable mitigation measures can be suggested.

### 1.6.2 Baseline Data Collection

A considerable amount of baseline information on the project area was available from the environmental studies previously conducted in the region of other projects. A field visit was conducted to collect primary data on the water quality, ambient air quality, noise level, and ecological species surviving in the area and the ecosystems prevalent, and the lifestyle, socio-cultural setup, income and sources of income and the facilities available for the residents in the areas around the unit. For ambient air and water quality, tests were conducted by an EPA-certified laboratory, noise level was measured using noise meter, and for socioeconomic profile, people around the site were interviewed.

### 1.6.3 Impact Assessment

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

- Geomorphology
- Meteorology
- Groundwater and surface water quality
- Ambient air quality& noise level
- Ecological Resources, including flora and fauna
- Local communities

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

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

### 1.6.4 Documentation

This EIA Report is prepared according to the relevant guidelines prescribed by the Punjab Environmental Protection Agency. It includes findings of all the phases of the assessment process. Before preparation of the final report for submittal to the EPA Punjab, draft report was presented to the Proponent for review and comments.

## 1.7 COMPONENTS OF THE REPORT

This EIA Report presents the screening of potential environmental impacts of the Proposed Project and discusses the necessary mitigation measures to eliminate or reduce the negative impacts to an acceptable level. It also describes the institutional requirements for smooth and easy implementation of the project and provides an Environmental Management Plan (EMP).

EIA report comprises of following chapters.

**Chapter 1: Introduction** (A description of the project including the need for the project and how the project will be undertaken).

**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** (Presents details about stakeholder consultation regarding the project)

**Chapter 6: Project Impacts and mitigations** (Presents an assessment of the project's impacts and their required mitigation measures on the Physical, Biological and Socioeconomic environment).

**Chapter 7: Environmental Management Plan** (Provides the complete outline of the project and Environmental Management Plan).

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

# CHAPTER 2: DESCRIPTION OF THE PROJECT

## 2.1 General

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.

## 2.2 Type and Category of Project

As per Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2000 the proposed project; i.e. Installation of Wastewater Treatment Plant at Macca Sugar Mills (Pvt.) Limited falls in Schedule II, under the category (F) stating "Water supply schemes and treatment plants with total cost of Rs. 25 million and above".

## 2.3 Project Objectives

The main objectives for the establishment of this unit as an Installation of Wastewater Treatment Plant at Macca Sugar Mills (Pvt.) Limited located at Chak 65, Manga Road, District Kasur are as under:

- To improve quality of wastewater
- Elimination of pollutants, toxicants and many such types of pollutants.
- Preservation of water quality of natural water resources
- Prevention of harmful diseases
- **Reuse water** - To make wastewater usable for other purposes & high-quality effluent can be reclaimed, reducing plant operating costs.
- **Convert wastewater into green energy** - valuable biogas can be generated from wastewater via anaerobic digestion, resulting in a source of money-saving renewable energy.
- **Become an environmental steward** - Provide pollution free hygienic environments
- & minimize the environmental footprint.

## 2.4 Project Alternatives

### 2.4.1 Site Alternatives

Site alternative cannot be considered because the proposed project is the Installation of Wastewater Treatment Plant at Macca Sugar Mills Private Limited. Moreover, the Macca Sugar Mills Private Limited is located in an industrial area and using the best suitable technology keeping in view all the environmental considerations. Additionally, the cumulative effect of this type of project would result in noticeable economic benefits for the country. The project will also make a positive contribution to

industrial growth. Moreover, all the impacts associated with proposed project are extensively studied and they are minor to negligible so there is no need of considering site alternatives. Moreover, the site is well located in regard to the following:

- Easy road access for the customers.
- No ecologically / environmentally sensitive or declared protected area within safe radius of the selected site.

### 2.4.2 Technology Alternative

Keeping in view all the environmental consideration, best suited technology has been proposed for the said project including no air emissions. Water mitigation techniques are also considered at their best including Activated Sludge Process for Waste Water Treatment.

## 2.5 Location and Site Layout of the Project

The site of Project **"Installation of Wastewater Treatment Plant at Macca Sugar Mills (Pvt.) Limited"** is located at Chak 65, Manga Road, District Kasur.

The location map of the project is given as Annex-A.

## 2.6 Area Details

Total area of the project site is 2 Kanal, which involves treatment of the wastewater of sugar industry.

## 2.7 Land Use on the Site

The Proposed project of Macca Sugar Mills (Pvt.) Ltd has been planned in an industrial zone which has transformed the open plot into industrial use which is positive. Land use change to more useful purpose from less useful purpose is considered generally a kind of no environmental impact because the land use pattern at and around the project site is typical to that of built up structures for commercial, economic usages.

## 2.8 Road Access

The project site is connected to other areas with metaled roads. Major road connecting the project site to other areas. The map showing the road network of area is annexed as Annexure.

## 2.9 Vegetation Features of the Site

The proposed project will be established on the clear open land of the project site having no significant vegetation. Moreover, being part of industrial zone, the project facility has no significant plants or vegetation of ecological importance.

## 2.10 Cost and Magnitude of Operation

The total cost of the project is 45.8 Million PKR including infrastructure and machinery cost.

The total area of Project site is 2 Kanal.

## 2.11 Flow of the Plant

The Flow at which the wastewater treatment plant of the Macca Sugar Mills (Pvt.) Limited designed is $50m^3$/hrs.

## 2.12 Schedule of Implementation

The time required for the "Installation of Wastewater Treatment Plant at Macca Sugar Mills (Pvt.) Limited" is approximately 01 year. Breakdown of the time for the construction phase is given below in Table 2.2:

**Table 2.2: Timeline for Construction of Project**

| Sr. # | Activities | 3 Months | | | 3 Months | | 4 Months | | | | 2Months | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4W | 4W | 4W | 3W | 5W | 4W | 4W | 4W | 4W | 4W | 3W | 1W |
| 1 | Designing | | | | | | | | | | | | |
| 2 | Mobilization of Contractors | | | | | | | | | | | | |
| 3 | Lean Construction Period | | | | | | | | | | | | |
| 4 | Peak Construction Period | | | | | | | | | | | | |
| 5 | Restoration of Site | | | | | | | | | | | | |

## 2.13 DESCRIPTION OF PROJECT

The project site is spread over area of 2 Kanal. The project will include the development of Wastewater Treatment Plant in which the waste water of Macca Sugar Mills (Pvt.) Ltd will be treated in it which comes from the project site. The cost for the project is 45.8 million PKR. This project is a 100% local investment. The project will provide employment opportunities for local people.

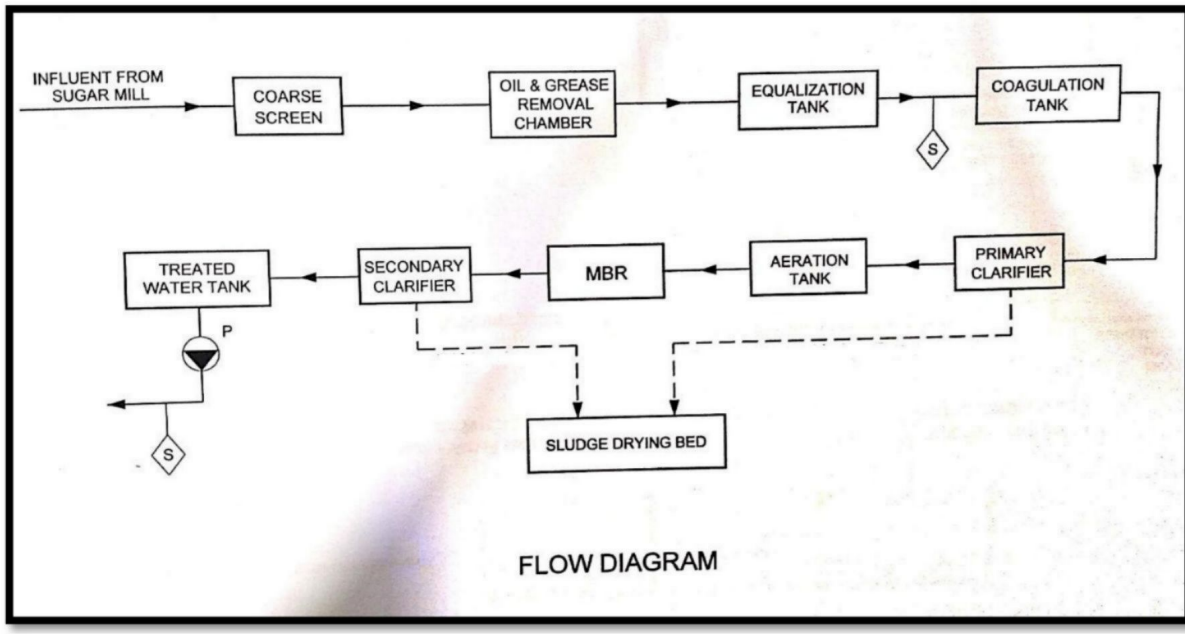
### Industrial Wastewater Treatment

Industrial wastewater treatment covers the mechanisms and processes used to treat waters that have been contaminated in some way by anthropogenic industrial or commercial activities prior to its release into the environment or its re-use.

Most industries produce some wet waste although recent trends in the developed world have been to minimize such production or recycle such waste within the production process.

### Wastewater Treatment with MBR

The picture below shows a simplified flow diagram for wastewater treatment plant in the Macca Sugar Mills (Pvt.) Ltd. The influent wastewater goes through several stages in which different compound are removed out of the wastewater.



FLOW DIAGRAM

### WASTEWATER TREATMENT STEPS:

Because industrial wastewater is varied in its contaminants, the processes needed for wastewater treatment are varied, too. Nonetheless, the basic wastewater treatment steps are often the same for municipal and industrial wastewater:

- Step 1: screening, first to remove large items and second grit.
- Step 2: Equalization tank is based on reducing the maximum and minimum flow difference to achieve a nearly constant flow to the system for maximum efficiency of the operation.
- Step 3: Wastewater from Equalization Tank will be passed to the Coagulation tank for Chemical Coagulation.
- Step 4: Primary clarification to separate solid organic matter.
- Step 5: Aeration to encourage conversion of NH3 to NO3 and provide oxygen for bacteria to grow.

- Step 6: MBR, The Membrane Bioreactor or MBR is used for the separation of micro-organisms by filtration with membranes.
- Step 7: Secondary clarification to allow remaining organic sediment to settle, often through chemical treatment.
- Step 8: Discharge of the water; and disposal of solids; reclamation of biosolids/biogas.

**Step 1: Wastewater Screening**

In the **Bar Rack** coarse solids are removed, such as sticks, rags, and other debris in untreated wastewater by interception. By use of fine screening even floatable matter and algae are removed.

In the **Grit Chamber** grit is removed consisting of sand, gravel, cinders, or other heavy solid materials that have subsiding velocities or specific gravities substantially greater than those of the organic putrescible solids in wastewater.

**Step 2: Equalization Tank**

Due to changing in flows during the day, ETP plants are usually encounter high loading at peak flow and very low loading allow flows, which significantly deteriorates the plant performance during the diurnal surges. One of the best possible approaches to handle such inefficiencies is the use of equalization tanks for all such applications.

The ideal equalization tank volume is based on providing a constant average hourly flow to the biological process throughout the day. In addition to flow dampening, equalization tanks also reduce the fluctuation in the BOD and TSS concentrations encountered in the influent during the day. This further reduces the abnormalities in plant operation due to high or low loading rates.

**Step 3: Coagulation Tank**

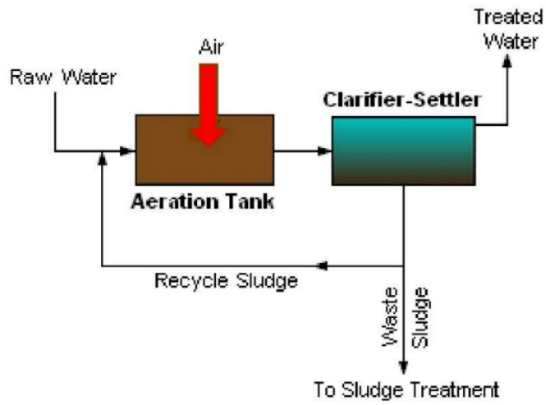
Wastewater from Equalization Tank will be passed to the Coagulation tank for Chemical Coagulation. This process involves the mixing of coagulant chemicals with wastewater by which colloidal and suspended material are destabilized and agglomerated into settle able or filterable flocs or both.

**Step 4: Primary Clarification and Separation**

The Primary Clarifier is a basin where water has a certain retention time where the heavy organic solids can sediment (suspended solids). Efficiently designed and operated primary sedimentation tanks should remove from 50 to 70 percent of the suspended solids and 25 to 40 percent of the BOD.

**Step 5: Aeration**

The influent of the aeration tank is mixed with activated sludge and in the **Aeration Tank** the mixed liquor is aerated. By aerating the mixed liquor the aerobic processes will be stimulated, the growth rate of bacteria will be must faster. Because the bacteria deplete the substrate, flocculation takes place. The soluble substrate becomes a solid biomass.




**A generalized, schematic diagram of an activated sludge process.**

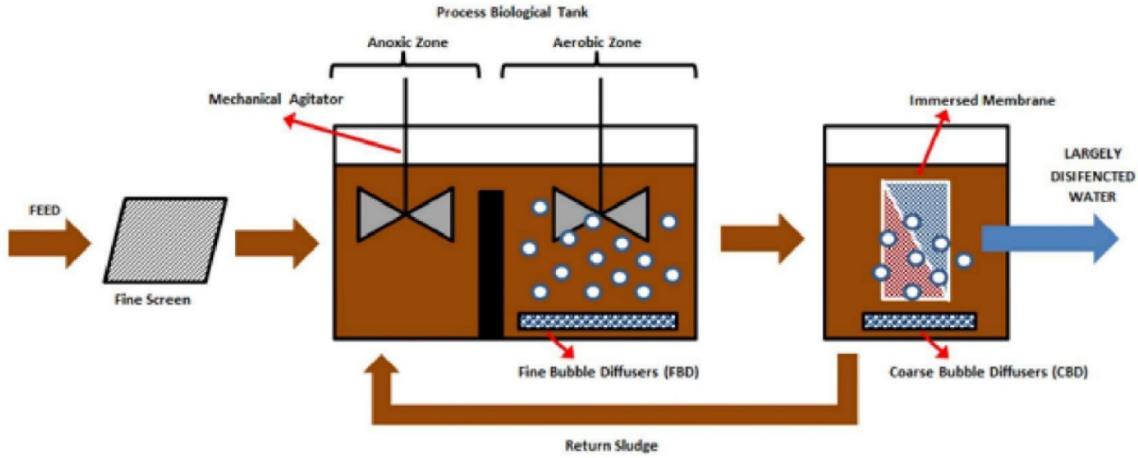
Activated sludge is a biochemical process for treating sewage and industrial wastewater that uses air (or oxygen) and microorganisms to biologically oxidize organic pollutants, producing a waste sludge (or floc) containing the oxidized material. In general, an activated sludge process includes:

- An aeration tank where air (or oxygen) is injected and thoroughly mixed into the wastewater.
- A settling tank (usually referred to as a "clarifier" or "settler") to allow the waste sludge to settle. Part of the waste sludge is recycled to the aeration tank and the remaining waste sludge is removed for further treatment and ultimate disposal.

**Step 6: MBR**

Membrane filtration has a major role in water and wastewater treatment, which is superior to the conventional water technologies with a proven better performance and more efficient economics.

The membranes will be employed as a filter removing the solids which will be developed during the biological process, which gives a clear and pathogen free product.




The wastewater goes through a fine screen for the removal of big objects that will cause damage to the downstream equipment. Then it enters an Anoxic Zone for the treatment of nitrogenous matter and phosphate following an Aerobic Zone where microorganisms with the help of the oxygen coming out of the FBD will digest the organics matter in the wastewater and clump together as they do so, producing a sludge. This sludge will enter the Immersed Membrane Bioreactor where the membrane will separate the solids and microorganisms from water.

**Step 7: Secondary Clarification**

These flocks of biomass will sediment in the **Secondary Clarifier**.

**Step 8: Disposal of Solids**

Disposal of the solids generated by industrial wastewater treatment plants is dependent on government regulations, geographical location, and sludge characteristics, among other things. Final disposal methods include reclamation, incineration, land application, and landfill.

## 2.16 Manpower

The manpower in operational phase of project is 35-40 persons while the manpower required for proposed project will be 20-25 in construction phase.

## 2.17 Water and Wastewater Details

### a. Sources of water

In project the water demand for domestic purposes during operational phase will be met by extracting ground water. Therefore, in proposed project the water requirement in the construction and operation phase will also be fulfilled by extraction of groundwater through installation of pumps.

### b. Water Requirement and Wastewater Generation

The Breakup of water requirement and wastewater generation during construction phase of project are given in Table 2.3:

**Table 2.3: Water Requirement and Wastewater Generation during construction**

| Sr. No. | Description | Water Consumption (gallons/day) | Wastewater Generation (gallons/day) | Mode of Disposal |
|---|---|---|---|---|
| 1 | Domestic | 3381 | 2704 | Will be disposed off after proper treatment through a channel into the drain. |
| 2 | Construction and sprinkling | 2000 | - | - |

Breakup of water requirement and wastewater generation during operational phase of project are given in Table 2.4

**Table 2.4: Water Requirement and Wastewater Generation during operational phase**

| Sr. | Description | Water Consumption (gallons/day) | Wastewater Generation (gallons/day) | Mode of Disposal |
|---|---|---|---|---|
| 1 | Domestic | 9,600 | 7,680 | Will be disposed off after proper treatment through a channel into the drain. |

### c. Waste Water

The generated wastewater will be collected properly through a network of pipeline and transferred to the Waste Treatment Plant undergoing Activated Sludge Process for its proper disposal according to standard practices.

- **Construction Phase**

During Construction phase of proposed project, the domestic wastewater will be generated which will be collected properly through a network of pipeline for its proper treatment and after the Process it will be disposed off.

- **Operation Phase**

In the proposed project, process waste water will be generated, the generated domestic waste water, process waste water and wash-off of equipment waste water will be collected through a network of pipeline and will pumped into the Waste Water Treatment Plant where it will be treated via Activated Sludge Process. After treatment, the waste water will be routed to the Nala through proper drainage channel.

## 2.18 Solid Waste Disposal

Solid waste generated from construction activities includes broken bricks, left overs of sand and cement, sanitary wares, electricity wires, glass pieces, wooden cuttings etc.

Therefore, the place is allotted for disposal of solid waste collected from project on daily basis from where it is collected by local administration.

## 2.19 HEALTH & SAFETY OF PROJECT

Health, Safety & Hygiene includes the following:

- **First Aid facility**

  At workplace, workers and employers should have enough information, knowledge and training regarding first aid treatment in case of any emergency.

  The subject project provides proper medical facilities to workers and staff to cope with any incidental accidents and proper training about first aid is provided to workers and staff.

- **Safety Trainings**

  Workers and all the staff should be provided with proper training about the work and safety practices.

- **List of Personal Protective Equipment (PPEs)**

Required personnel protection equipment (PPE) must be worn at all times when on construction or renovation sites at site project.

Depending on the circumstances and potential hazards present, additional PPE may also be required. This determination will be made by your supervisor based on the preliminary Hazard Analysis. Main PPEs to be used are:

- Protective gloves
- Hearing protection
- Full face shields when cutting, grinding, or chipping
- Chemical splash googles
- Respiratory protection
- Fall protection equipment when working above 6 feet
- Specific protective clothing such as welding leathers when welding or FR clothing when working with live electric.

## 2.20 Restoration and Rehabilitation Plan

Following Restoration and Rehabilitation Plan will be followed in its full accordance.

- After completion of the construction work all the disturbed sites will be changed into conditions as they were prior to the commencement of the project or even far better than that.
- The area will be planted with indigenous vegetation.
- All the concrete will be broken and disposed of according to the rehabilitation plan.
- For improving the environmental and aesthetic value or visual quality of the site, the proponent will carry out landscaping and tree planting with in premises of factory for which the Tree Plantation Plan has been provided in Chapter 7 of this report.

## 2.21 Government Approvals

At this Stage, the proponent has applied for Environmental Approval and after getting Environmental Approval, they will apply for other required approvals.

# CHAPTER 3: STATUTORY REQUIREMENT & STANDARDS

## 3.1 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 EIA 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).

## 3.2 Institutional Setup

## 3.3 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.

## 3.4 Relevant Legal / Institutional Framework

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.

Provincial Environment 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:

## 3.5 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.

### 3.6 Punjab Environmental Protection (Amendment) Act, 2012

Under section 12 (4) of PEPA, (Amended) 2012 *"The Provincial Agency shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the Initial Environmental Examination or, as the case may be, the Environmental Impact Assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations".*

As per definition given in the Punjab Environmental Protection (Amendment) Act 2012, Environmental Impact Assessment (EIA) 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.

### 3.7 National Environmental Policy, 2005

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.

### 3.8 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. As these regulations, the Projects have been classified based on 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.

### 3.9 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. These Guidelines are ideal for preparing the IEE or EIA report but line-to-line

preparation not necessary because Guidelines are not part of PEPA and EPA Punjab has not any notification for adoption or follow these Guidelines.

However, this EIA report has been prepared in following the Guidelines.

### 3.10 Pakistan Penal Code, 1860

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.

### 3.12 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 to ensure that contractors to follow the relevant labor laws and rules relating to safety of the workforce and creating a healthy working environment.

# CHAPTER 4: DESCRIPTION OF THE ENVIRONMENT

## 4.1 GENERAL

The existing environment around the site of project has been studied and compiled with respect to physical, ecological and socio-economic resources, and quality of living values. Information that has been collected from different sources, including public literature, reports of other studies conducted in this area, knowledge with the proponent and the concerned government departments and the first-hand surveys and field measurements has been presented in this section. This chapter of Initial Environmental Examination (IEE) Report encompasses all the important aspects of local environment.

**Kasur** is a city located to south of Lahore, in the Pakistani province of Punjab. The city serves as the headquarters of Kasur District, and is located near the border with neighbouring India. Founded by Pashtun migrants in 1525, Kasur is now the 20th most populous city of Pakistan and is renowned as the burial place of the legendary 17th century Sufi-poet Bulleh Shah.

## 4.2 PHYSICAL ENVIRONMENT

The district is bounded by the Ravi River in the north-west and river Sutlej in the south-east. Whereas the old course of Beas River bifurcates the district into two equal parts locally known as Hither and Uthar or Mithan Majh. Both of the areas have a height differential of approximately 5.5 meters. The natural surface elevation of the district is 198 meters above the sea level, having a general slope from north-east to south-west. Whereas the east and west ends of the district comprise the flood plains of the rivers Satluj and Ravi, characterized by breaching of looping river Channels braided around meander bars. Kasur district is attached with Lahore from east, attached with Nankana Sahib from north, attached with Faisalabad from west and attached with Okara and India from south.

### 4.2.1 SOIL:

The main types of soil in the district are Gora, an artificial soil highly manured, commonly found around villages and wells. Rohi is the finest natural soil, a stiff clay dark or reddish dark in colour; Dosahi or Missi which is a fine clay soil, Maira which is of less loam with less clay than sand; Tibba which is inferior Maira; Kallar which is a sour and barren clay unsuitable for cultivation, and Bela or the riverain soil which is fine alluvial mixed with sand.

### 4.2.2 GEOLOGY:

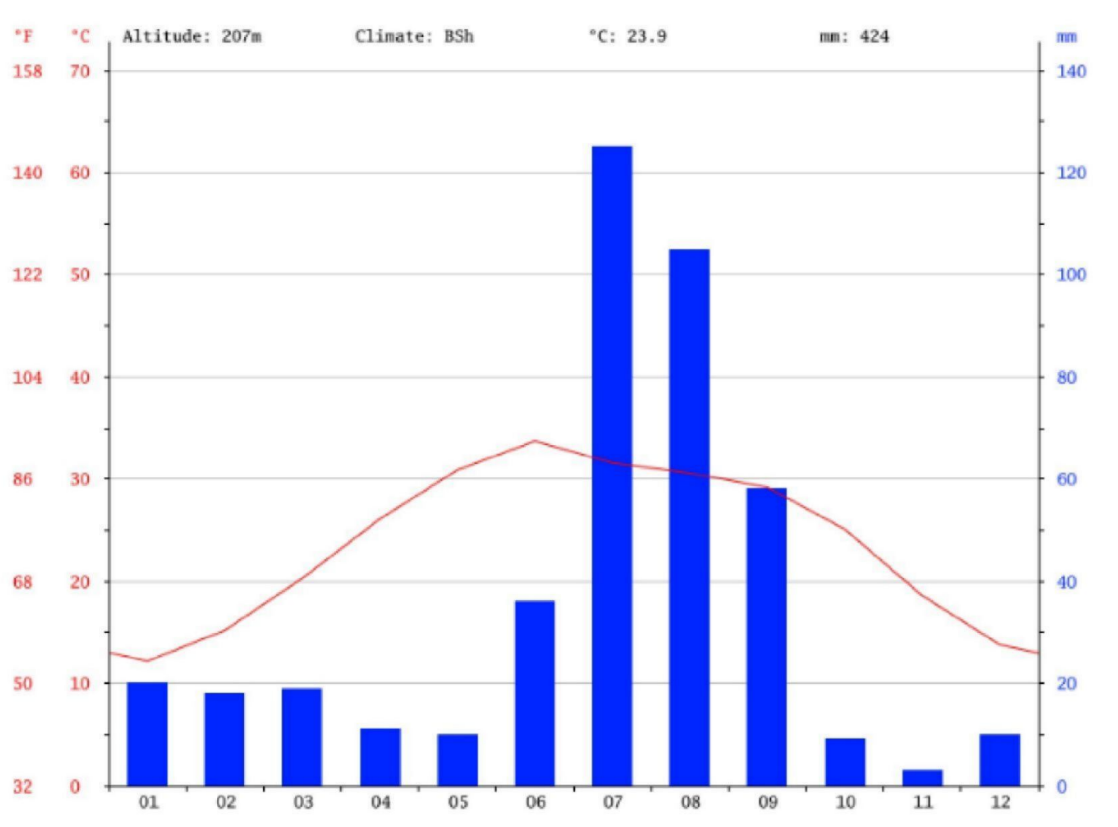
There is nothing of geological interest in the district, which is situated entirely on the alluvium. *Kankar* is found all over the district.

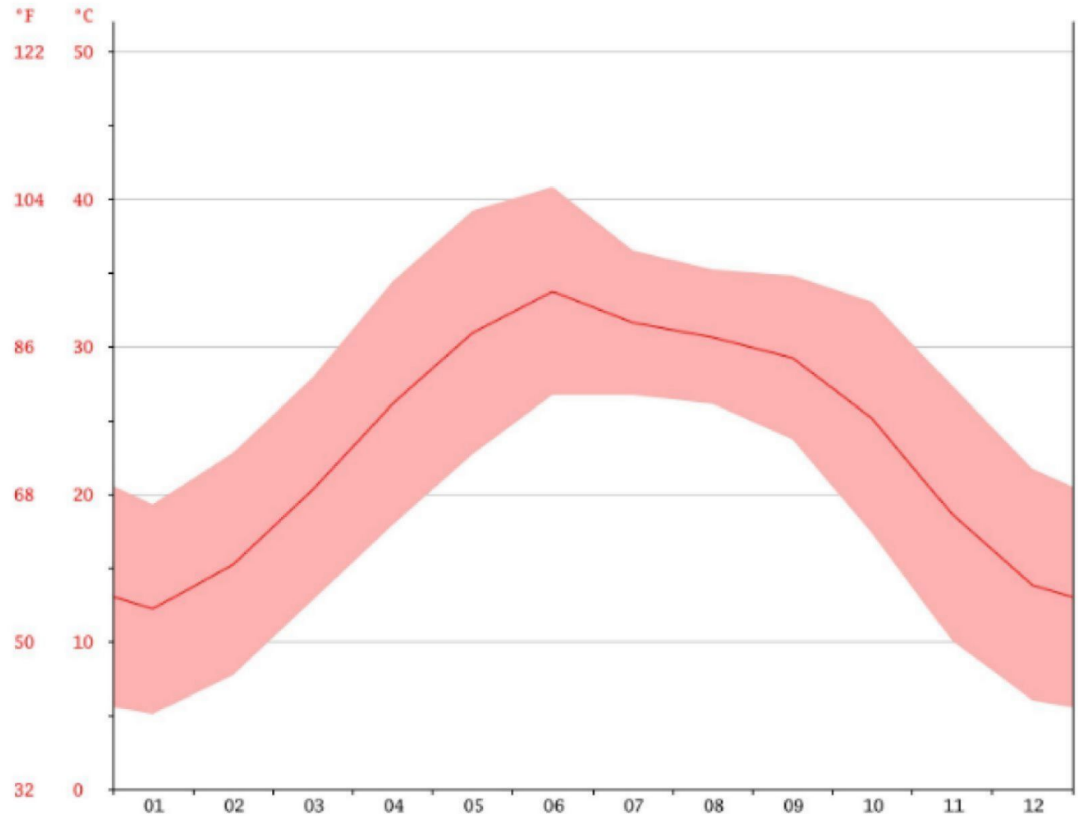
### 4.2.3 CLIMATE

Kasur's climate is a local steppe climate. There is little rainfall throughout the year. According to Köppen and Geiger, this climate is classified as BSh. 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.

### 4.2.4 TEMPERATURE

At an average temperature of 33.7 °C, June is the hottest month of the year. The lowest average temperatures in the year occur in January, when it is around 12.2 °C.






### 4.2.5 TOPOGRAPHY

Topographically speaking, Kasur District lies between the river Satluj which flows along its boundaries with India and river Ravi which flows its boundary with Nankana Sahib District. The districts may be divided into two parts, a low lying or riverine area along the two bordering rivers and upland, away from the rivers. The riverine area is generally inundates during monsoon season. The water level in this area is higher than in the upland. The soil is sandy. The upland is flat plains sloping from north-west to south-west. The general height of the area is from 150 to 200 meters above the sea level.

### 4.2.6 NOISE LEVEL

Noise is described as unwanted sound emitted from un-avoidable sources of anthropogenic activities. Daily based natural induced sources of noise are rare to none but human induced noise sources are plenty and un-avoidable. Physically, there is no distinction between sound and noise. Sound is a sensory perception and the complex pattern of sound waves is labeled noise, music, speech, low altitude aeroplane flying etc.

Kasur is district of the Punjab Province having population around eight million. 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.

### 4.2.7 AMBIENT AIR QUALITY

Atmospheric pollution means the imbalance in the normal air chemistry. It can occur due to the addition of a new chemical into atmosphere or by the change in concentration of the chemicals already existing in the atmosphere. Atmospheric pollution particularly in urban area has a strong impact upon daily life. The reasons of such changes can both be natural as well as anthropogenic.

Ambient air quality is a key to measure the concentration of the various chemicals in atmosphere; especially of the chemicals which pose detrimental effects on health, safety and environment, to have a comparison with their safe concentrations, as established in WHO Standards and NEQS.

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. SO2, NO2, CO2, CO, O3 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. The following table is presenting the measured parameters of the ambient air look from the center of the proposed project area for assessment of air quality.

### 4.2.8 WATER RESOURCES

- **Surface Water**

There are no surface water resources like ponds or wetlands, etc. near the project area.

- **Ground Water**

The Chenab river forming the northern and north-western boundary has been described as a broad shallow stream, with a sluggish channel and a licentious course. Its deposits are sandy, but its floods are extensive and owing to the loose texture of the soil on its banks. the moisture percolates far inland. but the weirs at Maraia (in the Sialkot district) and at Khanki district) have affected the river. and its usefulness as a fertilizing agent for the riverain tract has been reduced considerably.

**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.

## 4.3 BIOLOGICAL 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 unit.

### 4.3.1 FLORA

Flora of the district has been greatly modified by human agency of the old open forests of small trees and shrubs; there remains only a few Rakhs or portions of forest which are kept as gazing ground for cattle etc. Amongst trees the most important are Kikar (Acacia arbica), Shisham or Tahli (Dalbergia sissoo), Beri (Zizyphus jajaba), Toot (Morus marlaccae), Sharin (Albizzia lebbek), Dharek (Malia azerdaracb), Phulahi (Acacia modesta), and Nim (Melia indica), Piple (Ficus indica) are planted for shade.The growth in Rakhs is composed mainly of three kinds of trees Jand (Prosopis spicigera), Karril (Capparis aphylla), and van or Jal (Salvadora obeoides). Occasionally pelu (acacia Loucophhloea) and Farash (Tamarix articulate) are also found. Pilchi (Tamarix gallio) is found on moist sandy soil along the rivers and is used for wicker-work, basket making etc.

### 4.3.2 FAUNA

Wolf and jackal are the only wild animals of any importance. The former being met with occasionally in the low land wastes of Chunian Tehsil but jackal are found everywhere. Changa Manga reserve a thick forest is the only area in which a few Nelgai, pig, peafowl and here are found.

## 4.4 SOCIOECONOMIC ENVIRONMENT

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 DEMOGRAPHIC PROFILE OF KASUR

According to the 1998 census, Punjabi is the most widely spoken first language (88%), whereas Urdu was the first language of 6.2% of the population. The district is unusual in that Urdu accounts for a greater proportion of speakers in rural (7.3%) than in urban areas (2.6%)

### 4.4.2 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.

## 4.5 QUALITY OF LIFE VALUES

### Health Facilities

Medical facilities are readily accessible in city in a 100 kilometer radius, being the district headquarters and due to its importance as a military headquarters. DHQ is one of the main hospitals in the area.

### Customs

The peoples are very much concerned about castes and beliefs, visiting shrines is very common among them.

### Electric Supply

WAPDA power supply will be available at the site.

### Telephone Facilities

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

### Educational Facilities

No educational facility is present in the vicinity of the project area.

### Agriculture

Major crops of the town are wheat, grain, peas, barley are the important crops of Rabi season, while Kharif crops are cotton, sugarcane, potato, bajra, oil seeds which are shipped by rail and road to other parts of the country.

### Site of Cultural Heritage

There are no documented or protected sites of archaeological, cultural, historical & religious significance in the project area. No visible signs were observed of such sites while conducting the field work.

## 4.6 LAB REPORTS OF ENVIRONMENTAL ANALYSIS

Testing of different parameters was done from an EPA certified laboratory to check the quality of different environmental parameters. The copy of the lab reports of these parameters (ambient air analysis, water quality analysis) is given in annexure.

# CHAPTER 5: POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

## 5.1 GENERAL

This section discusses the project's potential environmental impact on the area's geomorphology, soil, water resources, air, biological resources and socioeconomic condition and, where applicable, identifies mitigation measures that will reduce, if not eliminate, its adverse impact. The assessment carried out in this section is based on potential impacts on overall environmental receptors within the project area.

## 5.2 OBJECTIVES

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

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

## 5.3 IMPACT ASSESSMENT METHODOLOGY

- **Screening of Potential Impacts**

Based on site visit, observation, brain storming, provided information and social interviews, significant impacts are anticipated and evaluated. Then qualitative and quantitative (where possible) assessment of these anticipated impacts is carried out.

- **Identification of Mitigation Measures**

After anticipation and screening of significant impacts, certain mitigation measures are provided in order to enhance benefits of project and reducing impacts.

## 5.4 IMPACTS ASSOCIATED WITH PROJECT LOCATION

The proponent has selected the site owing to the following reasons:

- There is no community or human settlement on the site
- There is no fauna flora (particularly belonging to an endangered species) on the site
- Main road network runs in front of the unit

- There is no ecologically sensitive or declared protected area (PA) like forest, fish hatcheries, Territorial Waters, wildlife or game reserves, any structure of socio-cultural significance (historical or archaeological site or religious structures; Masjid, temples, etc.) within 05 km of the selected site

It can be concluded in view of these reasons that the selected site is best suited for the project, and will not pose any adverse impact or threat on any component of the environment.

## 5.5 IMPACTS ASSOCIATED WITH DESIGN PHASE

At the design phase, no considerable impact will occur on land, soil, topography, ground water, and on people of the area. However, in pre-construction phase a management system should be provided at design level so impacts can be reduced. Design of the building will adhere to all standard technical requirements in order to avoid adverse impacts on environment and human health.

- **Mitigation Measures at Design Phase**

At design, phase special attention should be given to the design of the project in the sense that it has been designed in such a way as to cause minimum disruption and deterioration of environment and surroundings. There will be buffer zone to avoid any disaster.

## 5.6 IMPACT DURING CONSTRUCTION PHASE

The potential environmental impacts of the project at site and surrounding area during the development / construction phase are described as follows:

### *5.6.1* Physical Environment

The main impacts of the project during development / construction of the civil works, installation of water supply system, sewer system and installation of utility and equipments will be the dust and noise from transportation of construction materials and equipments. Standard Engineering Practices will be enforced on the construction / development site.

- **Seismic Hazard**

In this zone, distant earthquakes with fundamental period's greater than1.0 second may cause damage to structures. This factor requires special consideration of the designers. This will be a moderate negative impact.

- **<u>Mitigation</u>**

All the foundations of the structures (electric poles, water supply and other lines etc.) will be designed to withstand even moderate to large earthquakes. For seismic hazard analysis, updated structural and seismic evaluations will be consulted.

- **Impact on Soil**

The construction of treatment facilities and road in addition to excavation works will expose soils in the affected areas leaving them vulnerable to erosion by surface run-off. Limited quantities of soil will be excavated during the construction phase of the treatment plant. In case of a rainy season, there will be soil erosion.

Leveling at the plant site can result in soil disturbances, erosion problems and dusty conditions. The reuse of treated water for irrigation will improve the productivity of agricultural area in the region. When treated effluents are unacceptable, these will cause contamination for the receiving water body. If the grease and sludge are not properly handled and managed, they can contaminate the nearby soils and create Unpleasant odors.

- **Impact on Topography**

The topography of project area is nearly flat and remains unchanged during construction phase.

- **Ecological Impacts**

The project area is devoid of any trees cover or any endangered or threatened animal species. The impact will be Nil.

- **Impact on Water Bodies**

No fresh water bodies are known to exist in the vicinity of the project area. Therefore, there will not be any deterioration of surface water quality.

- **Impacts on Air Quality**

Following potential impacts on air quality may occur during construction phase.

- **Emission of Dust and Particulate Matter**

During the development / construction, vehicles and machinery will be employed. These will generate some dust and smoke temporarily, which will stop on completion of the construction work. During construction phase due to continuous operation of machinery and movement of heavy trucks and vehicles can generate gaseous emissions and can have a slight adverse effect on the surrounding environment. Combustion exhaust from vehicles and construction equipments during construction phase can affect ambient air quality of project area.

This impact is classified to be short term, reversible and limited, as it will only occur during the excavation activities. In addition, these impacts are expected to be contained within the site boundaries.

- **Vehicular Exhaust Emission**

During construction, the continuous operation of machinery and movement of cranes, heavy trucks and vehicles may generate gaseous emissions and may have an adverse impact on the surrounding environment. The overall impact on the quality of air during the construction stage will, however, be of less intensity. This will be of moderate negative impact.

- **Health and Safety of Workers**

During construction phase minor and severe injuries to workers due to operation activities may occur but if managed properly this impact can be mitigated.

## 5.7 Mitigation Measures during Construction phase

The potential negative impacts during construction and operational stage of the project should be mitigated to an acceptable level. Following environmental protection measures are adopted to eliminate adverse environmental impacts or to reduce them to an acceptable level within the legislative and regulatory framework. The mitigation measures are listed below:

- Appropriate waste disposal mechanism should be followed during the construction phase. The construction waste would be disposed in a manner that does not contaminate surface or groundwater.
- The construction waste generated will be used for earth filling within the project site premises.
- The Contractor needs to make sure that their machinery and equipments are properly tuned and serviced and there is no leakage of oil from construction equipments and machineries.
- Contractor should give assurance of quality of machineries and equipments which will be used during excavation and construction process.
- All vehicles, machineries, equipment and generators used during construction activities should be in good working condition and be properly maintained in order to minimize exhaust emissions.

- Construction labor must be trained in safety procedures for all relevant aspects of construction
- Helmets or hard hats should be worn by workers at all time of work and everywhere on the Project Site.
- Regular checks should be carried out to ensure that the contractor is following safe working procedures and practices.
- Workers should be provided with personal protective equipments (PPE's) such as safety jackets, earplugs or earmuffs, special boots and dust masks.
- Use of up-to-date and well maintained machineries or equipment with reduced noise level.
- Confining excessively noisy work to normal working hours in the day, as much as possible.
- Providing construction workers with suitable hearing protection like ear cap, or earmuffs and training them in their use.
- Earmuffs or ear caps should also be provided to those people living in nearby area.

### *5.7.1* Disposal of Construction Waste/Excavated Material

Dumping of construction wastes/excavated material in the surrounding area of the wastewater treatment plant may limit the use of land in the Project Area. This will be a moderate negative impact.

- **Mitigation**

  Management of construction activities will ensure minimum degradation to the soil around the project area and dumping of excavated waste will be used for earth-filling and in the depressions within the project area. The administrator will be bound to take care of the waste generated from the construction activities.

### 5.7.2 Noise and Vibration

Noise will be generated during site clearance and road construction works due to the use of heavy equipment, but it should not be any consequence to adjacent communities and that are located sufficiently far away of the area.

The remoteness of the site should help to mitigate noises. Typical noise emissions from different equipment, which may be used in construction works, are illustrated in Table

Table 2. Typical noise emissions of construction equipment

| Equipment | Distance | Typical sound pressure levels in dB(A) |
|---|---|---|
| | 15 m | 240 m |
| Air compressor | 75-87 | 51-63 |
| Backhoe | 71-92 | 47-69 |
| Compactor | 72 | 48 |
| Concrete mixer | 75-88 | 51-64 |
| Front loader | 72-81 | 48-58 |
| Generator | 72-82 | 48-58 |
| Grader | 80-93 | 56-69 |
| Pumps | 70-90 | 44-66 |
| Stone crusher | 85-95 | 61-74 |
| Tractor, Dozers | 78-95 | 54-74 |
| Trucks | 83-93 | 59-69 |
| Concrete vibrators | 68-81 | 44-57 |

- **Mitigation**

Mitigation measures mentioned below will be adopted to minimize the noise pollution. Those measures include, but are not limited to the following:

- Selection of up-to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built dampening techniques or appropriate muffling devices.
- Confining of excessively noisy areas and limiting the work to normal working hours in the day;
- Providing the construction workers with suitable hearing protection like ear cap, or

earmuffs and training them in their use; and

- Regular checkups and maintenance of the construction equipment, and oiling and greasing of the noise making mechanical parts.

### *5.7.3* Flora

During the site visit, it was observed that no rare, endangered or endemic flora or fauna species and no vegetation on the project site. On the hand, the future use of treated wastewater for irrigation, and the treated sludge as a fertilizer will help in land rehabilitation of surrounding areas which may create a suitable habitat for new species of plants and animals.

- **Mitigation**

After construction besides introducing new ornamental plants, local tree and plants species, as uprooted from the Project Site, will be planted for landscaping. In addition to providing a better view to the area, the vegetation's will help minimize the excess noise, vehicular emissions and dust pollution.

### *5.7.4* Fauna

There is no wildlife present in the Project area. In addition, the local animals and bird species of the area are very much domesticated and will not be adversely affected by the Project execution.

- **Mitigation** Not required

### *5.7.5* Relocation of Utilities

The construction of the infrastructure will not involve relocation of any public utilities.

- **Mitigation** Not required

### *5.7.6* Traffic Congestion and Disturbance to People

During the construction phase, the movement of heavy machinery and transportation of raw material and equipment may cause traffic congestions. As a result the daily activities of the people of nearby localities as well as of the visitors may be disturbed, which will require proper mitigation measures. This will be a moderate negative impact.

- **Mitigation**

During construction, following mitigation measures will be followed:

- Observation of timing by the vehicles carrying construction material of infrastructure to cause minimum disturbance to traffic on existing road. The construction equipment and machinery must be stationed in the boundary premises to avoid the traffic congestion on the main Road.
- Transportation of raw material and heavy machinery will be done early in the morning; and
- There will be coordinated planning of traffic movement by the Traffic Police and the Transport Department in accordance with the construction program with advance warnings to the affected residents and road users.
- All the machinery will stay inside the periphery of project site so it will not cause disturbance in the traffic.

### *5.7.7* Poverty Alleviation

Construction of this plant will generate the employment opportunities for the population living in the surrounding areas. This will be a potential minor positive impact.

- **Mitigation** Not required

### *5.7.8* Sanitation and Solid Waste Disposal

There will be a health risk of sanitation to the workers. This will be minor negative impact.

- **Mitigation**

All the solid waste will be disposed off in accordance with the regulations of Tehsil Municipal Administration.

### *5.7.9* Workers' Safety and Hygienic Conditions

The construction activities impose certain negative impacts on health and safety of the workers and public in case of unsafe and/or unfavorable working conditions. Mitigation measures will be

required to minimize health and safety related negative impacts of the project. This will be a minor negative impact.

- **Mitigation**

Implementation of the following measures will ensure health and safety of the workers and the public during the construction phase:

- The Administrator will ensure that the construction workers/labours are trained in safety procedures for all relevant aspects of construction;
- Construction workers will be provided with proper safety equipment such as helmets, goggles, masks, etc.;
- Formal emergency procedures will be developed for construction site increase of an accident. First aid kits and other necessary equipment will be kept available at site along with the list of emergency phone numbers to be contacted in case of any emergency/accident;
- The safety of the public at all stages of the construction will be ensured through appropriate public education and safety measures such as use of sign boards, barriers and flags; and
- Proper illumination will be provided at night.

## 5.8 IMPACTS OF OPERATIONAL PHASE

The anticipated impacts related to the project have been studied for operational stage and is discussed as follows:

### 5.8.1 PHYSICAL IMPACTS

- **Air Quality**

WWTP air pollution and odor may be transported towards the eastern south borders opposite to wind direction.

Air pollution and dusty conditions will occur during the excavation and construction work. In addition, gaseous and particulate emissions will have an impact on the environment. During the

operational phase, methane gas and other gases (like $H_2S$ and other volatile organic compounds VOCs) will be released into the atmosphere and may have a negative impact on air quality.

- **Mitigation**

In order to minimize air pollution, following mitigation measures are recommended:

- Site roads should be dampened every 4-6 hours or within reason to prevent a dust occurrence, this frequency should be increased on hotter days taking onto account the minimization of cleared areas that are needed to be utilized.
- Cover the construction materials such as cement to prevent a dust nuisance.
- Construction of odor removal systems at the main sources of odor (inlet channel, inlet pumping station, coarse and fine screen channels and conveyors, containers for screenings and grit, sludge dewatering). The exhaust air will be sucked through the biological compost filter by means of a fan. The water saturated waste air is then transferred beneath the bio-filter and enters the bio-filter through a special designed nozzle bottom. As this occurs microorganisms present in the biomass oxidize the contaminants in the gas to innocuous end products such as $CO_2$, $H_2O$ and common substances. After passing through the bio-filter, the cleaned exhaust air will be discharged to the atmosphere.

- **Noise**

During the operational stage, Noise will be generated mainly due to movement of vehicles on the roads, for which proper mitigation measures are required. This will be a moderate negative impact.

- **Mitigation**

The influence of ambient noise must always be minimized from its source and measurements should be done to ensure that the noise is within the acceptable limits. The following actions are required:

- Use equipment that has low noise emissions as stated by the manufacturers.
- Use equipment that is properly fitted with noise reduction devices such as mufflers.
- Operate noise-generating equipment during regular working hours (e.g. 7 am –7 pm) so as to reduce the potential of creating a noise nuisance during the night.
- Relating staff in the operation of noise-generating equipment should be equipped with noise

protection. Workers exposing to noise level of ≥ 80 dB continuously for 8 hours or more should use ear muffs. These who experiencing prolonged noise levels (70-80) dB should wear earplugs.

- **Water**

In general, the presence of the treatment plant will have a positive effect on surface and groundwater in the region; because it will treat the raw sewage currently discharged in the nature. There will no longer be a need to construct the septic tanks in the city, which cause contamination of water resources and result in a health deterioration. Treated water will be used for irrigation or disposed to the river as a high quality water source.

- **Mitigation**

- Minimization of leakages of wastewater to groundwater due to construction of WWTP.
- Regular testing should be done to effluent wastewater quality to ensure that its characteristics are within the standards. The chlorination contact basin effluent will flow by gravity into the outflow measurement channel.
- Construction of equalization bonds to contain the extra flow during the peak time and to avoid discharging it by-pass to river.
- Avoid permeability of supernatant drainage from the drying beds.

- **Soil**

The construction of treatment facilities and road in addition to excavation works will expose soils in the affected areas leaving them vulnerable to erosion by surface run-off. Limited quantities of soil will be excavated during the construction phase of the treatment plant. In case of a rainy season, there will be soil erosion.

Leveling at the plant site can result in soil disturbances, erosion problems and dusty conditions. The reuse of treated water for irrigation will improve the productivity of agricultural area in the region. When treated effluents are unacceptable, these will cause contamination for the receiving water body. If the grease and sludge are not properly handled and managed, they can contaminate the nearby soils and create Unpleasant odors.

- **Mitigation**

- The staff should be trained for proper management of greases, to avoid soil contamination.

- Periodic tests should be done to assure the quality of effluent water and to avoid partially treated wastewater to reach the soil.
- Excavated soil should be utilized for landscaping and tree planting purposes.
- Exposed areas should be replanted with grass as soon as possible after construction.

- **Potential Impact on Landscape**

WWTP will not significantly affect on the landscape; as the WWTP is not visible from any residential units or from most of the neighboring areas. On the other hand, there will be a positive impact of the long-lived trees which supposed to be planted.

- **Mitigation**

- Trees should be planted around the plant and within the project site to improve the local climate making use of effluent treated water for irrigation purposes.
- The effluent water of the WWTP can be utilized for the purpose of planting squares, parks and recreational areas in the neighboring regions.

## 5.9 Socio-economic Impact

When a development project is launched in a community, it helps in boosting up the socio-economic conditions by providing the people different economic opportunities. The construction of plant would have a great impact on the commercial activities of the locals.

The socio-economic impacts like employment, education, life, style and cultural uplift are the direct benefits during this stage for the people of the Project Area. Local people will be hired for different jobs. All the Project related job opportunities will ultimately improve per capita income of the population in the area. This is a major positive impact.

- **Mitigation:** Not required

## 5.10 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

- **Tree Plantation**

Tree plantation and cropping within the premises have been planned by the proponent for environmental enhancement. The Proponent will also make arrangements for protection and maintenance of trees. More than 300 trees will be planted including amaltas, keekar Shisham, Rose and other ornamental plants for beauty having height of 6-7 ft.

Tree Plantation Plan has been prepared for Proposed Project as part of environment enhancement measure. Straight line and Circular plantation will be carried out. These rows will cover the road's boundary of Project Area.

**Objective of Tree Plantation:**

The tree plantation will be done to:

- Improve the environment: It will help enhance the environment, moreover will work as a noise and dust barrier.
- Increase the aesthetic value of the property.

**Tree plantation Pattern:**

Planting of trees in this plant will be carried out in linear and circular pattern. Spacing distance between rows and plants depends on choice of species. Ten planting hoes will be used for tree plantation. The trees for this project are selected on basis of site requirements, climatic suitability, potential growth rate on site, sunlight requirements and potential competition problems, potential for insect and disease problems.

The detailed plan is given below:

**Table 5.1: Estimated Tree Plantation**

| Sr. No. | Particulars | Numbers |
|---|---|---|
| 1 | Total Plantation | 300 |
| 2 | Tree Spacing (m) | 5 m |

Following plants species may be suitable to be plant in the Project Area:

**Table: 5.2: Trees to be Planted**

| Sr.# | Scientific Name | Local Name | Family |
|---|---|---|---|
| **1** | Acacia Karoo | Kikar | Fabaceae |
| **2** | Erythrophleumsuaveolen | Tali | Leguminosae |
| **3** | Eucalyptus Globus | Safaeda | Myrtaceae |
| **4** | DalbergiaSissoo | Sheesham | Fabaceae |
| **5** | Melia indica | Nim / Neem | Mimosaceae |

# CHAPTER 6: STAKEHOLDER CONSULTATION

## 6.1 General

Any person, group or organization with an interest in the project or who can be affected directly or indirectly, negatively or positively by the project activities is a project stakeholder. Because of their interests and concerns, it is very important to take stakeholders into confidence regarding the project need and impacts, and their management. Stakeholder consultation is a mean of involving the entire primary and secondary stakeholders in the project decision making process in order to address their concern, improve project design and give the project legitimacy. Stakeholder consultation, if conducted in a participatory and objective manner, is a mean of enhancing the project stability.

Community input (both of knowledge and values) on socioeconomic and environmental issues can greatly enhance the quality of decision making. Stakeholder consultation was therefore conducted in the project area, not only to satisfy legal requirement of EIA in Punjab but also to improve and enhance the social and environmental design of the project.

## 6.2 Objective of the Stakeholder Consultation

Role of the public participation is very important in the design making process to achieve the goal of sustainable development. The major objectives of public consultation are as follows:

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

## 6.3 Proponent

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

## 6.4 The Responsible Authority

The Management of Macca Sugar Mills (Pvt.) Ltd. will be the responsible authority to take all measures prior to start the project and during operation.

## 6.5 Other Departments and Agencies

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

## 6.6 Environmental Practitioners and Experts

Team of Elite Environmental Solutions visited the project site, had discussion with stakeholders and consulted with the local people of nearby and other villages to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to employment, own businesses, doctors, some of them communicated but according to social value of the area they mostly hesitate to communicate comfortably and get pictured. People provide the massive information about the project and have positive remarks regarding the project development.

## 6.7 Community Concerns

### 6.7.1. Project Approval

The community consultations demonstrated that goodwill towards the project proponent indeed exists; approval for project activities by the communities was evident. The consultations were considered a good gesture and appreciated, especially by the men and women. This project will provide employments to the local as well as non-local poor community in its construction as well as in operational stages.

### 6.7.2. Resettlement/ Relocation

The proposed site is located on the land already owned by proponent of the project. Therefore, no issue of the resettlements is there.

### 6.7.3. Local Employment

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

### 6.7.4. Interaction with Local Community

Non-Local work force coming in the project area that will not be aware of the local customs and norms, may result in conflicts with the local community, keeping in mind the sensitive law and order situation and culture of the area.

## 6.8 Consultation Process

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

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

Secondary stakeholder consultations were more formal as they involved government representatives and local welfare organization, NGOs consulted during face to face meetings and through telephonic conversations. They were briefed in the EIA process about the potential negative and positive impacts of the project on the area's environment and communities.

It is important not to raise community expectation unnecessarily or unrealistically during the stakeholder consultation meetings in order to avoid undue conflicts with tribal leaders or local administrators. The issues recorded in the consultation were examined, validated, and addressed in EIA report.

## 6.9 Stakeholder Consultation Techniques

In recognition of diversity of views within any community, it is very important to obtain a clear understanding of the different stakeholders' views and concerns regarding the project and to

analyze their capacity and willingness to be involved in some or all of the project and its planning process. It is important to be aware of how different power relations can distort the participation. It is also important to know that how community skills, resources and knowledge can be applied to improve the project implementation. All of this can be achieved by careful use of various tools of stakeholder consultation. Therefore the following participatory techniques were employed during stakeholders' consultation:

- Informal meeting with the communities in neighborhood areas; men and elders attended these meetings.
- Focus group with women participants in surrounding areas.

## 6.10 Stakeholders Consulted

In consultation process for EIA, the following stakeholders were consulted.

- Local communities, men, women and elders attended the meetings
- Local Government representatives
- Meeting with stakeholders comprised of community consultation meeting, focus group discussion and in-depth interviews with men and limited focus discussion with women. The location of meeting, the process followed and the outcome are discussed here.

## 6.11 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 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 summary of consultation with various stakeholders is given below:

**Table 5.1: Detail of Public Consultation with Community**

| Sr. No. | Name of Respondent | Department | Comments |
|---|---|---|---|
| 1 | Rozeena Riaz | Community | He favored the project by focusing on its positive impacts meanwhile on its mitigable temporary environmental impacts. |

| | | | |
|---|---|---|---|
| **2** | Muhammad Saif | Community | By showing concern towards generating employment opportunities, he fully supported the project. |
| **3** | Farukh Zaidi | Community | He showed positive response towards industrial development of the country by increasing its economic growth to cater the current economic crisis of the country. |
| **4** | Muhammad Akram | Community | He overall favored the project by saying that the establishment of proposed project will not affect any residential community so it is a positive step to establish a Wastewater treatment plant for economic growth. |
| **5** | Tariq Bashir | Community | He was in favor of the Project and showed no negative concern about the Project. He said that it will generate employment opportunities. |
| **6** | Waqas Ali | Community | By concerning to local employment opportunities to skilled unemployed labors he overall favor the project. |
| **7** | Wajid Khan | Community | He said that Wastewater Treatment Plant will lead towards the availability of local good quality water, it will decrease the need of fresh and ground water. So I am fully supporting the establishment of proposed project. |

# CHAPTER 7: ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

## 7.1 General

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

As per the environmental legislation in Pakistan, the EMP for the operation phase, along with other documents, is to be submitted to the concerned Environmental Protection Agency to obtain confirmation for compliance and Environmental Approval for project operation.

## 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, contractors and other staff and stakeholders.
- Provide means of effective communication of environmental issues between all the persons associated with the project.
- 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 take overall responsibility for compliance with the EMP in his hand. Proponent will carry out verification checks to ensure that the contractors are effectively fulfilling their environmental and social responsibilities as mentioned in EIA.

**Contractors***:* The contractors will implement the majority of environmental and social mitigation measures. The contractors are subject to certain liabilities under the environmental laws of the

country, and under contract with the proponent.

## 7.4 Environment Management Plan

It lists all the mitigation measures identified in the EIA and the associated environmental or social aspects 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 Management Plan (EMP)**

| Environmental and social aspects | Mitigation Measures | Responsibility |
|---|---|---|
| **Construction noise** | • Periodic surveys will be conducted for the control of noise level from the construction equipment, operational machinery and vehicles.<br>• Machines and vehicles will be provided with mufflers.<br>• Proper maintenance, oiling and greasing of machines at regular intervals to reduce generation of noise.<br>• Provision of PPEs (ear plugs, ear muffs) to the workers working in high noise areas. | Construction Contractor |
| **Dust emission** | • Sprinkling of water on all the exposed sites to suppress the emission of dust.<br>• Covering all the soil piles and construction materials will be transported in closed containers. | Construction Contractor |
| **Vehicle and equipment exhaust** | • Maintenance of all vehicles and other equipment used during the construction in order to minimize the emission of pollutants. | Construction Contractor |
| **Water conservation plan** | • Recording of amount of groundwater that will be extracted for construction activities<br>• Strict monitoring will be in place to have an eye on all water uses so that no wastage of water takes place and where possible, water would be recycled. | Construction Contractor |
| **Wastewater** | • Wastewater generated during the construction | Construction |

| | | |
|---|---|---|
| **management** | activities will be managed through a Septic Tank and a screen. | Contractor |
| **Solid Waste** | • Identification and quantification of all waste streams<br>• Provision of separate waste bins at various locations for proper collection of different waste streams<br>• Onsite Separation of recyclable waste<br>• Hiring of waste collection contractor for its regularly collection<br>• Recording of all waste generation activities and its management | Construction Contractor & Waste Contractor |
| **Health and safety** | • Establishment of SOPs for all the project activities.<br>• Safety audits should be conducted.<br>• All accidents and incidents should be recorded, reported and reclaimed.<br>• Provision of Standardized Personal Protection Equipment (PPEs) such as ear plugs, safety Helmets, Gloves, Goggles, Masks and Gum Shoes to the employees to ensure their safety at work.<br>• Displaying Workers' awareness and safety wall chart showing safety symbols.<br>• Provision of First Aid Box in all departments.<br>• Development of comprehensive firefighting system to avoid any chance of fire that will includes all types of fire Extinguishers, fire hydrants, sand Buckets and fire fighting Vehicles.<br>• Basic medical and safety training will be held from time to time to minimize the risk of health and safety issues in the industrial premises.<br>• Provision of free medical facilities and services to the employees. | Construction Contractor |
| **Soil contamination** | • Spills trays will be provided and used at refueling locations. Emergency plan for the | Construction Contractor |

| | | |
|---|---|---|
| | spill management will be prepared and inducted to the staff for any incident of spill. Fuels, lubricants and chemicals will be stored in the covered bounded area. | |
| **Hazardous and non-hazardous solid waste management** | • Reuse of construction and demolition waste (bricks, cement, etc.) for flooring.<br>• All hazardous waste will be separately collected and managed from the other waste.<br>• Proper labelling of all containers of hazardous waste.<br>• Municipal waste will be managed using procedures established in the industrial estate.<br>• Record of all waste generated during the construction phase will be recorded. | Construction Contractor & Waste Contractor |
| **Operation Phase** | | |
| **Noise** | • Silencing and proper muffling of operating equipment<br>• Preventive maintenance and regular servicing and tuning of the equipment will be assured.<br>• Workers should be told and encouraged to use PPEs (ear plugs or ear muffs) at all times.<br>• Tree plantation will be done to reduce noise level. | Operation and Maintenance staff |
| **Exhaust and Dust emission** | • Proper ventilation will limit the amount of indoor pollutants and will assure the supply of clean air at all times to all the workers inside.<br>• Closed operations will keep the emission of air pollutants within PEQS limits.<br>• Provision of PPEs to the workers before entering into the working vicinity.<br>• Practicing water spraying where required.<br>• Regular monitoring of air emission sources.<br>• No open burning of waste within the premises of project site. | Operation and Maintenance staff |
| **Water conservation** | • Recording the amount of groundwater that will | Operation and Maintenance staff |

| | | |
|---|---|---|
| **plan** | be extracted for operation activities.<br>• Strict monitoring will be in place to have an eye on all water uses so that no wastage of water takes place and where possible, water would be recycled. | |
| **Wastewater management** | • Proper domestic waste water collection will be done through a network of pipeline to the waste water treatment plant which will undergo Activated Sludge Process. Treated wastewater will be disposed off in nearby drain according to standard practices. Activated Sludge Treatment layout plan is annexed in this report. | Operation and Maintenance staff |
| **Soil contamination** | • Provision of dense greenbelt within the premises of factory.<br>• Maintenance of impervious flooring and roof covers in order to avoid land contamination due to accidental spills.<br>• Regular maintenance of pumps and flange connections in the pipelines. | Operation and Maintenance staff |
| **Health and safety** | • Establishment of SOPs for all the project activities.<br>• Conducting Safety audits.<br>• Recording and Reporting of all accidents and incidents.<br>• Preventive approach will be preferred to corrective approach.<br>• Provision of Standardized Personal Protection Equipment (PPEs) such as ear plugs, safety Helmets, Gloves, Goggles, Masks and Gum Shoes to the employees to ensure their safety at work place.<br>• Workers' awareness and safety wall chart showing safety symbols will be displayed.<br>• Availability of First Aid Box in every department which will be within easy approach of all in case of any injury or mishap. | Operation and Maintenance staff |

| | | |
|---|---|---|
| | • Development of a comprehensive firefighting system including all types of fire Extinguishers, fire hydrants, sand Buckets and fire fighting vehicles to avoid any chance of fire<br>• Basic medical and safety training will be held from time to time to minimize the risk of health and safety issues in the industrial premises.<br>• Provision of free medical facilities and services to the employees. | |
| **Energy Management** | • Energy audit must be conducted.<br>• Energy leakages should be immediately noted, reported and sorted out. Repair and recovery measures should also be adopted.<br>• Attempts shall be made to bring into use the renewable resources to the extent possible and practicable. | Operation and Maintenance staff |
| **Decommissioning Phase** | | |
| **Soil Disturbance** | • Scheduling to avoid heavy rainfall periods to the extent practical.<br>• Mulching to stabilize exposed areas. | Operation and Maintenance staff |
| **Solid Waste Generation** | • Timely collection and disposal of solid waste.<br>• Recyclable waste should be sell out to the recycle market or any relevant customer. | Operation and Maintenance staff |
| **Health and Safety Issues** | • Employees should be provided with personal protective equipment. | Operation and Maintenance staff |

### 7.4.1 Environmental Monitoring Plan

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

- To provide a mechanism to determine whether or not 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 socioeconomic 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. The record will include:
  - ✓ Location of spill
  - ✓ Estimated quantity
  - ✓ Spilled material
  - ✓ Restoration measures
  - ✓ Photographs
- Description of any damage to vegetation, water resource or community asset.
- Corrective measures taken, if any
- Waste Tracking Register that will record entire waste generated during the construction period. This will include quantities of waste disposed, recycled and 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.
- ✓ Archeological resources—Record of any findings with photographs.
- ✓ Project and Community Interface
- ✓ Record of community complaints and the measures taken to address them.
- ✓ Number of meetings held in various communities and persons who attended
- ✓ Environmental and social training records

**Table 7.2: Roles and Responsibilities for Environmental Monitoring**

| Aspects | Proponent Responsibilities | Contractors Responsibility | Relevant Documentation |
|---|---|---|---|
| Contracting | Ensure that the monitoring, rehabilitation and rebuilding requirements are included in the contract between the proponent and the construction contractor. | Understand the environmental requirements of the contract. | 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 resources for environmental responsibilities; monitoring, rehabilitation and rebuilding. | Ensure the availability of resources for environmental monitoring, rehabilitation and rebuilding and their efficient use without wastage. | Project budget |
| 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 | Systematically observe and collect the data on the environmental | Inspection and survey reports |

| | | | |
|---|---|---|---|
| | carry out the field measurement or assign this duty to a concerned person or organization. | performance. | |
| 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 where required. | 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 |

## 7.5 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 meetings will be to present the EMP to project staff and discuss its implementation strategy and policy.

A weekly meeting will be held during operation. The purpose of this meeting 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.

### Changes-Record Register

A change-record register will be maintained at the site, in order to document any change in project/system design; especially those which have direct impact on the industry's emissions, effluents, wastes and resource management; such as the project to include some other processes. These changes will be handled through the change management mechanism.

### Environmental Training

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

**Table 7.5: Training Program**

| Target audience | Trainers | Contents | Schedule |
|---|---|---|---|
| Selected management staff | Contractors | Key finding of mitigation measure | After every five months |
| All personnel | Contractors | Mitigation measures | Monthly |
| Technical Staff | Contractors | Waste disposal, vehicle movement restriction and other mitigation measures | After every three month |
| Other staff | Contractors | Waste disposal, resource conservation and other mitigation workers | Monthly |

### Institutional Responsibilities

Following functionaries will be involved in the implementation of EMP:

1. The project proponent and owners of the EMP
2. Project construction contractor(s) as executors of the EMP during construction phase of the project.
3. Operational & Maintenance (O&M) and the Health, Safety and Environment team of the proposed project as an executor of the EMP during the operational phase of the project.

## 7.5.2 Monitoring Plan

The monitoring of the EMP and the communication and documentation mechanism that will be employed during the operation phase will be based on the Environmental Management System (EMS) of the project proponent. The management system of the project proponent will be the same

as the certified EMS in place at the company.

**Table 7.3: Environment Monitoring Plan for Construction Phase**

| Potential activity and potential impact | Objective of monitoring | Parameter to be monitored | Measurements | Location | Frequency | Responsibility |
|---|---|---|---|---|---|---|
| Disturbance due to noise from construction activity | To determine the effectiveness of the noise abatement measures on the sound level | Noise level near the receptor | Reading will be taken. | At least three locations on the plant boundary and three locations at the receptor end | On three typical working days and one weekend | Environment Officer |
| Soil contamination due to leakage of oil and chemicals on the ground | To determine the effectiveness of the control measures taken to minimize the spillage of oil and chemicals | Procedure in place to handle the liquids and availability of procedure and equipment for emergency response | Visual inspection and availability checks | Construction site | Weekly inspection | Environment Officer |
| 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 | Visual inspection | Construction sites and camp sites | Once daily | Environment Officer |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | undertaken | | | | |
| Water and other resources' conservation | To determine the effectiveness of the conservation techniques in practice | Leakages, spillages and wastages | Visual inspection and record tracking | At all points of use | On monthly basis | Environment Officer |
| Workers' safety | To check and evaluate the effectiveness of the workers' safety plan | Injuries and LWI or LTI | Injuries will be recorded | Construction site | Daily | Environment Officer |
| Vehicle and equipment exhaust | To confirm the availability of exhaust control devices with the construction vehicles and equipment | Air quality at different points around the vehicles and equipment | Readings will be taken | At least three points around the source and three points at some distance downwind | On three word days | Environment Officer |

**Table 7.4: Environment Monitoring Plan for Operational Phase**

| **Potential activity and potential impact** | **Objective of monitoring** | **Parameter to be monitored** | **Measurement** | **Location** | **Frequency** | **Responsibility** |
|---|---|---|---|---|---|---|
| Disturbance due to noise from | To determine the | Noise level near the receptor | Noise Measurement | At least three | Quarterly | Environment Officer |

| | | | | | | |
|---|---|---|---|---|---|---|
| operational activity | effectiveness of the noise abatement measures on the sound level | | | locations on the plant boundary and three locations at the receptor level | | |
| PM concentration in air | To determine if the PM concentration exceeds the prescribed limits. | Ambient Air parameters | PM | Processing halls and project boundaries. | Monthly | Environment Officer |
| Procedure for waste collection, storage, sorting and sale | To check if the solid waste can be reduced, reused or recycled at plant before sale | Inspection of waste generation, collection, storage, sorting and sale will be undertaken at entire unit and record will be maintained. Waste Audit | Visual inspection | Entire unit | Once daily | Administration Officer/Waste Manager |
| Health and safety of the employees and the neighboring community | To determine the effectiveness of the Health & Safety management system in place | All the major and minor incidents and accidents, and injuries or losses will be recorded. Safety Audit | Periodic medical check-up of all the employees and Visual Inspection | All the employee / Entire unit | Monthly or earlier if required | Environmental Officer/ HSE Manager |

| | | | | | | |
|---|---|---|---|---|---|---|
| Energy management and conservation | To check the effectiveness of the energy management and conservation system in place | Energy audit | Energy audit | Entire unit | Bi-annually | Environmental Officer |

## 7.6 Summary of Impacts and their Mitigation Measures

Environmental monitoring is a vital component of the Environmental Management Plan. It is the mechanism through which the effectiveness 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 are:

- 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.

## 7.7 Equipment Maintenance Details

- PPE's and other required machinery of latest technology with high efficiency will be purchased by the proponent
- Good technical practice should be implemented during operations.
- Maintenance of equipment will be done twice a year for the smooth operation.
- All the equipment must be kept clean.
- Proper lubrication of moving parts of machines should be according to schedule.
- Make maintenance and inspection schedule.
- Prepare and keep the record of equipment maintenance log.
- Training workshops to staff about SOPs of equipment should be planned and implementation of such practices must be ensured.

## 7.8 Environmental Budget

The environmental cost has been worked out in Table 7.6:

**Table 7.6: Environmental Budget**

| Sr. # | EMP Parameters | Unit Cost | Before Construction | | During Construction | | After Construction | | Total (m PKR) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Times | Cost | Times | Cost | Times | Cost | |
| **1** | Environmental Monitoring | 0.3 | 1 | 0.3 | 1 | 0.3 | 2 | 0.3 | 0.9 |
| **2** | Social Cost (meeting, visit, tour etc.) | 0.03 | 1 | 0.03 | 1 | 0.03 | 1 | 0.03 | 0.09 |
| **3** | Environmental Training | 0.1 | 1 | 0.1 | 0 | 0 | 1 | 0.1 | 0.2 |
| **4** | Tree Plantation Plan | 0.0010 | 0 | 0 | 0 | 0 | 500 | 0.0010 | 0.5 |
| **5** | Environmental reporting & review | 0.3 | 1 | 0.3 | 0 | 0 | 1 | 0.3 | 0.9 |
| **Total** | | | | | | | | | 2.59 |
| **Contingencies (10%)** | | | | | | | | | 0.279 |
| **Grand Total** | | | | | | | | | **2.3** |

# CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

## 8.1 Conclusion

The report presents Environment Impact Assessment of the project of Installation of Wastewater Treatment Plant at Macca Sugar Mills (Pvt.) Limited, located at Chak 65, Manga Road, District Kasur. The main objective for the establishment of this unit is to treat the wastewater of the sugar industry.

The performed EIA showed all the possible impacts (both positive and negative) associated with the construction and operation of the project. Appropriate mitigation measures as explained in the environmental study shall reduce, if not eliminate, these impacts so that these can be brought within acceptable, safe limits. The study also shows that there will be no exploitation and consequential depletion of the local natural resources. Based on overall assessment of the environmental impacts of the project, it is concluded that the project is not likely to cause any significant adverse impact on the social, physical and biological environment of the area, provided that suitable mitigation measures as identified in this study are implemented. Moreover, the identified impacts have been found to be of temporary nature; leaving no long-term, residual impacts behind.

This Environmental Impact Assessment has been conducted, to the extent possible, in line with the relevant guidelines provided by the Environmental Protection Agency. The objective of such study is to identify and assess potential environmental and socio-cultural impacts of the project. The Environmental Impact Assessment contains description of the project, description of the environmental baseline, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is also included in the study, developed separately for construction and operation phases. For compliance checks of the EMPs, Environmental Monitoring Plans have also been developed.

On the basis of all the above conclusions and the fact that the project is going to have a benefit/cost ratio above one for both environmental and socioeconomic concerns, this project is found to be environmentally feasible. Since, conservation, reduction, reuse, recycling, treatment and recovery techniques have all been planned to be practiced for both material and energy resources with the aim to reduce footprint of the industrial processing, the project can also be declared to be sustainable.

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. It is accordingly recommended that environmental approval for the project may be issued by the Environmental Protection Agency, subject to the payment of the requisite scrutiny fee by the proponent of the project.

## 8.2 Recommendations

Following are some recommendations to improve the environmental status of the project:

- All the parameters of discharges of the project shall be within prescribed limits.
- No activity should be undertaken at the project site which may cause leakage and spillage of oils, chemicals and fuels into adjoining grounds;
- No activity should be undertaken at the site which could pose any sort of a threat to public health.
- Workers should be provided with adequate and standardized PPEs like ear muffs, goggles, gloves and shoes etc.
- Workers should be told and encouraged to use PPEs.
- Training schedules should be strictly followed;
- Separate parking spaces should be demarcated at the project site for parking of vehicles;
- Trained drivers should be hired for transportation and they should be told and encouraged to observe traffic rules;
- Establishments shall be regularly advised to keep noise levels within acceptable limits.
- Waste minimization practices should be employed and workers should be encouraged to adopt such methods;
- Small waste storage bins should be installed at different corners for proper waste collection of solid waste.
- An area designated for sorting of the solid waste must be constructed;
- Wages should be distributed on time;
- Wages should not be below minimum wages as prescribed;
- Proper ventilation must be in place;
- Proper tree plantation plan will also be developed in order to make the unit environment friendly.
- Obligatory insurance should be provided to work laborers against accidents

- Basic medical training should be provided to the specified work staff and basic medical service and supplies to workers.
- Flammable materials should be prohibited in the premises area.
- Stop the source of the spill or any other accident immediately;
- Track and root out the causes of any accident or spill;
- The Security Guards shall also be trained to act in case of all possible emergency situations. The fire alarms can be activated to signal evacuation. At the same time, communication shall be made with hospitals, emergency services and police for urgent support.
- The proposed Environmental Management & Monitoring Plan should be implemented.