Contents

EXECUTIVE SUMMARY

Title & Location of the project

It is the intention of **Malik Ghulam Mustafa** S/o **Ghulam Muhammad**, the proponent of Mezan Beverages (Pvt.) Limited, to obtain environmental approval by submitting the Environmental Impact Assessment (EIA) for the **proposed extension of unit** and **installation of ETP** in Mezan Beverages (Pvt.) Limited. The project site is located at Located at **45 Km, Multan Road, Nathay Khalsa, District Kasur, Pakistan**. The project involves the extension of the existing unit by adding new machinery and improving infrastructure for enhancing production capacity. The new production line will be installed within the premises of existing unit with the total cost of 3.5 billion PKR. The total area of the project site is 247000 sqft. The existing production capacity of the unit is 13,777,920 liters/month and the added capacity will be 17,222,400. Total capacity of the beverage unit will be 31,000,320 liters/month.

Objective of project: This extension aims to meet growing market demand, improve efficiency, and enhance competitiveness in the beverage industry by increasing the production capacity of existing unit

This EIA is being submitted in compliance with Section 12 of the Pakistan Environmental Protection Act (PEPA), 1997 (Amended 2012), to ensure that the expansion is carried out in an environmentally responsible and sustainable manner.

Location

The Subject project is located at 45 Km, Multan Road, Nathay Khalsa, Kasur, Pakistan

Project land coordinates are as follows:

31°15' 19" N

74° 01' 18"E

North ----------Industrial Area

South ----------Covered Area

East ---------- Open Area

West ----------Open Area

For further details, layout map of the project is attached as Annexure with the report.

Figure 1: Google map of the project area M/s Mezan Beverages (Pvt) Limited

Details of the proponent

Name: Malik Ghulam Mustafa S/o Ghulam Muhammad

Address: 45 Km, Multan Road, Nathay Khalsa, Kasur

CNIC: 36302-0296826-5

For further details CNIC of the proponent and other relevant documents are attached as Annexure with this report.

Name of organization preparing the report:

Pak Green Enviro-Engineering (Pvt.) Ltd, as independent consultants, has been appointed by the proponent to conduct Environmental Impact Assessment Study (EIA).

Company office address: 46-M, Gulberg III, Lahore

Contact: 042-35441444, 0303-4442335.

For detail company profile see the Chapter # 1 “Introduction”

A brief outline of the proposal

Title of the Project	Proposed Extension of Mezan Beverages (Pvt) Limited
Location of the Project	45 Km, Multan Road, Nathay Khalsa, Kasur
Name of the Proponent	Malik Ghulam Mustafa
Cost of the Project	Total estimated cost of the Project is 3.5 billion PKR.
Project Description	The project involves the extension of the existing unit by adding new machinery and improving infrastructure for enhancing production capacity. The new production line will be installed within the premises of existing unit with the total cost of 3.5 billion PKR. The total area of the project site is 247000 sqft. This extension aims to meet growing market demand, improve efficiency, and enhance competitiveness in the beverage industry by increasing the production capacity of existing unit.
Raw Materials	Raw materials include Water, Sweeteners, Carbon Dioxide Coloring Agents, Preservatives and Fruit Extracts
Production Capacity	The existing production capacity of the unit is 13,777,920 liters/month and the added capacity will be 17,222,40. Total capacity of the beverage unit will be 31,000,320 liters/month.
Power Requirement	Power requirements will be fulfilled by the National Grid/WAPDA.
Labor/Workforce	During Construction: 20-25 persons
Water Requirement	During operation: Approximately 20,000,000 gallons/month for industrial processes and domestic purposes.

Solid Waste	During operation: Domestic waste generation of 0.75 kg/capita/day per person, which will be handed over to a contractor. Project-related waste will majorly include fruit pulp and organic waste that can be reused in Composting, biogas production, animal feed, or extraction of pectin for food industries

The major impacts

In order to identify all the activities associated with the project during operation phase with potential to cause adverse environmental impacts and harm a thorough review has been conducted. Project will not have any significant adverse impacts on the nearby community and on environment. Overall, the project will have positive impacts on the local population and country as a whole. Moreover, area for plantation is also reserved for air purification within the project vicinity.

Table: Summary of Environmental impacts of the project during the Construction phase and their mitigation measures:

Potential Impact	Criteria for determining Significance	Key Mitigation Measures
Dust Emissions—Particulate matter emitted during construction activities and gaseous emissions from transportation vehicles can result in deterioration of ambient air quality in the vicinity of the project site, and be a nuisance to the surrounding workers.	An increase in visible dust beyond the boundaries of the construction site; or Concentration of PM10 in excess of 150 µg/m3 PEQS for Ambient Air.	Sprinkling of water on unsealed surfaces is recommended Vehicle speed restrictions should be applied in the project area; Raw materials should be transported in covered trucks. Ensuring that no stockpile is within 250 m of the community.
Construction Noise- Disturbance to surrounding communities due to operation of construction machinery at the project site.	PEQS for Noise OSHA standards	Noise monitoring has been conducted at the project site before starting the construction activity. Reduce noise at source; Take noise levels in consideration during detailed design and construction planning; Reduce traffic noise.

Solid waste Management— Improper waste management may generate health and aesthetic issues	Generation of excessive waste; Recyclable waste and reusable waste is discarded; Improper disposal.	Development of a waste management plan; Constructional waste should be utilized for road filling and maintenance. Domestic waste should be disposed of properly, handed over to contractors, placed in bins.
Vegetation Loss/ Soil erosion—Loss of vegetation as a result of land clearance for the construction purposes	Unnecessary or excessive removal of trees and shrubs.	Preparation of a Reinstatement Plan; Minimization of the felling of trees and clearing of vegetation; and avoidance of the use of fuel wood
Water Resources— The extraction of water for the project construction activities can affect the groundwater availability for the project area communities	Water extracted for the project can directly affected the ability of the community to meet their water needs	No impact on the community groundwater needs is envisaged as a result of the project.
Soil Contamination—Oil can contaminate the soil	Presence of visible amount of hydrocarbon in soil	Provision of spill prevention and control kits; Use of impermeable surfaces in workshops, and storage areas
Socioeconomic Issues **Workers Safety—** Safety hazards associated with the construction activity, particularly with the increase in traffic at the project site**.**	No specific guidelines exist. A significant impact will be interpreted if there are complaints from the community or the occurrence of any injury or loss	Speed limit of 10 km/h will be maintained on the access road; Traffic controller will be stationed on the access road; night driving will be kept to a minimum
Project and Community Interface—Inter-cultural differences between the project staff from other areas and the local community	No community complaints	Training of the non-local project staff on local culture and norms; Avoidance of unnecessary interaction of local population with the non-local project staff

Table: Summary of Environmental impacts of the project during the operation phase and their mitigation measures

Potential Impact	Criteria for determining Significance	Key Mitigation Measures
Machinery Noise- Working of machinery can be a nuisance for the workers in the working area.	OSHA Standards	PPEs i.e. ear muffs should be provided to workers in case of high noise.
Health & Safety Issues- Health and Safety issues e.g. Cuts and Injuries may be caused during the machinery handling.	OSHA Standards	Proper training of the staff should be conducted to avoid the accidents. First aid measures should be provided at the workplace.
Solid waste management- Improper solid waste management may cause health problems and aesthetic issues	Exposure to potentially hazardous waste; Generation of excessive waste; Recyclable waste and reusable waste is discarded; Improper disposal.	Waste bins should be placed at suitable places. Domestic and process related waste should be handed over to contractors.
Groundwater—The increased withdrawal of groundwater for the project will affect the groundwater resources of the project area	Water extracted for the project can directly affected the ability of the community to meet their water needs	No impact on the community groundwater needs is envisaged as a result of the project.

Proposed Environmental Monitoring

To oversee the environmental performance of the project through its lifecycle enforcing the PEQS an Environmental Monitoring Program should be formulated which ensures effective surveillance of the environmental parameters at various stages of the project development and compliances with PEQS and legal obligations. Monitoring for following Environmental Parameters is recommended:

Ambient Air

Monitoring for ambient air should be conducted on quarterly basis during operational phase of the project and report should be submitted to EPA Punjab.

Noise

Regular monitoring for noise level should be maintained periodically during operation phases of the project and report should be submitted to EPA Punjab.

Water quality

Regular monitoring of water quality should be conducted on monthly basis during operation phases of the project and report should be submitted to EPA Punjab. Record should be maintained regarding the underground water pump and consumption.

Recommendation: Environmental Monitoring data log book should be maintained by the project proponent.

CHAPTER # 1

INTRODUCTION

This Section of the report provides an overview of the rational of the Project, objective of project, requirement of the project, purpose of the report and approach adopted to conduct the Environmental Impact Assessment Study.

Purpose of the report

Environmental Impact Assessment report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab, Lahore for the compliance of Section 12 of Punjab Environment Protection Act-1997 (Amended 2022) for obtaining No Objection Certificate (NOC)

The other relevant regulations and guidelines considered while preparing this EIA report include:

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

Various aspects like environmental, social, physical and other aspects of the project its regular occupancy are highlighted in this EIA report. Measures necessary to be adopted to mitigate any environmental impacts on any part of the environment around are also described. All the important information is also provided as described under the format used to help decision makers, EPA Punjab in the present case, before issuing the desired Environmental Approval.

Identification of the project and proponent

The proposed project falls under Clause 6 of Category B of Schedule II of the Review of IEE and EIA Regulations, 2022.

Proponent Details:

Name: **Malik Ghulam Mustafa** S/o **Ghulam Muhammad**

Address: 45 Km, Multan Road, Nathay Khalsa, Kasur

CNIC: 36302-0296826-5

For further details CNIC of the proponent and other relevant documents are attached as Annexure with this report.

Details of Consultant

Pak Green Enviro-Engineering (Pvt.) Ltd is an independent company, who conducts EIA, EIA, EMP and other environmental investigations through its panel of environmental consultants, public participation practitioners and experienced environmental managers. The company has its own recommended instruments to check the baseline environmental data/PEQS and lab analysis facility for water, wastewater priority parameters.

Contact: Pak Green Enviro-Engineering (Pvt.) Ltd.

Office No. 46-M, Gullberg III, Lahore

Tel: 042-35441444, 03034442335

Email: info@pakgreen.pk; pak.green@hotmail.com

The current study was carried out by the following professionals:

Sr. No.	Designation	Name/Qualification	Experience
1.	Chief Environmentalist/ Lead Environmental Professional	Abdul Hafeez Nasir PhD Scholar Environmental Management	Ten Years' Experience as Environmentalist
2.	Senior Environmentalist/ Environmental Professional	Iftikhar Ahmed M. Phil Environmental Sciences	Seven Years' Experience as Environmentalist
3.	Associate Environmental Professional	Azka Mehboob M. Phil Environmental Sciences, GCU	>1 Year experience
4.	Associate Environmental Professional	Muhammad Ahmad BS Environmental Science, QAU	1 Year Experience

Brief description of Nature, Size and Location of Project

Mezan Beverages (Pvt) Limited is undertaking the proposed extension of unit and installation of ETP. The project involves the expansion of the existing unit which means increasing production capacity, adding new machinery, improving infrastructure, and possibly introducing new product lines. This expansion aims to meet growing market demand, improve efficiency, and enhance competitiveness in the beverage industry, and the establishment of an Effluent Treatment Plant (ETP).

The project is located at 45 Km, Multan Road, Nathay Khalsa, Kasur and spans a total area of 247000 SFT. The total estimated cost of the project is 3.5 billion Pkr

The expansion aims to enhance the company's production capabilities while ensuring environmental compliance through improved wastewater treatment capacity. The installation of ETP maintains water reuse. Treated water from the ETP can be **reused for non-drinking purposes** such as cooling, floor cleaning, or irrigation, reducing overall water consumption

This development will strengthen Mezan Beverages' position in the beverage industry, enabling it to meet growing market demands while maintaining high-quality production standards.

Title of the Project	Proposed Extension of Mezan Beverages (Pvt) Limited
Location of the Project	45 Km, Multan Road, Nathay Khalsa, Kasur
Name of the Proponent	Malik Ghulam Mustafa.
Cost of the Project	Total estimated cost of the Project is 3.5 billion PKR.
Project Description	The project involves the extension of the existing unit by adding new machinery and improving infrastructure for enhancing production capacity. The new production line will be installed within the premises of existing unit with the total cost of 3.5 billion PKR. The total area of the project site is 247000 sqft. This extension aims to meet growing market demand, improve efficiency, and enhance competitiveness in the beverage industry by increasing the production capacity of existing unit.
Raw Materials	Raw materials include Water, Sweeteners, Carbon Dioxide Coloring Agents, Preservatives and Fruit Extracts
Production Capacity	The existing production capacity of the unit is 13,777,920 liters/month and the added capacity will be 17,222,400. Total capacity of the beverage unit will be 31,000,320 liters/month
Power Requirement	Power requirements will be fulfilled by the National Grid/WAPDA.
Labor/Workforce	During Construction: 20-25 persons
Water Requirement	During operation: Approximately 20,000,000 gallons/month for industrial processes and domestic purposes.
Solid Waste	During operation: Domestic waste generation of 0.75 kg/capita/day per person, which will be handed over to a contractor. Project-related waste will majorly include fruit pulp and organic waste that can be reused in Composting, biogas production, animal feed, or extraction of pectin for food industries

Location of the Project

Subject project is located at 45 Km, Multan Road, Nathay Khalsa, District Kasur, Pakistan.

Project land coordinates are as follows:

31°15' 19" N

74° 01' 18"E

North ----------Industrial Area

South ----------Covered Area

East ---------- Open Area

West ----------Open Area

For further details, layout map of the project is attached as Annexure with the report

Figure 2: Google map of the project area M/s Mezan Beverages (Pvt) Limited

Screening:

Subject project is the proposed extension of the Beverage unit under the name of M/s Mezan Beverages (Pvt) Limited at 45 Km, Multan Road, Nathay Khalsa, District Kasur, Pakistan

Project falls under Schedule II, Clause 6 of Review of IEE and EIA Regulations, 2000. (Amended 2022) TORs of the study under clause 5 (f) of policy and procedure for the filing, review and approval of environmental assessment.

Scoping

Spatial and Temporal Boundaries of Environmental Assessment

This project spans at the area of 247000 square feet. The existing land use is industrial as the project lies in an Industrial area in District Kasur. The surrounding plots are either a property of farmers with agricultural lands and will most probably be sold to industries in future, so currently they are open plots and industrial units. The main road along with the project site is Industrial Road. The following map shows the spatial and temporal boundaries of the project. For further details Google earth map of the project on A3 page is attached as Annexure with the report.

Important issues and concerns raised during consultation

Important issue and concerns raised by the community during consultation include the impact of untreated wastewater released from the industry that may be discharged into the drinking water supply. The Proponent ensured that to treat the wastewater coming out from the industry before final disposal into the nearby drain. The community was also concerned about employment to local people. The proponent ensured that maximum job opportunities will be given to residents of the area.

Significant Impacts to be determined

Mezan Beverages (Pvt) Limited is undertaking an expansion project to enhance its production capacity and improve operational efficiency. The project involves the expansion of the existing unit which means increasing production capacity, adding new machinery, improving infrastructure, and possibly introducing new product lines. This expansion aims to meet growing market demand, improve efficiency, and enhance competitiveness in the beverage industry, and the establishment of an Effluent Treatment Plant (ETP).

The beverage industry has several significant environmental impacts, primarily related to water consumption, wastewater generation, energy use, air emissions, and solid waste production. Large quantities of water are used in manufacturing, leading to potential water resource depletion and pollution if wastewater is not properly treated. Energy-intensive processes contribute to greenhouse gas emissions, while packaging materials, such as plastic bottles, aluminum cans, and glass, generate substantial waste. Additionally, noise pollution from machinery and transportation can affect nearby communities. Identifying and managing these significant impacts is essential for sustainable operations, regulatory compliance, and environmental conservation.

To mitigate these impacts, the proponent has ensured the implementation of several measures. The Effluent Treatment Plant (ETP) has been upgraded to efficiently treat and recycle wastewater, reducing water consumption and preventing pollution. In terms of waste management, proper waste segregation and disposal practices have been adopted to ensure compliance with environmental standards for handling solid and hazardous waste. Noise pollution has been addressed through the installation of soundproofing measures and regular maintenance of machinery to minimize its impact on workers and the surrounding community.

CHAPTER # 2

DESCRIPTION OF THE PROJECT

Title of the Project

Proposed extension of Mezan Beverages (Pvt) Limited Unit and Installation of Proposed ETP site.

Objectives of the Project

Objectives of the subject project are:

- To establish a state-of-the-art, environment-friendly, clean & green Beverage manufacturing unit and installation of ETP.
- To contribute to the national economy of the country.
- Compensate to help poverty by providing employment.

Location and Site layout of the project

Location

Subject project is located at 45 Km, Multan Road, Nathay Khalsa, Kasur, Pakistan

Project land coordinates are as follows:

31°15' 19" N

74° 01' 18"E

North ----------Industrial Area

South ----------Covered Area

East ---------- Open Area

West ----------Open Area

For further details, layout map of the project is attached as Annexure with the report

Figure 3: Google map of the project area M/s Mezan Beverages (Pvt) Limited

Land Use on site

The land is designated as an Industrial area.

Road Access

Main Road is present at the side of the project which provides access to the project area/ unit.

Vegetation features of the project

There is no dense vegetation are present within the vicinity of the current project.

Cost and magnitude of the operation

Mezan Beverages (Pvt) Limited is undertaking an expansion project to enhance its production capacity and improve operational efficiency. The project involves the expansion of the existing unit which means increasing production capacity, adding new machinery, improving infrastructure, and possibly introducing new product lines. This expansion aims to meet growing market demand, improve efficiency, and enhance competitiveness in the beverage industry, and the establishment of an Effluent Treatment Plant (ETP).

The project is located at 45 Km, Multan Road, Nathay Khalsa, Kasur and spans a total area of 247000 square feet. The total estimated cost of the project is 3.5 billion Pkr

Schedule of Implementation

Detailed feasibility studies and designing of the project have been completed. Necessary legal, administrative and financial formalities are being finalized. The project is expected to be completed within 11-12 months from the date of environmental approval. Subsequently the operational and maintenance aspects of the project is undertaken by the proponent.

Description of the project:

Title of the Project	Proposed Extension of Mezan Beverages (Pvt) Limited
Location of the Project	45 Km, Multan Road, Nathay Khalsa, Kasur
Name of the Proponent	Malik Ghulam Mustafa
Cost of the Project	Total estimated cost of the Project is 3.5 billion PKR.
Project Description	The project involves the extension of the existing unit by adding new machinery and improving infrastructure for enhancing production capacity. The new production line will be installed within the premises of existing unit with the total cost of 3.5 billion PKR. The total area of the project site is 247000 sqft.

	This extension aims to meet growing market demand, improve efficiency, and enhance competitiveness in the beverage industry by increasing the production capacity of existing unit.
Raw Materials	Raw materials include Water, Sweeteners, Carbon Dioxide Coloring Agents, Preservatives and Fruit Extracts
Production Capacity	The existing production capacity of the unit is 13,777,920 liters/month and the added capacity will be 17,222,400. Total capacity of the beverage unit will be 31,000,320 liters/month
Power Requirement	Power requirements will be fulfilled by the National Grid/WAPDA.
Labor/Workforce	During Construction: 20-25 persons
Water Requirement	During operation: Approximately 20,000,000 gallons/month for industrial processes and domestic purposes.
Solid Waste	During operation: Domestic waste generation of 0.75 kg/capita/day per person, which will be handed over to a contractor. Project-related waste will majorly include fruit pulp and organic waste that can be reused in Composting, biogas production, animal feed, or extraction of pectin for food industries

Project Activities and Key Components

Raw Material Handling & Storage: The beverage manufacturing process relies on raw materials such as water, sugar, carbon dioxide, flavors, preservatives, and packaging materials (plastic bottles, aluminum cans, and glass bottles). These materials are stored in silos, storage tanks, and packaging warehouses.

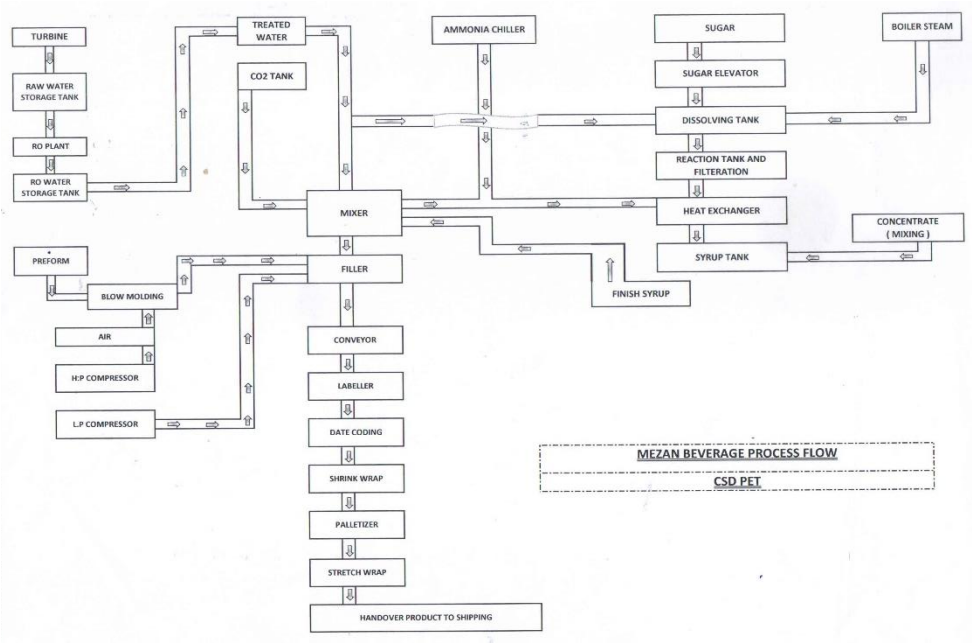
Production & Processing: The beverage formulation involves mixing, carbonation, pasteurization, and bottling. This phase requires mixing tanks, carbon dioxide injectors, pasteurizers, and automated filling machines.

Effluent Treatment & Wastewater Management: The installed ETP treats wastewater before discharge. The key components of the ETP include primary treatment units (screening, sedimentation tanks), secondary treatment (biological processes), and tertiary treatment (filtration and disinfection).

Energy & Utility Management: The production process requires significant energy and water use, supported by boilers, chillers, cooling towers, and power backup generators. Energy efficiency measures, such as solar panels and automated control systems, may also be implemented.

Packaging & Distribution: Finished products are packed and transported to markets using conveyor belts, labeling machines, and trucks. Warehousing and logistics facilities ensure proper storage and timely distribution.

Waste Management & Recycling: Solid and liquid waste, including plastic waste, rejected bottles, sludge from the ETP, and organic waste, are managed through recycling programs, reuse strategies, and proper disposal mechanisms.



Process flow diagram

Main Processes in the Beverage Industry

The beverage manufacturing process involves multiple steps to ensure **high-quality production, efficient resource utilization, and compliance with safety standards**. Below is a detailed explanation of each process in the **process flow chart**, covering how each step is carried out from raw material intake to the final product distribution.

1. Raw Material Receiving & Storage

Process: The first step involves receiving and storing essential raw materials such as **water, sugar, carbon dioxide (CO_2), flavors, preservatives, and packaging materials**.
How It's Carried Out:

- Water is sourced from **groundwater, municipal supply, or treated water** and stored in large **storage tanks**.
- Sugar and other ingredients are received in **bulk storage silos**.
- Carbon dioxide is stored in **pressurized cylinders** for carbonation.
- Packaging materials like **plastic bottles, glass bottles, and aluminum cans** are stored in dedicated warehouses.

2. Water Treatment

Process: Water is purified before use in beverage production to ensure it meets food-grade standards.

How It's Carried Out:

- The water undergoes **filtration, reverse osmosis, and disinfection** (chlorination or UV treatment) to remove **impurities, bacteria, and dissolved solids**.
- Treated water is stored in **sterile tanks** for use in production.

3. Ingredient Mixing & Syrup Preparation

Process: Ingredients are mixed to form the beverage concentrate or syrup.

How It's Carried Out:

- Sugar is dissolved in heated water to form **simple syrup**.
- Flavoring agents, preservatives, and coloring are added using **automated mixing tanks**.
- The mixture is filtered to remove any **undissolved particles**.

4. Carbonation (For Carbonated Beverages Only)

Process: Carbon dioxide (CO_2) is infused into the beverage to create **fizziness**.

How It's Carried Out:

- The syrup is **chilled** before carbonation to enhance CO_2 absorption.
- CO_2 is injected into the liquid using **high-pressure carbonation machines**.
- The carbonated beverage is **stored in pressurized tanks** before filling.

5. Pasteurization (For Certain Beverages)

Process: Beverages are heated and cooled to kill bacteria and extend shelf life.

How It's Carried Out:

- The liquid is heated to a **specific temperature (e.g., 85°C - 95°C for a few seconds)** using **heat exchangers**.
- Rapid cooling follows to prevent **flavor degradation**.

6. Filtration & Quality Control

Process: The beverage undergoes final filtration to remove any remaining solids and ensure consistency.

How It's Carried Out:

- The liquid passes through **membrane filters** to remove any **suspended particles or microbes**.
- Samples are tested in a **quality control laboratory** for **pH, sweetness, CO_2 levels, and microbial contamination**.

7. Filling & Bottling

Process: The beverage is filled into **bottles, cans, or PET containers** under hygienic conditions.

How It's Carried Out:

- Empty bottles and cans are washed, sterilized, and dried using **automated rinsing systems**.
- The filling machine **precisely measures and fills** each container to the required volume.
- Carbonated beverages are filled under **high pressure** to maintain CO_2 levels.

8. Capping & Sealing

Process: Bottles and cans are sealed immediately after filling to maintain freshness.

How It's Carried Out:

- Metal caps, plastic caps, or can lids are placed and **tightly sealed** using **automated capping machines**.

- The sealed containers are inspected to ensure **proper closure**.

9. Labeling & Packaging

Process: The sealed containers are labeled and packed for distribution.
How It's Carried Out:

- Labels containing **product information, expiry date, and batch number** are applied using **automatic labeling machines**.
- Bottles and cans are grouped into cartons or shrink-wrapped for **easy transportation**.

10. Storage & Warehousing

Process: The finished products are stored before distribution.
How It's Carried Out:

- Products are kept in **temperature-controlled warehouses** to maintain freshness.
- FIFO (First In, First Out) method is followed to ensure **older stock is distributed first**.

11. Distribution & Sales

Process: Beverages are transported to **wholesalers, retailers, and customers**.
How It's Carried Out:

- Trucks and distribution vehicles deliver products to **local markets, supermarkets, and export destinations**.
- Proper handling is ensured to prevent breakage and contamination.

Water requirements:

During construction phase 80 gallons/day/hr. of water will be used per day.

Wastewater treatment:

60-70% of the used water will be the wastewater from the industry related activities, this will be treated in the proposed wastewater treatment plant on site and then discharged in the industrial drain after the treatment in the premises of industrial area.

Wastewater Drain:

Industrial drain is present near the project site, in which wastewater will be disposed of after treatment, it will be ensured that no wastewater will be disposed of without having been treated in ETP (wastewater treatment plant) throughout the project activities.

Solid waste:

The project related solid waste will be produced during the operation phase of the project.

Solid waste management system/practices

The Solid waste will be managed in proper way by following operations:

- Placement of separate waste bins for domestic and project related waste in all working halls and designated points. Any waste generated will be segregated
- Collection of waste from all the working halls at one designated point by the sanitary workers on daily basis.
- Careful collection of waste on regular basis and temporary storage at designated point.
- Collection of waste from designated area and handling to the solid waste contractors for its final disposal.
- All these measures will ensure the PEQS compliance of generators and emissions will not exceed the limits.

Plantation:

Planation will be done within and outside the unit.

Parking Area:

Parking area will be made available within the unit for cars, motorcycles, trucks etc.

Occupational Health and Safety:

All the methods and procedures for machinery handling will be displayed and implemented at the project site. Health and safety rules for workers has been maintained.

Personal Protective Equipment:

Following PPEs is available for the workers in the proposed unit:

- Ear Plugs
- Ear muffs
- Safety Boots

- Safety Gloves
- Safety Belt
- Helmet
- Goggles

Types of PPEs used during operational phase and Operational activities.

Protection	Occupational Hazards	PPEs
Head Protection	Falling objects, inadequate height clearance, and overhead power cords	Helmets with or without electrical protection
Hand protection	Hazardous material, cuts or lacerations, vibrations, extreme temperatures	Synthetic or Rubber gloves, leather, insulating material etc.
Eye and face protection	Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation	Glasses, shield protective, etc.
Hearing protection	Noise, ultra sound	Hearing protectors like ear plugs, ear muffs
Respiratory protection	Dust, fogs, fumes, gases, smokes, vapors, oxygen deficiency	Facemasks or air supply
Body protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	Aprons, insulating clothing etc. of appropriate materials

Fire Protection System

An addressable fire protection system with detection and alarm annunciation and other installations etc. would be provided to protect against any fire hazards. Fire buckets and fire extinguishers will be installed at all sensitive places within the unit.

Emergency Exits:

Emergency exit points will be available for easy evacuation in case of any emergency.

Security:

The proposed unit/ industry will be constructed along with the presence of security guards round the clock which will improve the security of the project site and also in its vicinity.

Personal protective equipment:

Workers will be provided with dust mask, ear plug, ear muffs, safety boots, safety gloves, safety belt, helmet and goggles etc. during the working hours to ensure personnel health & safety. Implementation of PPEs will be ensured by the proponent for the proposed project also.

Power sources and transmission:

Power requirements for the project will be fulfilled by the National grid/WAPDA.

Restoration / Rehabilitation Plan

All possible precautions will be to prevent an untoward incident in terms of life and property losses. The demolition materials will possibly be reused and recycled. All excavated surfaces are termite proofed.

On completion of the project, the debris will be removed from the site in order to maintain aesthetics of the project. All measures are undertaken for ensuring occupational safety, security and clean environment in the project area. Ornamental trees and flower plants will be planted on inside peripheral of the unit premises to restore the land.

Government approvals required by the project:

All the approvals from concerned departments will be obtained after getting the approval from EPA Punjab.

CHAPTER # 3

DESCRIPTION OF ENVIRONMENT

Baseline Physical Environment

The baseline physical environment assessment provides an overview of the existing conditions of the project site and its surroundings. This section includes details on topography, climate, air quality, water resources, soil characteristics, and noise levels to establish a reference point for evaluating potential environmental impacts.

1. Topography and Land Use

Kasur is characterized by predominantly flat terrain with a gentle slope towards the **southeast**, directing surface water flow toward the **Ravi River**. The land in the project area consists of a mix of **agricultural, industrial, and residential zones**. Kasur is known for its **agriculture-based economy**, with fertile alluvial soils supporting crops such as **wheat, rice, and sugarcane**. In recent years, industrial development has increased due to the presence of **leather tanning, textile, and food processing industries**.

The project site is situated in an **industrial zone**, reducing potential conflicts with residential areas. It is well-connected via **Multan Road (N-5)**, facilitating the transportation of raw materials and finished products.

2. Climate and Meteorology

Kasur has a semi-arid subtropical climate, characterized by hot summers, mild winters, and a monsoon season. The average annual rainfall is around 500-600 mm, primarily occurring from July to September. The temperature can vary significantly between seasons, ranging from 5°C in winter to 45°C in peak summer months.

Table 1: Climate Characteristics of Kasur

Parameter	Description
Temperature Range	5°C to 45°C (Seasonal variations)
Annual Rainfall	600–700 mm
Humidity	30% – 85% (varies seasonally)

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	12.1 °C (53.7) °F	15 °C (59) °F	20.5 °C (68.9) °F	27.1 °C (80.8) °F	32.1 °C (89.8) °F	33.2 °C (91.8) °F	30.8 °C (87.4) °F	29.7 °C (85.5) °F	28.6 °C (83.6) °F	25.2 °C (77.4) °F	19.2 °C (66.6) °F	13.9 °C (57) °F
Min. Temperature °C (°F)	6.4 °C (43.5) °F	8.9 °C (48) °F	13.6 °C (56.5) °F	19.1 °C (66.4) °F	24 °C (75.3) °F	27 °C (80.6) °F	26.7 °C (80) °F	26.1 °C (78.9) °F	24.1 °C (75.5) °F	19 °C (66.2) °F	13 °C (55.4) °F	7.9 °C (46.1) °F
Max. Temperature °C (°F)	18.3 °C (64.9) °F	21.3 °C (70.3) °F	27.3 °C (81.1) °F	34.4 °C (94) °F	39.2 °C (102.6) °F	38.8 °C (101.9) °F	34.9 °C (94.9) °F	33.7 °C (92.6) °F	33.5 °C (92.2) °F	31.7 °C (89.1) °F	26.1 °C (79) °F	20.7 °C (69.3) °F
Precipitation / Rainfall mm (in)	28 (1)	46 (1)	36 (1)	29 (1)	20 (0)	68 (2)	166 (6)	145 (5)	64 (2)	14 (0)	7 (0)	13 (0)
Humidity(%)	70%	66%	55%	36%	30%	43%	70%	76%	69%	55%	58%	64%
Rainy days (d)	3	4	4	4	4	7	14	13	7	2	1	1
avg. Sun hours (hours)	7.6	9.1	10.3	11.5	12.3	12.2	10.6	10.3	10.3	10.1	9.3	8.4

3. Air Quality

Air quality in Kasur is affected by emissions from **industrial activities, vehicular traffic, and agricultural practices**. Leather tanning industries in the area contribute to air pollutants such as **sulfur compounds and particulate matter**. Additionally, brick kilns operating in nearby areas are a major source of **PM2.5 and PM10** pollution.

Table 2: Baseline Air Quality Parameters

Pollutant	Measured Concentration (µg/m³)	NEQS Limit (µg/m³)	WHO Guideline (µg/m³)
PM10	160–220	150	50
PM2.5	90–140	35	15
SO_2	45–65	120	20
NO_x	50–80	80	40
CO	3–5 mg/m³	5 mg/m³	4 mg/m³

Concentrations exceeding WHO guidelines indicate potential health concerns, especially during winter months when smog conditions intensify.

4. Water Resources

The **primary water source** in Kasur is **groundwater**, extracted through deep tubewells. The area has seen a **gradual decline in groundwater levels** due to **over-extraction by industries and agriculture**. The Ravi River, located approximately **15–20 km west of the project site**, serves as a secondary water source but is **highly polluted** due to **untreated industrial and municipal wastewater discharge**.

Table 3: Groundwater Quality Analysis

Parameter	Measured Value	NEQS Limit
pH	7.2 – 7.8	6.5 – 8.5
TDS (mg/L)	450 – 700	1000
Nitrates (mg/L)	12 – 25	50

5. Soil Characteristics

The soil in Kasur consists of alluvial deposits with sandy loam and clayey textures.

Table 4: Soil Characteristics of Project Site

Parameter	Value
Texture	Sandy Loam, Clayey
Permeability	Moderate to High
pH	7.1 – 7.5

Organic Matter (%)	0.5 – 1.5%
Soil Contamination	Possible due to industrial runoff

6. Noise Levels

Noise levels in the vicinity are influenced by traffic, industrial operations, and commercial activities. Baseline noise monitoring results are presented below:

Table 5: Noise Levels in Project Area

Location	Daytime Noise Level (dB)	Nighttime Noise Level (dB)	NEQS Limit (dB)
Project Site	70 – 75	55 – 60	70 (Day), 55 (Night)
Nearby Residential Area	65 – 70	50 – 55	55 (Day), 45 (Night)

The baseline physical environment assessment highlights key factors that may influence the environmental impact of Meezan Beverages' operations. Proper mitigation measures will be required to minimize adverse effects on air quality, water resources, and noise levels in compliance with EPA Punjab regulations.

Baseline Ecological Environment

The baseline ecological environment assessment identifies and evaluates the existing flora, fauna, and biodiversity within and around the project site. This information provides a reference for understanding potential impacts on the local ecosystem due to project activities.

1. Terrestrial Ecology

Kasur has an urbanized environment with fragmented green spaces, parks, and agricultural lands. The project site is located in an area dominated by industrial and commercial activities, with limited natural vegetation. However, some pockets of greenery exist in the form of roadside plantations and small green belts.

Table 1: Common Terrestrial Flora in the Project Area

Botanical Name	Common Name	Status (Native/Planted)	Ecological Importance
Dalbergia sissoo	Sheesham	Native	Timber, Shade
Azadirachta indica	Neem	Planted	Air Purifier, Medicinal
Melia azedarach	Dharek	Native	Ornamental, Pollution Control

Eucalyptus spp.	Safeda	Planted	Fast Growth, Shade
Ficus religiosa	Peepal	Native	Sacred, Oxygen Provider

2. Faunal Diversity

The faunal diversity in the project area is influenced by urbanization. The presence of wildlife is limited to common urban species, including birds, rodents, and small mammals.

Table 2: Common Fauna Observed in the Project Vicinity

Scientific Name	Common Name	Conservation Status (IUCN)	Habitat
Passer domesticus	House Sparrow	Least Concern (LC)	Urban Areas
Corvus splendens	House Crow	Least Concern (LC)	Scavenger, Cities
Milvus migrans	Black Kite	Least Concern (LC)	Open Skies, Cities
Funambulus pennantii	Northern Palm Squirrel	Least Concern (LC)	Parks, Gardens
Herpestes edwardsi	Indian Grey Mongoose	Least Concern (LC)	Grasslands, Shrubs

3. Aquatic Ecology

The aquatic environment of Kasur is largely influenced by the Ravi River, which serves as the primary surface water body in the region. However, due to industrial effluents, municipal sewage discharge, and agricultural runoff, the river is highly polluted and has low biodiversity. The aquatic ecosystem in Kasur has undergone significant degradation over the years, impacting fish populations and overall water quality.

Surface Water Bodies in Kasur

The main surface water bodies in Kasur include:

- Ravi River (approximately 15–20 km west of the project site)
- Canals and tributaries connected to the river
- Small ponds and water reservoirs used for irrigation and livestock

These water bodies support limited aquatic life, primarily due to high pollution levels and low dissolved oxygen (DO) content.

Water Quality of Ravi River

The Ravi River is one of the most polluted rivers in Pakistan, receiving untreated wastewater from Lahore, Kasur, and other industrial zones.

Table 1: Water Quality of Ravi River near Kasur

Parameter	Measured Value	PEQS Limit for Surface Water	Remarks
pH	7.2 – 7.8	6.5 – 8.5	Within limit
Dissolved Oxygen (DO)	2.0 – 3.5 mg/L	> 5.0 mg/L	Low, indicating poor aquatic health
Biochemical Oxygen Demand (BOD)	40 – 80 mg/L	< 80 mg/L	High organic pollution
Chemical Oxygen Demand (COD)	150 – 300 mg/L	< 150 mg/L	Exceeds limits, indicates high industrial pollution
Total Dissolved Solids (TDS)	800 – 1200 mg/L	< 1000 mg/L	High, suggests contamination
Heavy Metals (Cr, Pb)	Detected	Not allowed	Presence due to industrial waste

Key Observations:

- High COD and BOD levels indicate heavy organic and industrial pollution.
- Low Dissolved Oxygen (DO) levels make it difficult for aquatic life to survive.
- Heavy metals such as chromium and lead are present due to leather tanneries and industrial discharges.
- Turbidity and TDS levels are high, making the water unfit for drinking or aquatic life.

4. Aquatic Biodiversity

Due to severe pollution, the Ravi River supports limited aquatic biodiversity. Historically, it was home to various fish species, but fish populations have declined sharply.

Table 2: Fish Species Found in the Ravi River near Kasur

Scientific Name	Common Name	Status	Remarks
Labeo rohita	Rohu	Declining	Found in upstream areas
Catla catla	Catla	Rare	Sensitive to pollution
Cirrhinus mrigala	Mrigal	Rare	Population decreasing
Channa marulius	Snakehead	Very Rare	Can tolerate some pollution
Wallago attu	Freshwater Shark	Almost Extinct	Due to water contamination

Key Observations:

- Sensitive species such as Rohu, Catla, and Mrigal are disappearing due to poor water quality.
- Only pollution-tolerant species, like snakehead fish, are found in small numbers.
- Overfishing and habitat destruction further threaten aquatic life.

The aquatic ecology of Kasur is under severe threat due to high levels of industrial pollution, mainly from leather tanneries and municipal wastewater discharge. The Ravi River is highly degraded, with low fish populations and poor water quality. Urgent action is needed to restore aquatic life and improve water quality through better wastewater management, industrial regulations, and conservation programs.

Baseline Socioeconomic Environment

Kasur is one of the key districts in Punjab, Pakistan, known for its **rich cultural heritage, agriculture, and industrial activities**, particularly **leather tanning and textile manufacturing**. The district has a **diverse socioeconomic structure**, with a mix of urban and rural communities engaged in various occupations.

1. Demographic Profile

Kasur has a **rapidly growing population** due to natural growth and migration. The district is home to a mix of **Punjabi-speaking communities**, with **Urdu and Saraiki** also spoken by some populations.

Table 1: Demographic Statistics of Kasur

Indicator	Value	Remarks
Total Population (2023 est.)	~3.5 million	Increasing due to industrialization
Urban Population	~30%	Concentrated in Kasur city & industrial areas
Rural Population	~70%	Engaged mainly in agriculture & livestock
Literacy Rate	~60%	Lower in rural areas compared to urban centers
Household Size	6-8 persons	Large family structure is common

Key Observations:

- Urban areas are expanding due to industrial growth.
- Rural areas dominate in terms of population but lag in infrastructure and services.
- Moderate literacy rate, with educational disparities between urban and rural areas.

2. Economic Profile

Kasur's economy is primarily **agriculture-based**, but **industrial and trade activities** also play a significant role. The **leather tanning industry** is a major contributor to employment and revenue.

2.1 Major Economic Sectors

- **Agriculture:**
  - Main crops: **Wheat, sugarcane, rice, maize, and vegetables**
  - Livestock farming is a significant source of income.
  - Dairy farming is common, with many households involved in **milk production**.
- **Industry and Manufacturing:**
  - Kasur is **Pakistan's largest leather tanning hub**, contributing significantly to **exports**.
  - Textile mills, brick kilns, and small-scale manufacturing units are also present.
  - The **leather industry employs thousands** but is a major source of **pollution**.
- **Trade and Commerce:**
  - Wholesale and retail markets in Kasur city support **local and regional businesses**.
  - The district has a **growing real estate sector** due to industrial expansion.

2.2 Employment and Livelihood

The employment pattern in Kasur varies across urban and rural areas:

Sector	Percentage of Workforce	Remarks
Agriculture & Livestock	50%	Mainly in rural areas
Industry (Leather, Textile, etc.)	30%	Urban-based employment
Services & Trade	15%	Includes retail, transport, and small businesses
Government & Others	5%	Includes teachers, health workers, etc.

Key Observations:

- Agriculture remains the dominant livelihood but is facing challenges like water scarcity and land degradation.
- Industrial employment is growing, but many jobs are low-wage and informal.
- Women's workforce participation is low, mainly limited to agriculture and small-scale businesses.

3. Education and Literacy

Education levels in Kasur vary significantly between **urban and rural areas**. While urban centers have **better educational facilities**, many rural communities **lack access to quality education**.

Education Facilities

- Government and private schools operate across the district, but rural areas face a shortage of qualified teachers and infrastructure.
- Colleges and universities are limited, with students often traveling to Lahore for higher education.
- Vocational training centers focus on technical skills like leather processing and mechanics.

4. Health and Sanitation

The healthcare system in Kasur consists of **government hospitals, private clinics, and dispensaries**, but **facilities are limited**, especially in rural areas.

Healthcare Facilities:

- District Headquarters (DHQ) Hospital in Kasur city provides basic and specialized treatments.
- Tehsil Headquarters (THQ) hospitals serve smaller towns but often lack resources.
- Basic Health Units (BHUs) and Rural Health Centers (RHCs) provide primary care but face staff shortages and medicine supply issues.

Common Health Issues:

- Waterborne diseases due to contaminated drinking water from industrial pollution.
- Respiratory diseases caused by air pollution from brick kilns and tanneries.
- Skin diseases and allergies linked to chemical exposure in industrial areas.

5. Infrastructure and Utilities

Infrastructure development in Kasur is **gradual**, but rural areas still face **deficiencies in basic services**.

Roads and Transportation

- Kasur is well-connected to Lahore (via Ferozepur Road & National Highway N-5).
- Public transport is limited, with reliance on buses, vans, and motorcycles.
- Rural roads need improvement, especially during the monsoon season.

Electricity and Gas

- Electricity supply is available, but rural areas face frequent power outages.
- Natural gas is available in urban areas, but many rural communities depend on LPG or biomass for cooking.

Water Supply and Sanitation

- Groundwater is the main source of drinking water, but contamination from industrial waste is a major concern.
- Sanitation facilities are inadequate, especially in rural areas where open defecation is still practiced in some villages.

6. Cultural and Historical Aspects

Kasur has a rich cultural heritage, known for its Sufi traditions, music, and historical sites.

Famous Cultural and Historical Landmarks

- Shrine of Baba Bulleh Shah: A famous Sufi poet and spiritual leader.
- Ganda Singh Wala Border: A historic site near the Pakistan-India border.
- Kasuri Falooda: A traditional dessert famous across Pakistan.

7. Environmental Concerns Affecting Socioeconomic Conditions

Kasur faces several **environmental challenges** that impact its socioeconomic environment:

Issue	Impact on Society
Industrial Pollution (Leather Tanneries, Textile Mills)	Health risks, water contamination, reduced fish populations
Deforestation and Soil Degradation	Reduced agricultural productivity
Air Pollution (Brick Kilns, Factories, Vehicles)	Respiratory diseases and poor air quality
Waste Management Issues	Accumulation of solid waste in urban and rural areas

8. Recommendations for Socioeconomic Development

To improve the socioeconomic conditions of Kasur, the following measures should be implemented:

1. **Improve Education and Vocational Training:**
    - Increase government investment in **schools, colleges, and technical institutes**.
    - Provide **skills training programs** for youth, especially in industrial and agricultural sectors.
2. **Enhance Healthcare Facilities:**
    - Upgrade **rural health centers** and **hospitals** with better staff and equipment.
    - Ensure **clean drinking water** to reduce waterborne diseases.
3. **Sustainable Industrial Development:**
    - Enforce **environmental regulations** on leather tanneries and other industries.
    - Promote **eco-friendly technologies** and **wastewater treatment plants**.
4. **Infrastructure Development:**
    - Improve **roads, electricity, and sanitation services**, especially in rural areas.
    - Expand **public transport facilities** for better connectivity.
5. **Environmental Conservation:**
    - Implement **solid waste management programs** in urban and rural areas.

- Reduce **air and water pollution** through stricter environmental laws.

Kasur has a diverse socioeconomic structure driven by agriculture, industry, and trade. However, challenges such as low literacy, inadequate healthcare, industrial pollution, and poor infrastructure need urgent attention. Sustainable development policies focusing on education, health, industry, and environmental protection can significantly improve the living standards of the people in Kasur.

Laboratory Reports of Environmental Analyses

The environmental analysis for air, water, noise, and soil was conducted to assess baseline conditions near the project site. The tests were performed in accordance with **Punjab Environmental Quality Standards (PEQS)** and international best practices.

1. Air Quality Analysis

Air quality monitoring was conducted at multiple locations around the project site. The results indicated that while most parameters were within permissible limits, **PM2.5 levels were slightly elevated**, likely due to **vehicular emissions, industrial activities, and dust from construction sites**. The presence of **Sulfur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) was minimal**, suggesting limited industrial pollution in the immediate vicinity.

Key Findings:

- PM2.5 levels exceed the recommended limit, requiring dust suppression measures.
- Other air pollutants remain within acceptable limits.
- Seasonal variations and weather conditions (e.g., winter smog) may influence air quality.

2. Water Quality Analysis

Water samples were collected from **nearby groundwater sources** to assess suitability for drinking and industrial use. The results showed that **pH, turbidity, total dissolved solids (TDS), and heavy metal concentrations were within PEQS limits**. No significant contamination of lead or iron was detected, and **nitrate levels remained within safe limits**, indicating no immediate risk from agricultural runoff or industrial waste.

Key Findings:

- Water is safe for industrial and drinking purposes.
- No significant contamination from heavy metals or pollutants.
- Regular monitoring is recommended to ensure long-term sustainability.

3. Noise Level Monitoring

Noise levels were recorded at **the project site, nearby residential areas, and along Multan Road**. While noise remained **within acceptable limits during daytime**, **slightly higher levels were recorded in residential zones during nighttime**, mainly due to **traffic movement and industrial activities**.

Key Findings:

- Daytime noise levels are within PEQS limits.
- Slight exceedance in residential areas at night.
- Use of green buffers or noise barriers is recommended.

4. Soil Quality Analysis

Soil samples were collected to analyze **fertility, texture, and contamination levels**. The results indicated that **pH levels were neutral to slightly alkaline**, and organic matter content was **sufficient for vegetation growth**. No heavy metal contamination was detected, making the soil suitable for industrial development.

Key Findings:

- Soil is suitable for industrial construction.
- No heavy metal contamination was detected.
- Organic matter content supports potential landscaping.

Suitability of the Project Site

The proposed Meezan Beverages project site, located at **45 KM Nathay Khalsa, Multan Road, District Kasur**, has been evaluated based on environmental, socioeconomic, and infrastructural factors. The assessment confirms that the site is generally **suitable** for the development of a beverage manufacturing facility, with some minor considerations for environmental management.

1. Location & Accessibility

- The site is situated along **Multan Road (N-5),** a major national highway that provides **easy transportation access** for raw materials and finished products.
- The location is **well-connected** to major industrial zones, suppliers, and markets, reducing logistical costs.

2. Environmental Considerations

- **Air Quality:** Baseline studies indicate that **air pollutants are mostly within limits**, except for slightly elevated **PM2.5 levels** due to regional vehicular emissions and dust.
- **Water Availability:** Groundwater testing confirms that **water quality is within PEQS limits**, ensuring a **reliable source for industrial operations**. However, **sustainable water management is required** to prevent over-extraction.
- **Noise Impact:** Noise levels are within acceptable limits during the day but slightly exceed limits in residential areas at night. **Mitigation measures such as green belts or noise barriers are recommended**.

3. Land Use & Soil Suitability

- The area is **already designated for industrial use**, aligning with zoning regulations.
- Soil analysis indicates **no heavy metal contamination**, making it suitable for industrial construction.
- **Stable topography** minimizes risks of land subsidence or erosion.

4. Socioeconomic Considerations

- The local economy is **industrial and agriculture-based**, providing **potential employment opportunities** for nearby communities.
- The presence of industrial zones in the vicinity **reduces potential conflicts with residential areas**.
- The project is **expected to generate economic benefits**, including job creation and increased demand for local services.

Chapter # 4

Consideration of Site Alternatives

1. Introduction

The selection of a suitable site is a crucial aspect of project planning, ensuring environmental sustainability, operational efficiency, and regulatory compliance. This chapter evaluates potential site alternatives for the proposed unit extension and Effluent Treatment Plant (ETP) installation at Meezan Beverages in Kasur. The assessment considers various factors, including environmental, technical, economic, and regulatory aspects, to justify the chosen location.

2. Site Selection Criteria

Several key criteria were considered in determining the feasibility of alternative sites:

- **Availability of Land:** Adequate space for unit expansion and ETP installation.
- **Proximity to Existing Infrastructure:** Accessibility to utilities, road networks, and production facilities.
- **Environmental Impact:** Minimizing adverse environmental consequences such as land degradation, deforestation, and loss of biodiversity.
- **Regulatory Compliance:** Conformity with zoning laws and environmental regulations.
- **Cost Efficiency:** Avoiding excessive expenses associated with land acquisition and infrastructure development.
- **Logistics & Transportation:** Ease of raw material procurement and product distribution.
- **Community and Social Considerations:** Impact on local communities and potential for job creation.

3. Site Rejection Criteria

The following factors led to the rejection of alternative sites:

- **High Cost of Land Acquisition:** Acquiring a new site would impose significant financial burdens.

- **Infrastructural Constraints:** Unavailability of essential utilities such as water, electricity, and road connectivity.
- **Longer Approval Processes:** Regulatory hurdles for new land zoning and environmental clearances.
- **Environmental Sensitivity:** Potential impacts on ecologically sensitive areas, agricultural land, or protected zones.
- **Increased Carbon Footprint:** Additional transportation needs leading to higher emissions and environmental impact.
- **Community Resistance:** Possible opposition from local communities due to industrial expansion concerns.

4. Evaluation of Alternative Sites

4.1 Alternative Site 1: A New Industrial Location

One alternative considered was establishing the extension and ETP at a separate industrial location away from the current facility.

- **Advantages:**
    - Potential for larger expansion in an industrially zoned area.
    - Reduced environmental burden at the existing site.
- **Disadvantages:**
    - High costs of land acquisition and infrastructure development.
    - Additional regulatory approvals required, leading to project delays.
    - Increased transportation and logistics challenges.

4.2 Alternative Site 2: Expansion Within the Existing Premises (Selected Option)

Expanding the current facility to accommodate the unit extension and ETP was the preferred choice.

- **Advantages:**
    - Efficient use of existing infrastructure, reducing capital expenditure.

- Avoidance of additional regulatory hurdles related to a new site.
- Minimized environmental impacts compared to clearing a new site.
- Streamlined operations and logistics by maintaining all production at one location.

- **Disadvantages:**
  - Space constraints may limit future expansions.
  - Temporary operational disturbances during construction.

5. Economic Alternatives

Economic feasibility played a vital role in site selection. Two key economic alternatives were analyzed:

1. **New Site Development:**
   - Requires significant investment in land acquisition, construction, and infrastructure development.
   - Leads to increased costs for obtaining regulatory clearances and new utility connections.
   - Long-term financial sustainability may be impacted by operational disruptions and additional overheads.
2. **Existing Site Utilization (Preferred Option):**
   - Minimizes capital expenditure by leveraging existing utilities and infrastructure.
   - Avoids additional land purchase costs and administrative delays.
   - Ensures faster project execution and immediate operational benefits.

6. Environmental Alternatives

Environmental sustainability is a key aspect of site selection. Two primary environmental alternatives were considered:

1. **Developing a New Industrial Site:**

- Potential risks include land clearing, habitat destruction, and increased emissions from transportation.
- Construction of new infrastructure can disrupt local ecosystems and water resources.
- May contribute to increased solid and liquid waste generation in a new location.

2. **Expanding Within the Existing Site (Preferred Option):**
   - Prevents deforestation or land-use change, preserving local biodiversity.
   - Reduces carbon emissions by avoiding additional transportation and infrastructure needs.
   - Ensures better environmental monitoring and control due to existing compliance mechanisms.

7. Justification for Selected Site

Based on the comparative evaluation, the existing site was selected for the following reasons:

1. **Operational Efficiency:** The existing facility provides well-established infrastructure, utilities, and logistics, reducing operational complexities.
2. **Regulatory Compliance:** The site is already approved for industrial operations, simplifying the permitting process.
3. **Cost-Effectiveness:** Utilizing the current location avoids significant land acquisition and development costs.
4. **Environmental Considerations:** Expanding within the same premises prevents land conversion and associated ecological impacts.
5. **Social and Community Benefits:** Continued employment for the local workforce and minimal community displacement.

The evaluation of site alternatives demonstrates that expanding within the existing Meezan Beverages facility is the most sustainable and viable option. This decision ensures minimal environmental impact, cost-effectiveness, and regulatory compliance while enhancing operational efficiency. Therefore, no alternative site has been selected for the project.

CHAPTER # 5

Screening of Potential Environmental Impacts & Their Mitigation Measures

The screening of potential environmental impacts is a fundamental step in the Environmental Impact Assessment (EIA) process. This process helps to identify, predict, and evaluate the significant environmental impacts associated with the proposed extension of the Meezan Beverages unit and the installation of an Effluent Treatment Plant (ETP). Screening enables decision-makers to determine the necessary mitigation measures to minimize adverse environmental effects while maximizing potential benefits.

The proposed project will involve construction and operational activities that may impact various environmental aspects, including air quality, water resources, soil conditions, biodiversity, and socio-economic factors. The Leopold Matrix is used to systematically analyze the interactions between project activities and environmental parameters, ensuring a structured evaluation of impacts. The assessment also categorizes impacts based on their magnitude, duration, reversibility, and significance to prioritize effective mitigation measures.

1.Identification of Potential Environmental Impacts

Potential Environmental impacts of the project are classified into two main phases:

Construction Phase Impacts

During the construction phase, various activities such as site clearance, excavation, foundation laying, material transportation, and equipment installation will take place. These activities can lead to environmental disturbances, summarized in the table below:

Environmental Aspect	Potential Impact	Significance (High/Medium/Low)
Air Quality	Dust emissions from excavation, material handling, vehicular movement, and machinery operations.	Medium
Noise Levels	Increased noise due to construction machinery, transportation, and human activities.	Medium
Water Resources	Possible contamination of water bodies due to runoff carrying sediments and pollutants.	Medium
Soil Quality	Soil erosion, degradation, and compaction due to excavation and construction vehicle movement.	Low

Waste Generation	Generation of construction waste, packaging materials, and hazardous waste from chemicals.	Medium
Occupational Health & Safety	Risk of accidents, injuries, and exposure to hazardous materials (paints, solvents, welding fumes).	High
Traffic and Transportation	Increased vehicular movement leading to congestion and road safety concerns.	Medium

Operational Phase Impacts

Once operational, the extension of the beverage unit and the installation of the ETP will have continuous interactions with the environment, as outlined in the table below:

Environmental Aspect	Potential Impact	Significance (High/Medium/Low)
Water Pollution	Effluent discharge with organic and chemical pollutants affecting surface and groundwater quality.	High
Air Emissions	Emissions from fuel combustion, boiler operations, vehicular movement, and industrial processes.	Medium
Noise Pollution	Continuous noise from operational machinery, cooling units, and increased transportation.	Medium
Solid & Hazardous Waste	Generation of sludge from ETP, packaging waste, and production residuals.	Medium
Energy Consumption	Increased energy demand for manufacturing processes and wastewater treatment.	High
Occupational Health & Safety	Risks associated with exposure to chemicals, heat, and moving machinery.	High

2.Leopold Matrix Analysis

The Leopold Matrix is a widely used tool to systematically assess the significance of environmental impacts by assigning numerical values for impact magnitude (-10 to +10) and significance (1 to 10). Negative values indicate adverse impacts, while positive values highlight beneficial effects.

Leopold Matrix for Meezan Beverages Extension and ETP Installation

Environmental Parameter	Construction Activities	Operation Activities
Air Quality	-5 x 5 (-25)	-3 x 4 (-12)
Noise Levels	-6 x 6 (-36)	-4 x 5 (-20)
Water Pollution	-4 x 7 (-28)	-8 x 9 (-72)
Soil Quality	-3 x 4 (-12)	-2 x 3 (-6)
Waste Generation	-5 x 6 (-30)	-7 x 8 (-56)
Energy Consumption	-4 x 5 (-20)	-9 x 9 (-81)
Occupational Health	-6 x 7 (-42)	-7 x 8 (-56)
Positive Impact (ETP)	+7 x 9 (+63)	+9 x 10 (+90)

The results show that significant negative impacts are expected in terms of water pollution, energy consumption, and occupational health risks, particularly during the operational phase. However, the installation of the ETP offers substantial positive effects by reducing wastewater pollution.

3.Mitigation Measures

To minimize the negative impacts identified, the following mitigation measures are proposed:

Mitigation Measures for Construction Phase

Environmental Aspect	Mitigation Measure
Air Quality	Use water sprinklers, dust suppressants, and cover stockpiles to minimize dust emissions. Maintain construction vehicles to reduce emissions.
Noise Levels	Restrict construction activities to daytime hours, use low-noise equipment, and install temporary noise barriers.
Water Resources	Implement sediment control measures like silt traps, ensure proper site drainage, and prevent spillage of construction materials into water bodies.
Soil Quality	Avoid unnecessary excavation, restore disturbed areas post-construction, and use proper waste disposal methods.
Waste Generation	Implement waste segregation, recycle construction materials, and dispose of hazardous waste at designated facilities.
Occupational Health & Safety	Provide Personal Protective Equipment (PPE), conduct safety training, and implement emergency response measures.
Traffic Management	Develop a transportation plan to reduce congestion, use designated routes, and ensure vehicle maintenance.

Mitigation Measures for Operational Phase

Environmental Aspect	Mitigation Measure
Water Pollution	Treat wastewater in the ETP before discharge, monitor effluent quality, and ensure compliance with regulatory discharge limits.
Air Emissions	Adopt energy-efficient processes, use clean fuels, and install emission control technologies.
Noise Pollution	Implement noise barriers, use soundproof enclosures, and conduct regular maintenance of machinery.
Solid & Hazardous Waste	Establish a waste management plan focusing on waste minimization, recycling, and proper disposal of hazardous waste.
Energy Consumption	Improve energy efficiency through process optimization, renewable energy adoption, and employee awareness programs.
Occupational Health & Safety	Ensure workplace safety measures, conduct regular health monitoring, and enforce strict safety protocols.

The extension of the Meezan Beverages unit and the installation of an Effluent Treatment Plant will lead to various environmental impacts across different phases of the project. The most significant concerns include air pollution, noise, water contamination, energy consumption, and occupational safety hazards. However, with the proposed mitigation measures, these negative effects can be effectively managed, ensuring environmental sustainability.

The installation of the ETP will provide long-term environmental benefits by reducing water pollution and improving compliance with regulatory standards. By integrating proactive environmental management strategies, implementing best practices, and monitoring compliance, the project can be developed in an environmentally responsible manner while supporting industrial growth.

CHAPTER # 6

ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

6.1. 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.
- Define a monitoring mechanism and identify monitoring parameters in order to:
    1. Ensure the complete implementation of all mitigation measures.
    2. Ensure the effectiveness of the mitigation measures.
    3. Provide a mechanism for taking timely action in the face of unanticipated environmental situations
    4. Identify training requirements at various levels.

6.2. Management Approach:

The overall responsibility for compliance with the environmental management plan rests with the project proponent.

A certain degree of redundancy is inevitable across all management levels, but this is in order to ensure that compliance with the environmental management plan is crosschecked.

6.3. Institutional Capacity

Following functionaries will be involved in the implementation of EMP:

- Project Proponent
- HSE/Project Manager
- In-Charge Administration
- Supervisor of project
- Environmental Engineer

6.4 Training Schedules

Training for the management/contractors/engineers and workers on environmental aspects of the project will be arranged. It will be imparted by a team of experienced trainers.

6.5 Training of building contractor

Training of building contractor & workers will be the part of the TORs regarding the construction of the scheme. The provisions given in EIA Report Chapter 5 Screening of Potential Environmental Impacts & Their Mitigation Measures will be followed.

TORs will be including the training and submission of reports in the following area:

1. Handling of Machineries in a safe way
2. Use of PPEs
3. Maintenance of vehicles and submission of Environmental Monitoring Reports
4. Maintenance of Water Consumption records
5. Testing of water and waste water and submission of Environmental Monitoring Reports.
6. Placement of safety signs/boards during construction
7. Sprinkling of water on the roads and dusty tracks
8. Monitoring of generator emissions

Training regarding all other aspects of HSE will be ensured by the contractor during the construction phase.

6.6 Responsibility of EMP

Overall responsibility for implementation of EMP will be that of project proponent. He will appoint HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage the all HSE condition at the PEQS.

6.7 Environmental Management and Monitoring Program (EMMP)

The Environmental Management and Monitoring Program (EMMP) is a structured framework designed to ensure that all environmental aspects of the construction phase of M/S Mezan Beverages Pvt. Ltd' beverage unit are managed effectively. The primary goal is to mitigate potential environmental impacts, ensure compliance with regulatory requirements, and promote sustainable construction practices.

The EMMP includes:

- A set of mitigation measures to reduce environmental risks.
- Define a monitoring mechanism and identify monitoring parameters in order to:
    a. Ensure the complete implementation of all mitigation measures

b. Ensure the effectiveness of the mitigation measures

- Roles and responsibilities for stakeholders involved in project execution.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations
- Reporting requirements to ensure compliance with environmental laws.

The program aligns with the Punjab Environmental Protection Act (PEPA) 1997, Punjab Environmental Quality Standards (PEQS), and guidelines set by the Environmental Protection Agency (EPA) Punjab.

Objectives

The key objectives of the EMMP are:

- Environmental Compliance: Ensure adherence to national and provincial environmental laws.
- Pollution Prevention: Reduce air, water, noise, and soil pollution during construction.
- Waste Management: Proper handling, segregation, and disposal of construction waste.
- Occupational Health and Safety (OHS): Ensure worker safety through training, protective equipment, and emergency preparedness.
- Monitoring and Reporting: Establish a system to assess environmental performance and take corrective actions.

Roles and Responsibilities

To ensure effective implementation of the EMMP, different stakeholders have specific responsibilities:

Stakeholder	Responsibilities
M/S Mezan Beverages (Project Proponent)	Ensure compliance with environmental laws and guidelines, allocate resources for mitigation measures, and oversee EMMP implementation.
Environmental Consultant	Conduct environmental monitoring, prepare compliance reports, and suggest corrective actions if needed.
Contractor	Implement mitigation measures, follow environmental guidelines, and ensure workers adhere to safety protocols.

EPA Punjab	Conduct inspections, review monitoring reports, and enforce compliance with environmental standards.

Each party plays a critical role in ensuring that environmental impacts are minimized and construction activities proceed in an environmentally responsible manner.

6.7 Environmental Technical Assistance and Training Plan:

In order to raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. HSE/Project Manager should play a key role in this respect and arrange the training programs.

HSE/Project Manager will provide training to staff and workers about the best environmental management practices at the construction site and affective implementation of the EMP

The training modules will include air, noise and water pollution monitoring, social awareness, Environmental Laws, National Environmental Quality Standards (NEQS), Usage of personal protection equipment, and health and safety related issues on the construction site.

The HSE/Project Manager will train all workers & staff in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of Sexually Transmitted Infections (STI) HIV/AIDS and in general health and safety matters, and on the specific hazards of their work. Training should also consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation.

6.8 Environmental Mitigation and Monitoring Plan

The Environmental Mitigation and Monitoring Plan is a key component of the Environmental Management and Monitoring Program (EMMP). It outlines the potential environmental impacts associated with the construction phase of the M/S Mezan Beverages project and provides detailed mitigation measures to minimize these impacts. Additionally, it establishes a monitoring framework to ensure compliance with environmental regulations and best practices.

This section covers the following key environmental aspects:

- Air Quality Management
- Noise Pollution Control
- Water Resource Protection
- Solid and Hazardous Waste Management

- Occupational Health and Safety (OHS)

Each of these aspects is described in detail below, along with the corresponding mitigation measures and monitoring plans.

6.8.1 Air Quality Management

Potential Impacts

During the construction phase, air pollution may result from the following activities:

- Dust emissions due to excavation, land clearing, and material handling.
- Vehicular emissions from construction machinery, trucks, and generators.
- Airborne particulate matter from cement mixing, sand movement, and demolition activities.

These pollutants can negatively impact the health of workers and nearby communities, as well as reduce visibility in the area.

Mitigation Measures

To minimize air pollution, the following control measures will be implemented:

- Water Sprinkling: Regular sprinkling of water on unpaved roads, construction sites, and stockpiles to suppress dust.
- Covering of Materials: Construction materials (such as sand, gravel, and cement) will be covered with tarpaulin sheets during transport and storage.

Monitoring Plan

Parameter	Monitoring Method	Frequency	Responsibility
Particulate Matter (PM_{10}, $PM_{2.5}$)	Air quality monitoring	Monthly	Environmental Consultant
Carbon Monoxide (CO)	Air quality monitoring	Monthly	Environmental Consultant
Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2)	Air quality monitoring	Monthly	Environmental Consultant

6.8.2 Noise Pollution Control

Potential Impacts

Excessive noise from construction activities can disturb nearby communities and pose health risks such as hearing impairment and stress to workers. Noise may arise from:

- Heavy machinery operations (excavators, bulldozers, cranes, concrete mixers).
- Vehicular movement (trucks, loaders, dumpers).
- Material handling (cutting, welding, drilling, hammering).

Mitigation Measures

- Use of Low-Noise Equipment: Where feasible, construction activities will use noise-reduced machinery.
- Time Restrictions: Construction activities will be limited to 8 AM - 6 PM to avoid nighttime disturbances.
- Noise Barriers: Installation of temporary noise barriers near sensitive receptors, such as residential areas, hospitals, or schools.
- Regular Maintenance of Equipment: Ensuring that machinery is properly maintained to reduce excessive noise.
- PPE for Workers: Workers exposed to high noise levels will be provided with earplugs or earmuffs.

Monitoring Plan

Parameter	Monitoring Method	Frequency	Responsibility
Noise Levels (dB(A))	Noise level measurement	Quarterly	Environmental Consultant

6.8.3 Water Resource Protection

Potential Impacts

- Contamination of surface water due to runoff from construction sites carrying sediment, oil, grease, and chemicals.

- Groundwater contamination from improper disposal of concrete washout and hazardous waste.
- Increased water consumption, leading to pressure on local water resources.

Mitigation Measures

- Sedimentation Ponds: Establish sedimentation ponds or filters to manage stormwater runoff before discharge.
- Concrete Washout Management:
    - Designated areas for washing construction equipment to prevent concrete residue from contaminating soil and water.
    - Proper collection and disposal of wash water.
- Oil Spill Prevention:
    - Storage of fuels and chemicals in leak-proof containers.
    - Availability of spill kits and trained workers to handle accidental spills.
- Wastewater Disposal: Ensuring proper disposal of wastewater generated from worker camps and site offices.

Monitoring Plan

Parameter	Monitoring Method	Frequency	Responsibility
pH, TSS, BOD, COD	Water quality testing	Monthly	Environmental Consultant

6.8.4 Solid and Hazardous Waste Management

Potential Impacts

Improper waste disposal can lead to:

- Soil and water contamination due to hazardous waste (used oil, batteries, paints, solvents).
- Unhygienic conditions from accumulation of non-biodegradable waste.

Mitigation Measures

- Waste Segregation:
    - Separate collection of hazardous, non-hazardous, and recyclable waste.
    - Provision of color-coded bins for different waste types.
- Recycling and Reuse:
    - Encourage reuse of materials like wood, metal, and plastic.
- Safe Disposal:
    - Disposal of hazardous waste through EPA-approved vendors.
    - Proper storage of chemicals and fuel to avoid leaks.

Monitoring Plan

Parameter	Monitoring Method	Frequency	Responsibility
Waste Segregation & Disposal	On-site inspections	Monthly	Contractor & Environmental Consultant

6.8.5 Occupational Health and Safety (OHS)

Potential Impacts

- Risk of injuries from falls, machinery accidents, and exposure to hazardous materials.
- Respiratory issues due to inhalation of dust and fumes.
- Heat stress and dehydration due to prolonged exposure to the sun.

Mitigation Measures

- Provision of PPE: Helmets, gloves, safety boots, masks, and ear protection will be provided.
- Safety Training: Workers will be trained in emergency response, first aid, and safe machinery handling.
- Emergency Preparedness:
    - Availability of first aid kits at construction sites.

- Fire extinguishers and evacuation plans at all key locations.

- Drinking Water & Rest Areas:
  - Provision of clean drinking water at the site.
  - Shaded rest areas to prevent heat stress.

Monitoring Plan

Parameter	Monitoring Method	Frequency	Responsibility
PPE Compliance	Site inspections	Weekly	Safety Officer
Incident Reports	Safety audits	Weekly	Safety Officer

The Environmental Mitigation and Monitoring Plan ensures that all potential environmental impacts during the construction phase of M/S Mezan Beverages are identified and effectively managed. Through rigorous monitoring, compliance with Punjab EPA regulations will be maintained, ensuring that the project is executed in an environmentally responsible and sustainable manner.

Responsibility of EMP:

Overall responsibility for implementation of EMP will be that of project proponent. He will appoint HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage the all HSE condition at the NEQS.

Management Approach regarding EMP:

The overall responsibility for compliance with the environmental management plan rests with the project proponent.

A certain degree of redundancy is inevitable across all management levels, but this is in order to ensure that compliance with the environmental management plan is crosschecked

6.9 Summary of Impacts and their mitigation measures:

Table: Summary of impacts and their mitigation measure

Impacts	Mitigation Measures
Project Location	
• There are no significant negative impacts on the environment due to the project location/ selected site, because the project is beverages producing unit having no significant impact on the surrounding industrial unit and community.	✓ Surveillance of environmental management with respect to sustainability is recommended
Project design	
• Possible impacts due to design can be: o Structure of the building o ventilation o Working space o Health & safety	✓ Constructional engineer should approve the structure of building. ✓ The building is well ventilated and provided with clean indoor environment. ✓ Working space is enough supporting the working and ergonomic conditions for the workers. ✓ Emergency exits points are available within the project building ✓ Firefighting system installation points have been kept for the emergency situations ✓ Electricity system has been designed safe and sound. Wires are covered by thick plastic/electricity resistant covers.
Waste Water	
• Waste water is produced during the production process, cooling, washing and	✓ Domestic waste water is being drained out in nearby local drain after treated in septic tanks

cleaning of the equipment. It also includes the sanitary waste	✓ Oils, lubricants, chemicals, and other listed hazardous materials are being stored safely at their designated spots, enclosures or store rooms. ✓ There is no process waste water at the unit. There are two main source of waste water first; the waste water generated from the domestic source second is the RO rejected waste water. ✓ The waste water coming from the washroom is being treated in the series of septic tanks and the ultimate disposal is into the nearby drain which is present at the distance of 2000m from the front boundary wall of the project. ✓ Open evaporation pits should be constructed to treat the RO rejected water. Residual sludge is being dumped on the local Government designated site. ✓ Waste water sample was tested the results were within PEQs limits. ✓ Monitoring of waste water is recommended as per PEPA, PEQS Rules 2001
Air pollution and Dust emission	
• There is no process related to indoor dust generation • During the operational phase dust is only be generated due to the transportation of final products and that impact is outside the unit on the unpaved roads or non-concreted roads. • Flue gases can be generated from the vehicular transportation and generator if	✓ Air emissions-controlled devices must be installed to control the air pollution ✓ All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke. ✓ M/s Mezan Beverages Private Limited should provide PPEs to the labor during handling and processing of raw material and product. ✓ Effects of PM during handling, loading/unloading of raw material are being

these will not be maintained or tuned properly.	controlled by selection of paved area for unloading and by providing PPEs. Grassy area has been established within the premises of the unit to avoid the ambient dust. ✓ In project area there are no dusty tracks the factory. Most of the areas are paved and metaled that require no sprinkling of water.
Noise	
• Noise can be generated due to the operation of machinery and vehicles transporting materials	✓ The Noise level within the project area and around the boundary wall of project has been checked. All values are within PEQS limit. ✓ Ear plugs/muffs are recommended at all the noise generation points. ✓ Trainings for safe driving practices & HSE trainings of the employees and workers is recommended. ✓ It is recommended to minimize use of horns by project vehicles. ✓ Monitoring should be conducted on quarterly basis as per PEPA, PEQS Rules 2001
Solid waste	
• Solid waste will be generated due to domestic sources and also due to packaging (minor).	✓ The main sources of solid waste in operation of M/s Mezan Beverages are packaging (minor) and domestic waste and office waste. ✓ Both packaging and domestic waste are handed over to contractor. ✓ Waste bins have been placed at suitable places for the collection of solid waste collection and

	the solid waste is being handed over to the contractor on regular interval.
Odor	
• There is no significant source of odor generation.	✓ In case of odor proper SOP to cope with odor is recommended.
Health and Safety	
• Health and safety issues may arise during working hours, by mishandling machinery and improper work practices.	✓ Safe drinking water must be provided to workers, staff, and poor people of the area. ✓ smoking or any drugs should be prohibited during working hours or performing work ✓ Training of workers is being conducted regarding health safety & Environment, by the HSE department of Mezan Beverages. ✓ HSE Resource has been deployed on plant to ensure HSE policy and procedures; He is carrying out trainings on safe working practices and conducting audit on HSE compliance. ✓ PPEs are being implemented at workplace. ✓ First aid measures/medical facility is being provided to project related employees. ✓ Firefighting system has been installed in the project area. Safety signs are placed at all sensitive areas. ✓ Proper housekeeping is being ensured at workplace. ✓ Quality and safety manual is being implemented by M/s Mezan Beverages.

6.10 ENVIRONMENTAL MANAGEMENT PLAN FOR MANUFUCTURING UNIT OF M/S MEZAN BEVERAGES PVT. LTD.

Serial No.	Environmental Parameter/ Element	Mitigation measure to be taken during construction stage		
		Construction	**Regular operations**	**Responsibilities**
1.	Gaseous/ Dust emissions	**1-** Installation materials shall be transported to the project site during night time and will be stored away from the road or foot path. They will be kept under cover to avoid any fugitive dust.	Management will ensure that PPEs i.e. masks will be provided to workers during the working hours.	**HSE/Environment Manager**
		2- The site proposed for the construction of Manufacturing Unit is located away from human settlements.	Vehicles to use for the transportation of raw materials Manufacturing Unit, should be properly tuned.	
		3- All equipment, generators, and vehicles used during the project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions.	One diesel fired generator shall cater for emergency situation only. Their exhaust will be emitted through an adequately fabricated stack. It will also be kept in mind that the generators will only function during emergency condition for limited period.	

		4- All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.	Monitoring should be conducted on Monthly basis as per EPA PEQS Rules.	
2.	Noise	1- All activities will be under PEQS level of noise during construction phase.	All activities will be under PEQS level of noise during operation phase.	**HSE/Environment Manager**
		2- Ear plugs will be provided & implemented (ensured by the management of Mezan beverages Pvt. Ltd	PPEs i.e. ear muffs should be provided to workers in case of high noise.	
3.	Health & safety	1- Local people will be informed in advance when work is about to start in an area. This may result in people keeping young children away from work areas. 2- Machinery will never be left unattended. 3- Safe driving practices will be adopted, particularly while passing through settlements.	1- The EMP guidelines will be followed strictly (committed by the management). 2- Training of workers will be conducted regarding health and safety. 3- PPEs will be provided and implemented. 4- First aid measures will be provided to workers.	**HSE/Environment Manager**

		4- Basic health facilities will be provided to workers. 5- PPEs will be provided & implemented. 6- Electrical wires will be kept covered to avoid electrical hazards.	5- Shift Rotation, proper ventilation will be provided to workers in case of thermal stress. 6- Safety signs, safety boards, exit arrows etc. will be placed on site. 7- An Assembling point will be kept to gather in case of emergency situation such as fire hazards. 8- Floors will be kept clean without slippery to avoid any hazard. 9- Firefighting system will be installed to avoid any health hazards. 10- Electrical wires will be kept covered to avoid electrical hazards.	

			11- Machinery will never be left in running condition.	
4.	Generation of domestic & project process related solid waste.	Construction Solid waste will be stored in solid waste bins and will be reused for land filling and maintenance purposes and domestic waste will be handed over to the certified contractors.	Domestic, process related solid waste and sludge will be stored in solid waste bins and will be handed over to certified contractors.	**HSE/Environment Manager**
5.	Waste effluents	Wastewater must be treated	The sewage to be generated shall be treated in current treatment facility of unit & then will be drained out in the nearby Sundar Industrial Estate drain.	**HSE/Environment Manager**
6.	Water supply	It shall be ensured that no activity tempers with the water supply system and water availability	It shall be ensured that no activity tempers with the water supply system and water availability	**HSE/Environment Manager**
7.	Soil erosion	The clearing of vegetation along proposed site will be minimized as far as possible.	Plants will be planted during operation phase of the subject Division.	**HSE/Environment Manager**
8.	Enhancement of aesthetic beauty of the building and the area.	By using site hoardings, dust control measures, and organized material storage. Temporary landscaping and regular site cleanups help maintain visual appeal of the area.	1- Flower pots containing flowers and plants will be provided in front of the building to add to the improvement of the environment around.	**HSE/Environment Manager**

			2- All other necessary measures will be taken to maintain standards of cleanliness so that the building may add to the scenic/aesthetic beauty of the area around.	
9.	**Staff for catering the Environmental Management Plan**	Dedicated environmental staff are appointed to implement and monitor the Environmental Management Plan (EMP). They ensure compliance with regulations, manage mitigation measures, and conduct regular inspections.	Special staff will be recruited to implement this Environmental Management Plan on regular basis.	**HSE/Environment Manager**

CHAPTER # 7

STAKEHOLDERS PARTICIPATION

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

In order to evaluate the socioeconomic and environmental impacts, filed surveys are extremely essential. In addition to the surveys at the preliminary stage, consultation with the community and their active participation plays a vital role in successful implementation of the project. To identity the different types of stakeholders and ascertain their perceptions about the project, an Environmental Impact Assessment (EIA) was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed in the following pages.

7.1 Objectives of Consultation

Public consultation plays a vital role in studying the effects of the project on the stakeholders and in the successful implementation and execution of the proposed project. Public involvement is a compulsory feature of environmental assessment, which leads to better and more acceptable decision making. The objective of the consultation with stakeholders is to help verify the environmental and social issues that have been presumed to arise and to identify those which are not known or are unique to the establishment/ installation of the proposed unit.

The important general objectives of the consultation process are:

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

7.2 Methodology of consultation:

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

- Selection of the stakeholders for consultation, reconnaissance of the proposed project site and initial discussions with the neighboring factory workers, villagers, shopkeepers, drivers etc.
- Environmental consultants and social specialists and documenting the opinions of the stakeholders expressed during the meetings etc.

7.3 Proponent

Possible impacts and mitigation measures related to the subject project were discussed with the project proponent and management. They assured to take all suggested mitigation measures to control any discrepancy arose by the project and to make the project environmentally friendly.

7.4 Responsible Authority

Management of M/S Mezan beverages Pvt. Ltd. is the responsible authority to take all measures prior to start the activity.

7.5 Other departments and agencies

For the impact analysis detailed meetings were held with the management of M/S Mezan beverages Pvt. Ltd. local community, education institutes, health institutes, hospital and NGOs. Issues were discussed that may affect the environment and also the implementation of proposed project. All possible mitigation measures were considered and incorporated in the Environmental Management Plan.

Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders in the area. The purpose of such consultations is to obtain the feedback from the relevant persons.

7.6 Affected & Wider Community

There is no affected community present in the radius of our study area. PGEE team has consulted with the inhabitants of the different villages. They provided positive remarks regarding the subject project and in the favor of the subject activity for the proposed plant. Stakeholders' participation Performa's and socioeconomic questionnaire were get filled by the

inhabitants to evaluate the project socio-economic impacts. List of respondents and socioeconomic questionnaires are attached as **Annexure** with the report.

7.7 Categories of stakeholders interviewed in the project area:

Sr. No.	Stakeholder Category
1.	Neighboring factory workers.
2.	Nearby residents
3.	Shopkeepers.
4.	Drivers.

7.8 Issues Discussed:

Following issues were discussed during the stakeholder consultation:

- Overall activities of the project;
- Possible impacts on natural vegetation, air, land and properties;
- Possible mitigation measures;
- Benefits of the project specifically for the local people.

7.9 Findings of the Overall Discussion:

- After the completion of the proposed project the site will be used for industrial activities.
- It will enhance the socio-economic conditions/values of the area.
- Project will increase revenue generation for the Government.
- It will create employment opportunities.
- Local people will be given preference for employment in the proposed project.
- Establishment/ installation of the proposed project will be completed in the designated timeframe to limit adverse impacts of construction.
- There will be no significant additional load on the existing infrastructure i.e. utilities of water, telephone, electricity etc. due to the development of the proposed project.

Majority of people favored the proposed project in a sense that the construction of the said project will generate employment opportunities for local people and revenue for the government, will enhance the socioeconomic conditions of the area and automatically will contribute to the national economy of the country.

7.10 Analysis of Stakeholder Consultation

Sample Size

For the socioeconomic survey, a sample size of 20 respondents was selected, including both men and women. The sample was representative of various demographics in the project area, including residents, shopkeepers, teachers, and other community members.

Statistical Analysis

The data collected from the stakeholder consultations and surveys were analyzed using **SPSS 19.0** software for statistical analysis. The analysis focused on the community's perceptions of the project's potential impacts and their suggestions for improvement.

Results and Discussion

The results of the consultation and survey are presented below, in both graphical and statistical formats, highlighting the opinions and feedback gathered from the local community:

Gender Ratio of Respondents:

- **85% male** and **15% female** respondents. The lower number of female respondents can be attributed to cultural factors where women may be hesitant to engage in public discussions.

Education Status of Respondents:

- **88% of respondents** were **educated**, while **12% were uneducated**. This indicates that the community has a good level of education, which contributes to better understanding of the proposed project.

Occupation of Respondents:

- Respondents primarily worked in **trade, education,** and **small businesses**, with a small percentage employed in other sectors.

Satisfaction of Respondents with the Proposed Project:

- **78% of respondents** expressed **satisfaction** with the proposed project, citing its potential to create jobs, enhance infrastructure, and improve the living standards of the community.
- **13% were neutral**, having no strong opinion on the project.
- **9% expressed concerns** about aesthetic degradation and the lack of job preferences for local residents.

Effect of the Project on the Living Standard:

- **85% of respondents** believed that the project would **improve the living standard** of the area, with expectations of increased job opportunities and better infrastructure.

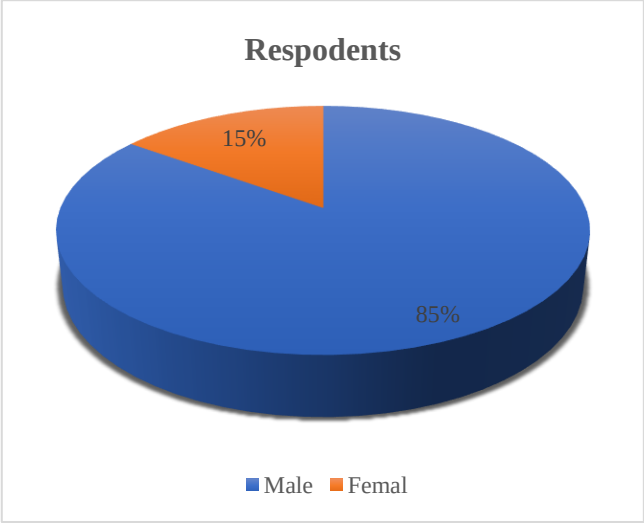


Figure 4: Gender Ratio of Respondents

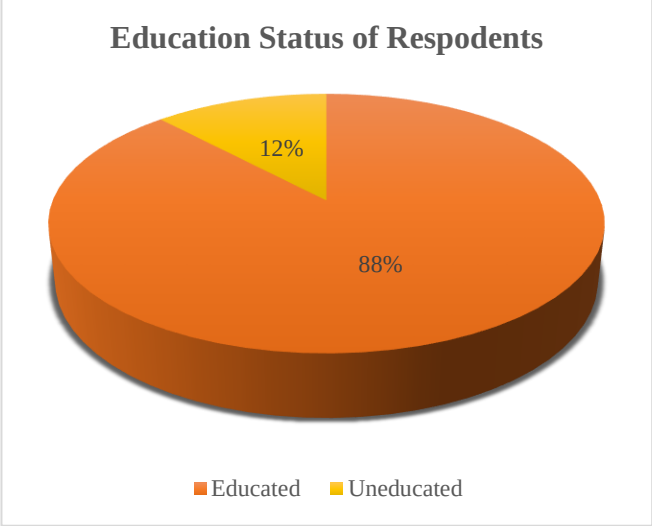


Figure 5: Education status of respondents

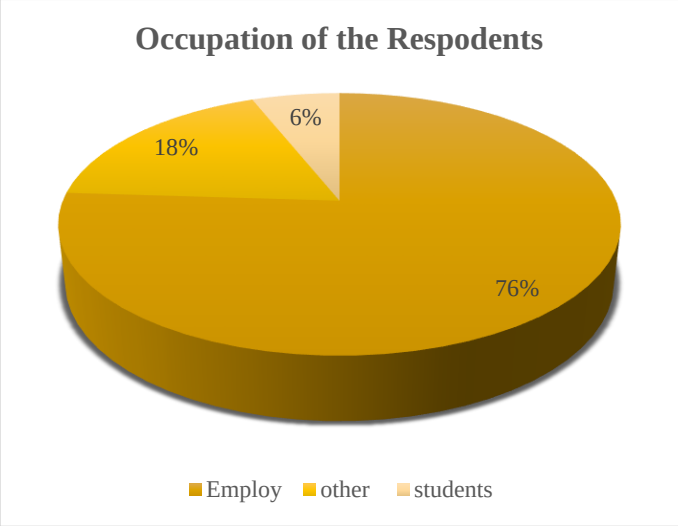


Figure 6: Occupation of respondents

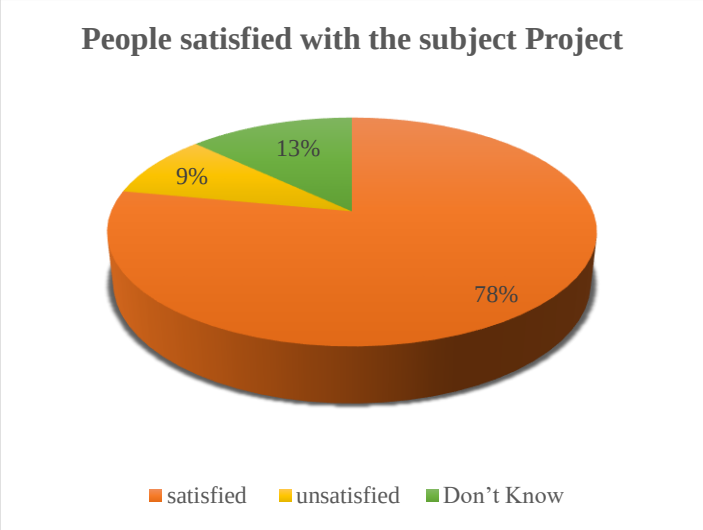


Figure 7: Satisfaction of respondents

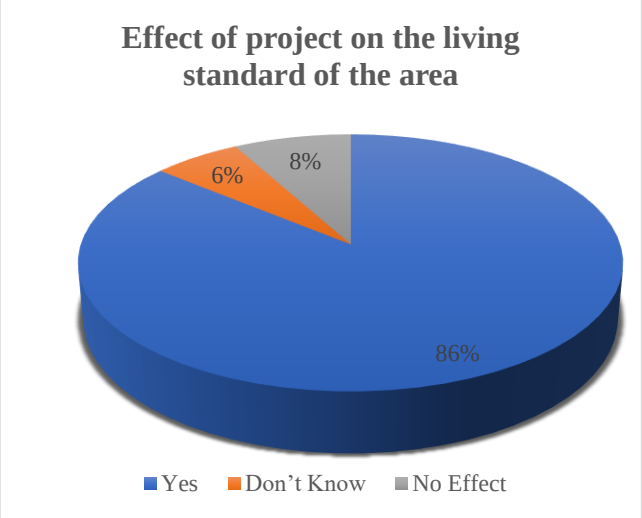


Figure 8: Effect of project on the living standard of area

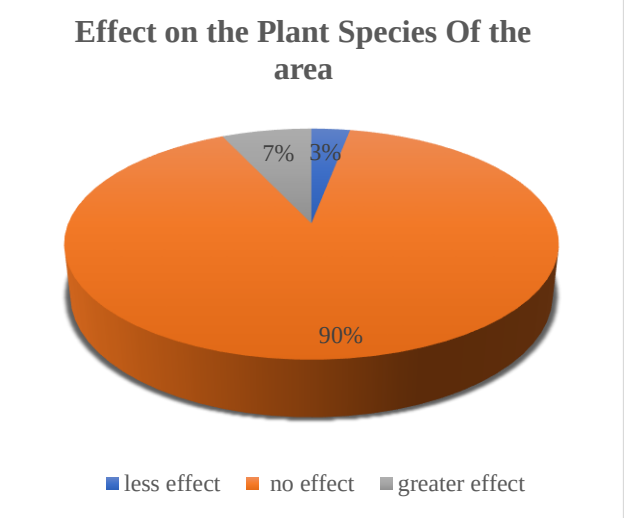


Figure 9: Effect on plant species of area

Effect of proposed project on Local Flora and Fauna:

- Most respondents did not anticipate any significant negative impacts on local plant species or biodiversity. However, some concerns about the impact on green spaces were raised, which will be addressed through proper landscaping and green area development in the project.

The stakeholder consultation process was successful in engaging the local community, government representatives, and other relevant stakeholders. The feedback gathered from these consultations has provided valuable insights into the potential impacts of the proposed project, as well as suggestions for improvement. The community generally expressed **support** for the project, highlighting its potential benefits in terms of job creation, infrastructure development, and overall improvement in the quality of life.

The concerns raised, such as those related to environmental impacts and job allocation, will be addressed through the implementation of effective **mitigation measures**, as outlined in the Environmental Management and Monitoring Program (EMMP). These consultations have been an integral part of the environmental assessment process and will continue to guide the project's development to ensure that it aligns with the community's expectations and contributes positively to the region.

The feedback obtained will be included in the **final Environmental Impact Assessment** report, ensuring that the voices of the local community and stakeholders are reflected in the decision-making process.

CHAPTER # 8

CONCLUSION AND RECOMMENDATIONS

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

8.1 CONCLUSIONS

- The EIA study reveals that the project is economically viable, socially acceptable and environment friendly.
- It will generate additional jobs during construction and operation phases.
- The proponent has committed to implement the project in the environment friendly manner.
- M/S Mezan beverages Pvt. Ltd. has applied to obtain approval from local Government.
- M/S Mezan Beverages Pvt. Ltd. will prepare and implement very comprehensive Emergency Preparedness and Response Standard Operating Procedures.
- M/S Mezan beverages Pvt. Ltd. will prepare and implement very comprehensive Security and Fire Fighting Standards Operating Procedures.

8.2 RECOMMENDATIONS

- In view of the comprehensive screening process and findings of the present study there is no need of conducting further investigations.
- Tree plantation inside the unit and near the unit is recommended.
- The untreated wastewater will not be reused for irrigating the vegetation and lawns.
- High standards of bio-security and safety will be enforced during operation stage. Safety of the workers will be top priority for the management.
- The management of M/S Mezan beverages Pvt. Ltd. will continue to assist the local communities as a corporate/social responsibility. The present EIA report is enough to meet the administrative and legal framework. Therefore, the environmental approval may be accorded for the present project.