Contents

PROJECT SUMMARY

Section	Parameter	Details
1. Project Identification	Name of Project / M/S	Proposed Construction of Beverages manufacturing unit along with the ETP
	Project Location	Plot No. 22, 23 & 23-A, Multan industrial Estate, Ph 1, Multan.
	Geographical Coordinates	Latitude: 30°08' 03.7" N Longitude: 71°23'35.2 "E
2. Proponent Information	Proponent Name	Malik Ghulam Mustafa
	CNIC	36302-0296826-5
	Proponent Address	House no. 80, Block-J, Mohallah Shah Rukn-e-Alam Colony, Multan.
3. Project Overview	Total Project Cost	Rs. 04 billion
	Project type	Proposed Construction
	Process Description	Proposed Installation of machinery for production line
	Land Area and Ownership	496589 Square Feet (11.40 Acres)
	Allied Facilities	Warehouse, Admin Block, Generators
4. Waste Management	Types of Waste	Plastic, Organic, Wastewater
	Estimated Waste Generation	0.7 - 1.5 Tons per Month (Wastewater) 2-3 kg (Organic waste) 1-2 kg (Packaging) 0.2-0.5 kg (Other waste)
	Waste Handling Measures	Transport
	Final Disposal Plan	Recyclers
5. Wastewater Management	Coordinates of WWTP	Latitude: 30°08' 01.2" N Longitude: 71°23'26.4 "E
	Treatment Method	(Primary, Secondary
6. Rainwater Harvesting	Harvesting Infrastructure	(Pits, Storage Tanks, Recharge Wells)
	Collection Source	Rooftop

	Implementation Status	Planned
7. Plantation & Green Development	Proposed Green Area	49658.9 Sq. ft
	Tree Types and Numbers	Kikar, Neem, Sheesham, Eucalyptus
8. CSR & Community Welfare	CSR Budget	Rs. 1 million
	Activities	• Health & Safety • Environment & Sustainability

EXECUTIVE SUMMARY

Title & Location of the project

Project Title:

Proposed Construction of Beverages manufacturing unit along with the ETP at CN Pak (Private) Limited

Project Proponent:

Mr. Malik Ghulam Mustafa S/o Ghulam Muhammad
CN Pak (Private) Limited

Project Description:

CN Pak (Private) Limited intends to secure environmental approval for the **proposed expansion of its existing beverage manufacturing facility** through the submission of this Environmental Impact Assessment (EIA) report. The proposed construction includes the **installation of an additional high-capacity production line** and the **development of an Effluent Treatment Plant (ETP)** to ensure environmentally responsible operations.

The project is located at Plot No. 22, 23 & 23-A, Multan industrial Estate, Ph 1, Multan. The construction work will be conducted with a **total estimated cost of PKR 4 billion**. The **total site area** is approximately **512847.92 square feet**. The production capacity of the proposed construction unit will be **17,222,400 liters/month**.

This EIA is being submitted in compliance with **Section 12 of the Pakistan Environmental Protection Act (PEPA), 1997 (Amended 2012)**, to ensure that the construction will be conducted in a sustainable, legally compliant, and environmentally sound manner.

Project Objective:

The primary objective of the proposed construction of beverage manufacturing unit is to increase the production capacity of CN Pak (Private) Limited. aims to **meet growing market demand, improve efficiency, and enhance competitiveness** in the beverage industry.

Project Location:

Address: Plot No. 22, 23 & 23-A, Multan industrial Estate, Ph 1, Multan.

Geographical Coordinates:

- **Latitude:** 30°08' 03.7" N
- **Longitude:** 71°23'35.2 "E

Surrounding Land Use:

Direction	Adjacent Area Description
North	Industrial Unit
South	Open Land
East	Industrial Unit
West	Access Road

A detailed **layout plan** of the project site, showing infrastructure including the production areas, effluent treatment plant is attached as **Annexure** to this report.

Project Map

Details of the Proponent:

Name of Proponent: Malik Ghulam Mustafa S/o Ghulam Muhammad

Address: House no. 80, Block-J, Mohallah Shah Rukn-e-Alam Colony, Multan.

CNIC No.: 36302-0296826-5

For further details, a copy of the proponent's CNIC and other supporting documents are enclosed 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 is as follows;

Title of the Project	Proposed Construction of Beverage Manufacturing Unit of CN Pak (Private) Limited
Location of the Project	Plot No. 22, 23 & 23-A, Multan industrial Estate, Ph 1, Multan
Name of the Proponent	Malik Ghulam Mustafa
Cost of the Project	Total estimated cost of the Project is 4 billion PKR.
Project Description	The project involves the construction of a beverage manufacturing unit, incorporating advanced infrastructure and modern machinery to significantly enhance production capacity. The new production line will be established within the premises of the designated site, ensuring efficient use of available land and resources. The total estimated cost of the project is PKR 4 billion, and the project site area of 512847.92 square feet. This development is strategically planned to address the rising demand in the beverage sector, optimize operational efficiency, and strengthen the market position of the company by substantially increasing the overall production capacity in a sustainable and competitive manner.
Raw Materials	Raw materials include Water, Sweeteners, Carbon Dioxide Coloring Agents, Preservatives and Fruit Extracts
Production Capacity	The production capacity of the unit will be 17,222,40 liters/month.
Power Requirement	Power requirements will be fulfilled by the National Grid/WAPDA.
Labor/Workforce	During Construction: 10-15 persons
Water Requirement	During operation: Approximately 13,000,000 gallons/month for industrial processes and domestic purposes.
Solid Waste	During operation: Domestic waste generation of 0.5 kg/capita/day per person approximately, 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

Environmental Impacts

A comprehensive review of the project's operational activities has been conducted to identify potential environmental impacts. It is concluded that:

- No **significant adverse impacts** are expected on the local environment or nearby community due to the project's nature and location.
- The construction is expected to yield **positive socio-economic outcomes**, including employment generation and economic uplift of the region.

- To mitigate potential air quality concerns, a dedicated **greenbelt/plantation zone** has been reserved within the project site to aid in natural air filtration and environmental enhancement.

Environmental Aspect	Potential Impact	Mitigation Measures
Air Quality	Dust emissions from excavation, loading/unloading, and vehicle movement	• Water sprinkling on dusty areas • Covering of construction material • Vehicle emission- checks
Noise Pollution	Noise from construction machinery and equipment	• Use of noise-reducing equipment Working only during daytime • PPE (ear protection) for workers
Soil Contamination	Spills of oils, lubricants, or chemicals during equipment maintenance	• Designated areas for machinery servicing • Proper storage of fuels/oils • Immediate spill cleanup
Water Pollution	Improper disposal of wastewater or runoff carrying sediments	• Temporary drainage systems • Silt traps and sedimentation tanks • No disposal into open areas
Solid Waste Generation	Construction debris, packaging, and general waste	• Waste segregation- Reuse of material where possible • Disposal through municipal/authorized agency
Health & Safety Risks	Accidents, injuries due to unsafe working conditions	• Use of PPE • Safety signage and fencing • First aid kits and trained staff on-site
Impact on Nearby Areas	Nuisance to nearby community (dust, noise, traffic)	• Proper scheduling of work • Community communication Routing of vehicles away from residential areas
Loss of Vegetation	Removal of trees and vegetation for site clearance	Minimize clearance Compensatory plantation at project boundary or designated areas

Proposed Environmental Monitoring

To ensure environmental sustainability and compliance with relevant environmental standards, a comprehensive environmental monitoring plan will be implemented throughout the operational life of the beverage manufacturing unit. This plan covers various key environmental parameters and is designed to detect, prevent, and mitigate any adverse impacts

arising from the project activities. The following outlines the general framework for environmental monitoring:

- **Air Quality Monitoring:** Ambient air quality and emissions from backup generators, transportation, and production processes will be monitored periodically. Parameters such as CO, NOx, SOx, and particulate matter (PM_{10} and $PM_{2.5}$) will be analyzed in line with National Environmental Quality Standards (NEQS). Monitoring will be conducted quarterly by qualified professionals.

- **Water Quality Monitoring:** Effluent generated from industrial processes will be treated in the Effluent Treatment Plant (ETP) before disposal or reuse. The quality of treated water will be tested monthly for pH, BOD, COD, TSS, oil and grease, and heavy metals. In addition, input (fresh) water will be tested quarterly for microbial content, turbidity, and total dissolved solids to ensure it meets operational and health standards.

- **Noise Level Monitoring:** Noise emissions from compressors, motors, and other machinery will be monitored at the project boundary and within operational zones using calibrated sound level meters. Monitoring will be carried out quarterly to ensure noise levels remain within permissible limits, especially near residential or sensitive areas.

- **Solid and Hazardous Waste Monitoring:** All types of waste, including general solid waste (packaging material, food waste) and hazardous waste (used oil, chemical containers, ETP sludge), will be documented and managed properly. Waste quantities will be logged daily, and disposal will follow prescribed methods. Hazardous waste will be handed over to EPA-licensed vendors, and disposal records will be maintained.

- **Occupational Health & Safety Monitoring:** Regular monitoring of workplace safety practices will be performed. This includes the provision and use of Personal Protective Equipment (PPE), maintenance of first aid kits, fire extinguishers, emergency drills, and reporting of accidents or incidents. Weekly inspections and monthly audits will ensure adherence to health and safety protocols.

- **Energy and Water Usage Monitoring:** Electricity and water consumption will be tracked regularly. Energy audits will be conducted bi-annually to identify areas for improving efficiency. Similarly, water meters will help track consumption, and measures such as recycling treated water and reducing wastage will be encouraged.

- **Odor Monitoring:** Odor from the ETP or waste storage areas will be monitored through regular field inspections. Complaints or observations related to odor will be recorded and addressed immediately through corrective measures like improved ventilation or sealing of waste containers.

- **ETP Performance Monitoring:** The efficiency of the Effluent Treatment Plant will be evaluated by comparing influent and effluent quality. Regular calibration of equipment, trained personnel, and backup power will ensure smooth and effective operation. Monitoring reports will be prepared monthly.

- **Community and CSR Monitoring:** A complaint redress system will be established for the nearby community to report any concerns. CSR-related activities like community meetings, awareness sessions, and local employment will also be monitored bi-annually.

- **Greenbelt and Plantation Monitoring:** Planted trees and landscaping around the project boundary will be inspected quarterly to ensure survival and proper maintenance. Plantation will help with dust suppression, air purification, and overall site aesthetics.

This environmental monitoring plan will be reviewed periodically and adjusted as necessary based on monitoring results, technological advancements, and stakeholder feedback. It forms a key part of the proponent's commitment to sustainable development and regulatory compliance.

CHAPTER # 1

INTRODUCTION

1.1 PURPOSE OF THE EIA REPORT

The primary purpose of this Environmental Impact Assessment (EIA) report is to identify, predict, and evaluate potential environmental and socio-economic impacts associated with the **Proposed Construction of a Beverages Manufacturing Unit along with an Effluent Treatment Plant (ETP) project** located at **Multan industrial Estate, Ph 1, Multan.**

This report provides a comprehensive environmental baseline, process details, risk identification, and mitigation strategies in accordance with the **Pakistan Environmental Protection Act, 1997**, and the **Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000**. The EIA ensures that environmental considerations are integrated into the project planning and decision-making processes, minimizing adverse impacts and promoting sustainable development.

This assessment adheres to the following applicable environmental regulations and procedural guidelines:

- Identify possible environmental and socio-economic consequences arising from the implementation of the proposed construction project.
- Suggest effective and realistic impact mitigation and benefit enhancement strategies to address adverse effects and support sustainable development.
- Outline a structured Environmental Management Plan (EMP) and monitoring protocol to uphold environmental standards and ensure compliance during both the construction and operational stages.

1.2 IDENTIFICATION OF PROJECT AND PROPONENT

Project Title: Proposed Construction of Beverages manufacturing unit along with the ETP

Name of Project Proponent:
Malik Ghulam Mustafa

CNIC: 36302-0296826-5
CN PAK (Pvt.) Limited

Proponent Address:
817-Ravi Block, Allama Iqbal Town, Multan Road, Lahore

Project Location:

Plot No. 22, 23 & 23-A, Multan industrial Estate, Ph 1, Multan

Geographical Coordinates:

Latitude: 30°08' 03.7" N

Longitude: 71°23'35.2 "E

1.3 DETAILS OF CONSULTANT

The Environmental Impact Assessment (EIA) study for the proposed project is being conducted by:

Consultant Firm:

Pak Green Enviro-Engineering (Pvt.) Ltd.

Environmental Consultants & Engineers

Office Address: 46-M, Gulberg III, Lahore

Contact: 042-35441444, 0303-4442335

Scope of Services: Independent environmental consultancy for the preparation of EIA including baseline assessment, stakeholder consultations, impact analysis, mitigation planning, and formulation of the Environmental Management Plan (EMP).

Pak Green Enviro-Engineering (Pvt.) Ltd. is a registered and experienced firm specializing in environmental assessments for industrial, infrastructural, and development projects across Pakistan. The firm has multidisciplinary expertise in environmental sciences, engineering, pollution control, and regulatory compliance.

1.4 BRIEF DESCRIPTION OF NATURE, SIZE AND LOCATION OF PROJECT

1.4.1 Nature of the Project:

The proposed project involves the installation of **modern beverage processing machinery, packaging system**. As part of its environmentally responsible design, an **Effluent Treatment Plant (ETP)** will be established on-site to treat wastewater generated during operations. Treated water from the ETP can be **reused for non-drinking purposes** such as cooling, floor cleaning, or irrigation, reducing overall water consumption. The project is **private sector-driven** and aims to support local industrial growth, generate employment, and contribute to the national food and beverage sector.

1.4.2 Project Size:

- **Project Area:** 512847.92 SFT
- **Total Project Cost:** PKR 4 billion
- **Production Capacity:** Approximately 17,222,400 liters/month.

The site is located within an established industrial zone with proper access to utilities, road infrastructure, and workforce. The land includes existing facilities that will be utilized and expanded as part of the project. No relocation or resettlement is required.

By-products:

There are no hazardous by-products. All solid waste will be non-hazardous and managed appropriately.

Source of Raw Materials:

Raw materials will be sourced from both **local markets and international suppliers** to maintain quality and supply chain efficiency.

Project Area:

The total land area allocated for the proposed beverage manufacturing unit is **512,847.92 SFT**, which provides sufficient space for the construction of production lines, raw material and

finished goods storage, Effluent Treatment Plant (ETP), administrative block, and provision for environmental management systems.

Estimated Project Cost:

The total estimated cost of the proposed project is **PKR 04 billion**, which includes civil construction, machinery, utilities, environmental management systems, and ETP.

1.5 PROJECT LOCATION

- **Address:** Plot No. 22, 23 & 23-A, Multan industrial Estate, Ph 1, Multan.
- **Geographic Coordinates:**

  Latitude: 30°08' 03.7" N

  Longitude: 71°23'35.2 "E

This location is part of a well-established industrial corridor and is well connected to urban infrastructure, utilities, and logistics networks. It is conducive for industrial development and minimizes environmental conflicts due to its existing industrial land use.

Water Requirements:

- **Consumption: 350,000–450,000 litres per day**
- **Source:** WASA (Water and Sanitation Agency) via motor pump system (**Industrial estate's approved water supply network)**

Solid and Liquid Waste Management:

Table 1.1: Categorizing Solid and Liquid Waste Management

Waste Type	Source	Estimated Quantity	Proposed Management/Disposal Method
Solid Waste			
Packaging Waste	Bottling, labelling, and sealing units	Moderate	Segregated and sold to authorized recyclers
Production Rejects	Damaged/expired bottles and defective items	Low to Moderate	Disposed of through licensed waste contractors

Maintenance Waste	Machine parts, oily rags, worn-out components	Low	Stored in labelled containers and handled as hazardous waste
Office Waste	Paper, plastic, general refuse from staff areas	Low	Collected in bins, sent to municipal disposal system
ETP Sludge	Effluent Treatment Plant	Moderate	Dewatered, dried, and disposed of through licensed hazardous waste handler
Liquid Waste			
Process Wastewater	Mixing, blending, cleaning, and rinsing operations	High	Treated in ETP to meet NEQS before reuse or discharge
CIP Wastewater	Cleaning-in-place systems	Moderate	Directed to ETP for biological and chemical treatment
Boiler/Cooling Waste	Blowdown, bleed-off	Low	Treated and reused/discharged as per environmental standards

Labor Force:

Table 1.2: Labor Force

Phase	Estimated Workforce
Construction	10-15 Persons
Operational	15-20 Persons

This construction is anticipated to significantly contribute **to meet growing market demand, improve efficiency, and enhance competitiveness** in the beverage industry.

Screening

Regulatory Basis for Screening

Environmental Screening is a preliminary assessment step used to determine the level of environmental review a proposed project must undergo, as per the provisions of the **Pakistan Environmental Protection Act (PEPA), 1997 (Amended 2022)**, and the **Pakistan Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2000 (Amended 2022)**. The main objective of screening is to classify the project into one of two categories:

- **Schedule I** projects, which require an **Initial Environmental Examination (IEE)**.
- **Schedule II** projects, which require a more comprehensive **Environmental Impact Assessment (EIA)**.

The classification is based on the **nature, size, and location** of the project and its potential environmental impacts.

Screening Determination for the Proposed Project

After a detailed review of the proposed project characteristics, it is determined that the Construction of Beverages manufacturing unit along with the ETP of CN PAK (Pvt.) Limited falls under Schedule II, specifically under the following clause:

Schedule II, Category B (Manufacturing and Processing), Clause 4: "Food Processing Industry (Beverage Products)"

Additionally, projects involving effluent treatment plants (ETPs), high-volume water abstraction, chemical handling, and solid/liquid waste generation also fall within this schedule due to their potential environmental footprint.

Justification for EIA Requirement

1. **Scale of Operation**

The project is of large industrial scale, covering an area of 512,847.92 square feet and housing multiple production lines, storage facilities, internal infrastructure, and a wastewater treatment system. The magnitude of raw material handling, water usage, and product output is substantial enough to potentially affect the surrounding environment if not properly managed.

2. **Resource Utilization**

The proposed facility will involve significant consumption of natural and utility resource. The resource intensity of this project directly impacts water availability, energy grid load, and waste management systems, thus demanding an environmental planning and monitoring framework through EIA.

3. **Waste Generation and Pollution Risk**

The plant will generate liquid waste effluents rich in sugars, organic matter, and cleaning agents, requiring efficient treatment. Solid waste will include packaging waste, rejected batches, and sludge from the ETP will need safe disposal or recycling.

4. **Location Considerations**

Although the site is within an industrial estate, the cumulative impacts of nearby industries can stress common infrastructure (e.g., roads, drainage, power). The EIA will assess the cumulative environmental load and propose suitable mitigation strategies.

5. **Legal and Regulatory Compliance**

Under **Schedule II of the EIA Regulations (2000)**, beverage manufacturing units with significant water use, effluent discharge, and chemical handling are **legally required** to conduct an EIA prior to construction and operation. The EIA ensures compliance with:

- National Environmental Quality Standards (NEQS)
- Water quality and effluent discharge limits
- Waste management protocols

6. **Public and Occupational Safety**

The use of pressurized systems, chemical storage, and high-speed bottling lines poses safety hazards to workers. Noise and traffic related to logistics operations can affect nearby communities. The EIA will identify these risks and suggest health, safety, and community safeguards.

Regulatory Consultation and Confirmation

The need for conducting a full EIA for this project was confirmed through a formal screening process in consultation with the Punjab Environmental Protection Agency (Punjab-EPA). The regulatory authority confirmed that the project falls under Schedule II and must follow the complete procedure under the EIA Regulations 2000 (Amended 2022**)**.

Accordingly, this EIA report has been prepared in compliance with:

- Section 12 of the PEPA 1997 (Amended 2022)
- Rule 4 and Rule 5 of the EIA/IEE Regulations 2000 (Amended 2022)
- Terms of Reference (TORs) provided or accepted by the Punjab-EPA for projects of this type and scale.

Summary of Screening Outcome

Table 1.3: Summary of Screening Outcome

Parameter	Description
Project Type	Construction of Beverages manufacturing unit along with the ETP
Activity Nature	Manufacturing (Beverage Products)
Schedule Classification	Schedule II
Regulatory Clause	Category B, Clause 4 (Manufacturing and processing)
Screening Decision	Requires Full Environmental Impact Assessment (EIA)

This screening outcome has guided the preparation of the full Environmental Impact Assessment report that follows, including baseline studies, impact analysis, mitigation planning, and stakeholder engagement strategies.

Scoping

Scoping is a critical component of the Environmental Impact Assessment (EIA) process, aimed at identifying key environmental and social concerns that must be addressed. It establishes the spatial and temporal boundaries, identifies major concerns raised by stakeholders, and defines the significant impacts and factors to be examined during the study.

1. Spatial and Temporal Boundaries of Environmental Assessment

The **spatial boundaries** of the EIA cover multiple zones of influence. The primary zone is the project site itself, spanning a total area of 512,847.92 square feet. This area includes space designated for the main production building, raw material and finished goods storage, machinery installation, internal roads, parking areas, and the ETP. The secondary zone includes the immediate surroundings within a 1 to 2 km radius, which encompasses adjacent industrial units, access roads, and associated infrastructure that may be indirectly impacted by project activities such as increased traffic, noise, or air emissions. A broader tertiary zone covers environmental receptors such as groundwater resources, local drainage systems, and regional road networks that may be affected over time.

The **temporal boundaries** of the assessment span across all phases of the project lifecycle. The pre-construction phase includes land preparation, leveling, and installation of temporary infrastructure. The construction phase covers civil works, structural development, and machinery installation, which may cause short-term impacts like noise, dust, and increased labour activity. The operational phase, which is the most environmentally intensive, involves routine beverage production, waste generation, transportation, and utility consumption. Although decommissioning is not expected in the near future, potential impacts during the facility's closure phase such as dismantling of equipment and disposal of residual waste are also considered in this EIA for completeness.

2. Important Issues and Concerns Raised During Consultation

During stakeholder consultations for the proposed beverage manufacturing unit with ETP at Multan Industrial Estate, several important concerns were raised. Concern over the potential

burden on the existing drainage system and the need for an effective Effluent Treatment Plant (ETP) to comply with NEQS. Estate management and transporters highlighted the need for proper internal road access and traffic flow management during peak hours. Neighbouring units expressed concern about emissions and operational noise affecting nearby operations. Worker representatives emphasized the importance of safety protocols, PPE usage, and emergency preparedness.

3. Significant Impacts and Factors to be Determined

The proposed beverage manufacturing unit along with an Effluent Treatment Plant (ETP) is anticipated to result in several significant environmental and social impacts that warrant comprehensive assessment. One of the key concerns is **water resource utilization**, as the facility will require a substantial amount of water for blending, cleaning, and processing activities. It is essential to evaluate the sustainability of the water source and implement conservation measures. Closely related is the **generation of wastewater**, which must be treated effectively to comply with National Environmental Quality Standards (NEQS); therefore, the design and operational capacity of the ETP must be carefully assessed.

Another significant factor is **air emissions**, primarily from diesel generators, transportation vehicles, and potential dust during construction. These emissions may affect ambient air quality and require control measures. **Noise pollution** from machinery and transport operations is also expected, potentially disturbing nearby industrial units and affecting occupational health. In terms of **solid waste**, the project will generate waste in the form of packaging materials, process rejects, and ETP sludge, all of which require proper handling, storage, and environmentally sound disposal methods.

Energy consumption is another critical factor, especially if fossil fuel–based backup systems are used extensively, contributing to greenhouse gas emissions. **Occupational health and safety** also form a major part of the assessment, necessitating the implementation of robust safety protocols to prevent accidents and exposure to hazards. Finally, **socio-economic impacts**, including job creation and local economic stimulation, must be weighed alongside community and labour welfare concerns. These impacts and factors form the basis for detailed analysis, mitigation planning, and the development of an effective Environmental Management Plan (EMP).

CHAPTER # 2

DESCRIPTION OF THE PROJECT

2.1 TITLE OF THE PROJECT

Proposed Construction of Beverages manufacturing unit along with the ETP

2.2 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.
- **Enhance competitiveness in the beverage industry** by producing high-quality products at lower operational costs, enabling better pricing and market penetration.
- **Improve production efficiency** through the adoption of automated systems, advanced blending and packaging technologies, and optimized workflows.

2.3 LOCATION AND SITE LAYOUT OF THE PROJECT

2.3.1 Location

Subject project is located at Plot No. 22, 23 & 23-A, Multan industrial Estate, Ph 1, Multan

Project land coordinates are as follows:

30°08' 03.7" N

71°23'35.2 "E

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

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

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

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

2.3.2 Location and Site Layout of the Project

The project is located at **Plot No. 22, 23, and 23-A, Multan Industrial Estate, Phase 1, Multan**. The site lies within an established industrial zone with access to essential utilities and services. The land area measures **512,847.92 square feet**, which is sufficient for accommodating all infrastructure components including production lines, raw material and finished goods warehouses, administrative buildings, internal roads, and the ETP. The site layout also allows space for future expansion and sustainability features such as solar panel installations.

2.3.3 Land Use on the Site

The land designated for the project is entirely industrial and has been officially allocated for manufacturing purposes by the relevant development authority. There is no residential or agricultural activity on the plot. The proposed development is consistent with the zoning and land use regulations of the Multan Industrial Estate.

2.3.4 Road Access

The site has excellent road connectivity via internal estate roads that link to major highways and transportation routes. These roads facilitate smooth delivery of raw materials and distribution of finished products. Proper access points for heavy vehicles and staff entry will be developed to ensure safe and efficient movement during construction and operation phases.

2.3.5 Vegetation Features of the Site

The project site is primarily barren and devoid of significant natural vegetation. Sparse wild shrubs and grasses may be present along plot edges but no protected or ecologically significant flora exists. Landscaping and green belts will be introduced around the facility post-construction to enhance site aesthetics and contribute to air quality improvement.

2.3.6 Cost and Magnitude of Operation

The total estimated cost of the project is **PKR 4 billion**, covering civil works, machinery installation, utilities, ETP construction, and infrastructure development. The facility will have a **production capacity of approximately 17,222,400 liters per month**. Operations will run in

multiple shifts, employing both skilled and unskilled labour, contributing significantly to local economic activity.

2.3.7 Schedule of Implementation

The implementation of the project is planned in phases, with estimated time period.

- **Phase I:** Site preparation, boundary wall construction, and utility arrangements (Months 1–3)
- **Phase II:** Civil construction and machinery installation (Months 4–9)
- **Phase III:** ETP setup, testing, and commissioning (Months 10–11)
- **Phase IV:** Trial production and full-scale operation (Month 12 onwards)

2.4 DESCRIPTION OF THE PROJECT

The project entails the construction of a beverage manufacturing plant with a fully integrated ETP. The production process will include water treatment, blending of ingredients (water, Flavors, sweeteners), pasteurization or sterilization, bottling or canning, sealing, labelling, and packaging. The facility will be equipped with modern machinery, quality control laboratories, energy-efficient systems, and safety features. A dedicated ETP will treat industrial wastewater to meet environmental standards before discharge.

2.4.1 Project Activities and Key Components

Raw Material Handling & Storage: The beverage manufacturing process relies on raw materials such as water, sugar, carbon dioxide, flavours, preservatives, and packaging materials (plastic bottles, aluminium 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, labelling 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.

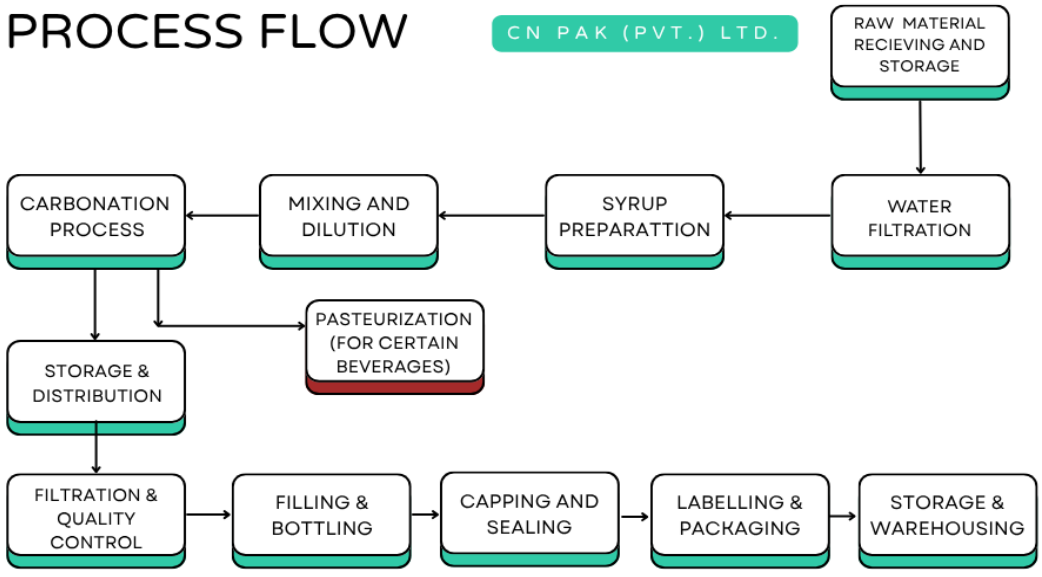

Figure 2.1: Process Flow of Beverage Manufacturing Unit

2.4.2 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), Flavours, 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 aluminium 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.

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.
- Flavouring agents, preservatives, and colouring 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 flavour 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. Labelling & Packaging

Process: The sealed containers are labelled and packed for distribution.

How It's Carried Out:

- Labels containing product information, expiry date, and batch number are applied using automatic labelling 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:

The beverage manufacturing unit will have a significant water demand due to the nature of its operations. Water is a primary raw material in beverage production and is also essential for various supporting processes. The estimated total water requirement for the operational phase of the project is approximately 20,000,000 gallons per month. This demand will be distributed across several key functional areas within the facility.

Water Usage Breakdown

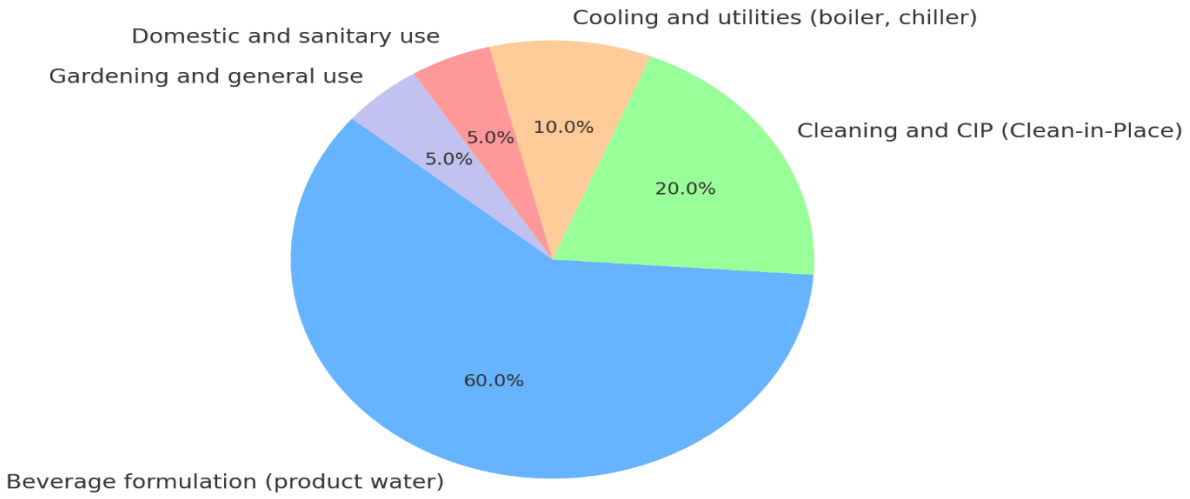

Figure 2.2: Estimate Water Usage Distribution in Beverage Manufacturing Unit

2.4.3 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.

2.4.4 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.

2.4.5 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.

2.4.6 Plantation:

Planation will be done within and outside the unit.

2.4.7 Parking Area:

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

2.4.8 Rainwater Harvesting:

To promote sustainable water management and reduce dependency on groundwater or municipal sources, a **Rainwater Harvesting (RWH) system** will be integrated into the

beverage manufacturing unit's design. This initiative aligns with environmental best practices and contributes to resource conservation within the industrial facility.

The project site, covering an area of approximately 512,847.92 square feet, offers significant potential for rainwater collection. Rainwater will be harvested primarily from the rooftops of the manufacturing and administrative buildings, including the executive residence, mess hall, and other covered areas. Additionally, stormwater runoff from paved surfaces such as roads and parking areas will be directed through a well-designed drainage system into collection sumps and recharge pits.

The harvested rainwater will be filtered through sedimentation and filtration units to remove debris, dust, and contaminants before being stored in dedicated underground or overhead rainwater storage tanks. The collected water will be utilized for non-potable purposes, such as:

- Gardening and landscape irrigation
- Floor washing and cleaning activities
- Cooling tower makeup water (after treatment, if required)
- Toilet flushing and other sanitary uses

In areas where direct reuse is not feasible, the rainwater will be directed into groundwater recharge pits, contributing to aquifer replenishment and promoting long-term water sustainability in the region. The RWH system will be regularly maintained and monitored by the facility's utilities team to ensure efficiency and compliance with environmental regulations. This initiative not only conserves water but also demonstrates the project's commitment to eco-friendly operations and sustainable industrial growth.

2.4.9 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.

2.4.10 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

Table 2.1: 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

2.4.11 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.

2.5 RESTORATION / REHABILITATION PLAN

During the construction phase, efforts will be made to minimize land disturbance. Any temporarily used areas will be restored to pre-construction condition. Post-construction, the site will be rehabilitated through paving, landscaping, and greening measures. Waste management protocols, including disposal of construction debris and plantation drives, will be adopted to enhance the ecological profile of the site. 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.

2.6 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

This chapter presents a comprehensive overview of the existing environmental conditions in and around the project area located in Multan. The environmental baseline serves as the reference point to assess potential impacts of the proposed project. The description encompasses physical, biological, and socio-economic components of the environment of Multan

3.1 PHYSICAL ENVIRONMENT

This section describes the physical characteristics of the environment in and around the project area. Understanding the physical environment is critical for evaluating the potential impacts of the proposed project and identifying effective mitigation measures.

3.1.1 Topography and Geography

The project site is situated within the Indus Plain of Southern Punjab, in District Multan. The terrain is generally flat, with gentle slopes that favour agricultural activity and infrastructure development. The elevation ranges between 110–130 meters above sea level. The topography is occasionally interrupted by canal networks and agricultural bunds.

The site does not fall in any hilly or rugged terrain and is not prone to landslides or erosion. Natural drainage follows a gentle gradient and typically flows toward local canals or man-made drains.

3.1.2 Geology and Soil

Multan lies within the alluvial plains formed by the deposition of sediments from the Indus River and its tributaries. The geological composition is mainly Recent alluvium (silt, clay, sand, and gravel), Underlain by Pleistocene sediments

The subsoil at the project location typically consists of:

- Topsoil: Sandy loam or clay loam
- Subsoil: Medium to heavy clay, suitable for agriculture

Table 3.1: Soil Characteristics of the Project Area

Parameter	Description
Soil Type	Sandy loam to clay loam
Colour	Light brown to reddish
Texture	Medium to fine-grained
Permeability	Moderate to low
pH Range	7.2 – 8.5
Organic Matter	Low to moderate
Agricultural Suitability	Good (with proper irrigation)

3.1.3 Climate

Multan has an **arid to semi-arid** climate characterized by long, hot summers and winters. The climate strongly influences the region's water balance, vegetation, and construction planning.

Table 3.2: Climatic Conditions of District Multan

Parameter	Value / Range	Remarks
Annual Temperature	5°C (min in winter) to 48°C (max in summer)	Peak temperatures occur in May–June
Average Rainfall	150–250 mm	Mostly during July–September (monsoon)
Relative Humidity	30% – 70%	Higher during monsoon season
Wind Pattern	Predominantly west to southwest	Affects dust dispersion and air quality
Evaporation Rate	High	Due to strong solar radiation

Extreme weather events such as heatwaves and dust storms are not uncommon during the summer season.

3.1.4 Air Quality

Air quality in the project area is influenced by:

- Vehicular emissions from nearby roads
- Agricultural burning
- Dust from construction and unpaved surfaces
- Brick kilns and small-scale industries (in surrounding zones)

If available, baseline ambient air quality data should be inserted here. Otherwise, it can be stated that air quality is **generally within National Environmental Quality Standards (NEQS)** limits in semi-urban and rural parts of Multan.

Table 3.3: Indicative Ambient Air Quality Parameters (Secondary Data)

Parameter	NEQS Limit ($\mu g/m^3$)	Typical Range in Area ($\mu g/m^3$)	Source
PM_{10}	150 (24-hr avg)	90 – 130	EPA Reports / Literature
$PM_{2.5}$	35 (24-hr avg)	40 – 70 (urban areas)	Secondary data
NO_2	80	25 – 50	Traffic emissions
SO_2	120	15 – 30	Combustion processes
CO	5 (mg/m^3)	1 – 3	Vehicles

3.1.5 Noise Environment

The primary sources of noise in the vicinity include:

- Vehicular movement on nearby roads
- Agricultural machinery (seasonal)
- Occasional construction activity

In general, noise levels remain within the **NEQS daytime limit of 55 dB(A)** for residential areas, though peaks may occur during traffic hours.

Table 3.4: Indicative Ambient Noise Levels

Location Type	Daytime dB(A)	NEQS Limit	Nighttime dB(A)	NEQS Limit
Residential Area	48 – 54	55	40 – 45	45
Roadside/Commercial	58 – 65	65	50 – 55	55
Agricultural/Farmland	40 – 50	55	35 – 45	45

3.1.6 Surface Water Resources

The region is served by an extensive irrigation network, including:

- **Canals**: Such as the Muzaffarabad or Shujabad branches
- **Drainage Channels**: Natural and artificial drains to manage stormwater and irrigation return flow

There is no major perennial stream or natural water body in the immediate vicinity of the site.

Surface water is primarily used for Agricultural irrigation and occasionally for livestock

Water quality may be impacted by Agricultural runoff (pesticides, fertilizers) and Domestic waste in downstream villages

3.1.7 Groundwater Resources

Groundwater is a major source of domestic and industrial supply in Multan. Tube wells and hand pumps are widely used.

- **Depth to Water Table**: Typically, 20 to 40 meters
- **Quality**: Generally good, but some areas report salinity and nitrate contamination
- **Recharge**: Mostly from canal seepage and rainfall

Table 3.5: Groundwater Quality Indicators (Typical Values)

Parameter	Value (Typical)	NEQS Limit
Ph	7.0 – 8.5	6.5 – 8.5
TDS	400 – 1,200 mg/L	<1,000 mg/L
Nitrates (NO_3^-)	10 – 45 mg/L	<50 mg/L
Chlorides	50 – 150 mg/L	<250 mg/L

3.2 METEOROLOGY AND CLIMATE

District Multan experiences an arid to semi-arid subtropical climate, characterized by extreme temperatures, low rainfall, and high evaporation rates. The meteorological parameters of the area play a vital role in the dispersion of pollutants, planning of construction activities, and environmental impact assessments.

3.2.1 Temperature

Temperatures in Multan vary significantly between summer and winter. Summers are long and extremely hot, while winters are short and mild.

Table 3.6: Monthly Average Temperature in Multan

Month	Average Max (°C)	Average Min (°C)
January	21	5
April	36	19
June	44	29
August	39	27
October	34	18
December	22	7

- **Hottest months**: May to July (up to 48°C)
- **Coldest months**: December and January (as low as 3–5°C)

3.2.2 Rainfall

Rainfall is sparse and erratic, mainly occurring during the monsoon season (July–September). The average annual rainfall is between 150–250 mm.

Table 3.7: Average Monthly Rainfall

Month	Average Rainfall (mm)
January	5
March	12
July	50
August	60
October	5
December	2

Rainfall is typically in the form of short, intense showers, which can cause temporary waterlogging due to poor drainage systems.

3.2.3 Relative Humidity

Humidity levels fluctuate with seasons:

- Monsoon months (July–August): 60–75%
- Winter months: 40–60%
- Dry summer months: 20–35%

3.2.4 Wind Speed and Direction

Winds play an essential role in the dispersion of air pollutants and dust, especially during dry seasons.

- Prevailing wind direction: West to Southwest
- Average wind speed: 10–15 km/h
- Peak winds: During May to July (can exceed 30 km/h)

Windstorms and dust storms are common in summer and may impact construction work.

Table 3.8: Wind Characteristics

Parameter	Value / Trend
Dominant Wind Direction	West–Southwest
Avg. Wind Speed	10–15 km/h
Peak Gusts	Up to 40 km/h (summer)
Dust Storm Occurrence	Common in May–June

3.3 HYDROLOGICAL ENVIRONMENT

This section covers the surface and subsurface hydrology relevant to the project area, including water availability, quality, and drainage.

3.3.1 Surface Water Resources

Surface water in District Multan is mainly available through the irrigation canal network that stems from the Sutlej and Chenab rivers, which are part of the Indus Basin Irrigation System (IBIS).

- Nearby Canal Systems: Shujabad Canal, Muzaffarabad Branch Canal, and link canals
- Drainage Channels: Seasonal and artificial drains to carry excess irrigation and stormwater

Table 3.9: Surface Water Features in the Vicinity

Feature	Description
Nearest Canal	[Insert canal name, if known] (within ~2–5 km)
Stream/Drain	Seasonal drains, nullahs
Waterlogging Risk	Low to moderate (during monsoon)
Use of Surface Water	Primarily irrigation and livestock

3.3.2 Groundwater Resources

Groundwater is a major source of domestic, agricultural, and industrial use in the area. It is typically accessed through boreholes and tube wells.

Table 3.10: Groundwater Characteristics

Parameter	Description / Range
Water Table Depth	20–40 meters below ground level
Source of Recharge	Canal seepage, rainfall
Water Quality	Generally potable, but localized salinity reported
Groundwater Use	Agriculture, industry, and drinking

In some areas, groundwater quality may be affected by High Total Dissolved Solids (TDS), Salinity or sodium hazard in deeper aquifers, Nitrate contamination due to agricultural runoff

3.3.3 Drainage Patterns

The natural drainage pattern of the area is aligned with the gentle slope of the Indus Plain, draining primarily toward the south and southeast.

- Drainage Type: Artificial and seasonal (man-made nullahs and canals)
- Flooding Risk: Low; however, localized flooding can occur during high-intensity rains, especially where drainage is obstructed

3.4 ECOLOGICAL ENVIRONMENT

The ecological environment of District Multan is shaped by its arid climate, extensive agricultural activity, and human settlement. The natural ecosystems have been significantly altered over time, but important biodiversity elements still exist in the region, especially in protected or less disturbed zones.

3.4.1 Flora (Vegetation)

The natural vegetation of the area is largely classified as dry tropical thorn forest, but this has been substantially replaced by agricultural crops and plantations. Common vegetation types include:

- Wild Flora: Acacia nilotica (Kikar), Capparis decidua (Karir), Zizyphus jujuba (Ber), Tamarix spp.

- Agricultural Crops: Wheat, cotton, sugarcane, maize, vegetables
- Ornamental/Planted Species: Eucalyptus, Sheesham, Neem, Date Palm

Table 3.11: Common Flora in District Multan

Category	Species (Local/Scientific Names)
Trees	Kikar, Neem, Sheesham, Eucalyptus
Shrubs	Karir, Phog, Ber
Grasses	Dub grass, Khabal, Ghaah
Crops (Seasonal)	Wheat, Cotton, Sugarcane, Vegetables

Most vegetation is now cultivated or managed, with little natural forest cover remaining in the vicinity of the proposed project.

3.4.2 Fauna (Wildlife)

Due to extensive agriculture, human activity, and urbanization, natural habitats for wildlife have been significantly reduced. However, the area still supports various species of birds, reptiles, and small mammals.

Table 3.12: Common Faunal Species in the Area

Category	Common Species
Mammals	Jackal, Hare, Indian mongoose, Wild boar (in outer areas)
Birds	House sparrow, Dove, Myna, Parrot, Crow, Kites, Owls
Reptiles	Lizard, House gecko, Indian cobra, Rat snake
Amphibians	Common toad (seasonal, near waterlogged areas)
Insects	Butterflies, Grasshoppers, Honeybees, Beetles

No endangered or critically threatened species have been recorded in or around the project site, based on available secondary sources and field verification.

3.4.3 Protected Areas and Sensitive Ecosystems

There are no protected forests, wildlife sanctuaries, wetlands, or ecological corridors in or near the immediate project area. The closest protected areas are Lal Suhanra National Park (Located ~100 km from Multan, in Bahawalpur) and Head Punjnad Wetland (Over 90 km south of the site)

Therefore, the proposed project is not expected to pose any direct threat to sensitive or critical habitats.

3.4.4 Ecological Sensitivity of the Site

The project site is located in a semi-urban/agricultural zone. Ecological sensitivity is low, and the site has already been modified by human activity, Does not support unique or sensitive ecosystems and is not part of any ecological or biodiversity hotspot

Precautionary measures such as green belt development, tree plantation, and dust control will be implemented to mitigate minor ecological impacts during construction and operation.

3.5 SOCIOECONOMIC ENVIRONMENT

The socioeconomic setting of District Multan influences land use, labor availability, resource access, and community engagement in the EIA process. The area surrounding the project site is a mix of rural and peri-urban settlements with agriculture as the primary livelihood source.

3.5.1 Demographics

According to the Pakistan Bureau of Statistics (2017 Census):

- District Population: ~4.7 million
- Urban-Rural Split: ~52% rural, 48% urban
- Literacy Rate: Approx. 55%
- Main Languages: Punjabi (Seraiki dialect), Urdu

The project site is near small villages and housing clusters, with the nearest town centre within 10–15 km.

3.5.2 Livelihood and Economy

The local economy is based primarily on agriculture, Livestock Rearing, Labor and Services: Daily wage earners, transport, and trade,

Table 3.13: Occupational Structure of Local Population (Indicative)

Occupation Type	Approximate % Population
Agriculture & Livestock	50%
Skilled/Unskilled Labor	20%
Small Businesses	10%
Government/Private Jobs	10%
Transport & Services	10%

3.5.3 Infrastructure and Utilities

- Road Access: Project site is accessible via paved road or local link roads
- Electricity: Supplied by MEPCO
- Water Supply: Primarily through tube wells and community water supply schemes
- Sewerage and Waste: Open drains or septic tanks in nearby villages
- Telecommunication: Mobile network coverage is available

3.5.4 Education and Health Facilities

- Schools: Government primary and secondary schools available within 2–5 km radius
- Health Units: Basic Health Units (BHUs) and Rural Health Centers (RHCs); major hospitals located in Multan city (~10–15 km from rural sites)

3.5.5 COMMUNITY ATTITUDE TOWARDS PROJECT

Initial consultations with locals indicate a neutral to positive attitude toward the proposed development. The community welcomes opportunities for Employment generation, Local procurement and economic activity, Infrastructure improvement

3.6 AESTHETIC AND CULTURAL ENVIRONMENT

The aesthetic and cultural environment refers to the visual, historical, religious, and cultural features of the project area that contribute to the local identity and heritage. For District Multan,

one of the oldest continuously inhabited cities in South Asia this dimension holds particular significance.

3.6.1 Aesthetic Environment (Visual Landscape)

The project site is located in a semi-urban/rural landscape with agricultural fields, scattered settlements, and limited vegetation cover. The visual characteristics of the area include:

- Agricultural Lands: Dominant visual feature; mainly wheat, cotton, and sugarcane fields
- Canal Networks: Contribute to the rural aesthetic in some locations
- Buildings and Structures: Mix of mud-brick and concrete houses; new constructions in peri-urban belts
- Tree Cover: Sporadic, primarily roadside and boundary plantation (e.g., Kikar, Sheesham, Eucalyptus)
- Visual Sensitivity: Low to moderate; no significant scenic views or protected landscapes in immediate surroundings

Table 3.14: Visual/Aesthetic Features of the Project Vicinity

Feature Type	Presence	Remarks
Natural Landscape	Limited	Mostly flat, modified for agriculture
Water Bodies	Minor canals	Artificial irrigation channels
Tree Cover	Sparse	Limited to private farms and road edges
Scenic Views	Absent	No notable scenic vistas or forested areas
Visual Intrusions	Moderate	Power lines, informal housing, agricultural activity

Since the project does not involve high-rise structures or major lighting installations, **no significant impact on visual aesthetics** is anticipated.

3.6.2 Archaeological and Historical Treasures

District Multan is renowned for its historical and archaeological significance, often referred to as the *"City of Saints"*. The city is home to ancient fortifications, shrines, and remnants of early civilizations, but the project site is not located in or near any officially notified protected site.

Table 3.15: Prominent Historical/Archaeological Sites in District Multan

Site Name	Description	Distance from Project Area
Multan Fort	Ancient fort with history dating back to 12th century	~10–20 km (depending on site)
Shrine of Hazrat Bahauddin Zakariya	13th-century Sufi shrine	~15–25 km
Shrine of Shah Rukn-e-Alam	Iconic heritage structure	~15–25 km
Tomb of Shah Shams Sabzwari	Important historical figure	~15–25 km
Old City Walls and Gates	Part of walled city heritage	~15–25 km

These sites are concentrated in the urban core of Multan, far from typical industrial or rural expansion zones. The project site is located in a peri-urban/rural setting, and no cultural or archaeological resource is present within the direct impact zone of the project.

3.6.3 Religious and Cultural Sites

Multan has a diverse cultural and religious fabric, with a majority Muslim population and numerous mosques, shrines, and gravesites. In the project's immediate surroundings

Table 3.16: Religious and Cultural Facilities in Vicinity

Facility Type	Presence Near Project Site	Remarks
Mosques	Yes (within 1–2 km)	Used for daily prayers by locals
Graveyards	Yes (~2–3 km away)	Small village-level cemeteries
Shrines	No	Major shrines located in central Multan
Temples/Gurdwaras	No	Not reported in the project vicinity

The project will **not affect access to or the sanctity of any religious or cultural site**.

3.6.4 Cultural Sensitivity and Community Identity

Multan has a rich cultural identity rooted in Sufism, agriculture, and traditional crafts (e.g., blue pottery, embroidery, and ajrak printing). Although the project is not located near traditional marketplaces or cultural venues, respect for local values and cultural norms will be ensured during all phases.

Cultural Considerations during Project Execution:

- No construction activities during Friday prayer hours
- Employment opportunities for local residents, respecting gender and religious practices
- Avoidance of construction near sacred trees or gravesites (if any discovered during excavation)

3.6.5 Impact on Aesthetic and Cultural Resources

Based on the above assessment:

- No significant visual disruption is expected due to the low aesthetic sensitivity of the site.
- No direct impact on archaeological, historical, or religious sites is anticipated.
- Cultural norms will be respected throughout the project's lifecycle.

CHAPTER # 4

CONSIDERATION OF ALTERNATIVES

4.1 INTRODUCTION

The selection of a suitable site is a critical component of environmental planning and sustainable industrial development. This section evaluates various alternative sites considered for the proposed beverage manufacturing unit and associated Effluent Treatment Plant (ETP), with a view to minimizing environmental and socio-economic impacts. The decision-making process is based on clearly defined selection and rejection criteria, with consideration of both environmental and economic aspects.

4.2 SITE SELECTION CRITERIA

The following criteria were adopted for selecting a feasible and environmentally sustainable site:

- **Location within an Industrial Zone:** Preference for a designated industrial area to ensure compatibility with surrounding land uses and availability of pre-established utility networks.
- **Logistic & Transportation:** Reduced transportation costs by selecting a site near raw material suppliers and distribution channels.
- **Infrastructure Availability:** Access to road networks, power supply (MEPCO), natural gas (SNGPL), and water supply.
- **Cost Efficiency:** Avoiding excessive expenses associated with land acquisition and infrastructure development.
- **Availability of Land Area:** Adequate land (512,847.92 square feet) required for construction, storage, utilities, and future expansion.
- **Environmental Compliance:** Potential for proper waste management, ETP installation, and minimal impact on sensitive receptors.

4.3 SITE REJECTION CRITERIA

Several factors led to the exclusion of alternative sites from consideration:

Presence in Residential Areas: Sites located near densely populated residential or agricultural zones were rejected to avoid conflicts and pollution-related risks.

Ecological Sensitivity: Proximity to wetlands, natural habitats, protected forests, or flood-prone areas disqualified certain locations.

Inadequate Infrastructure: Sites without proper access to utilities, transportation, or drainage infrastructure were deemed infeasible.

Land Ownership Disputes: Legal or ownership complications led to the rejection of private land options.

4.4 EVALUATION OF ALTERNATIVE SITES

4.4.1 Alternative Site 1: A New Industrial Location

One alternative considered was establishing the construction 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.

4.5 ECONOMIC ALTERNATIVES

Economic factors were key in assessing the viability of each site:

- **Cost of Land Acquisition:** Multan Industrial Estate offered competitive land rates with full ownership and transfer rights, reducing acquisition delays.

- **Construction and Operational Costs:** Availability of utilities reduced the need for expensive independent installations. Proximity to workforce and market centres reduces ongoing logistics costs.
- **Logistical Efficiency:** Well-developed road networks within the estate reduce travel time and fuel expenses.

4.6 ENVIRONMENTAL ALTERNATIVES

Environmental impacts were assessed for each site:

- **Air and Noise Pollution:** Alternative sites near residential areas posed higher risk of air and noise pollution complaints.
- **Effluent Management:** The selected site allows effective installation of an ETP and discharge compliance through estate-managed drainage systems.
- **Waste Disposal:** The estate offers designated industrial waste collection systems, reducing the risk of improper disposal.
- **Ecological Preservation:** No flora, fauna, or environmentally sensitive areas are located near the selected site, minimizing ecological disruption.

4.7 JUSTIFICATION FOR SELECTED SITE

The proposed site for the construction of the beverage manufacturing unit has been carefully selected based on a combination of technical, economic, and environmental factors that support the project's feasibility and sustainability. Strategically located within a legally designated industrial estate, the site ensures full compliance with zoning regulations and land-use compatibility. This minimizes the risk of legal or regulatory challenges during or after the project's implementation.

From an environmental perspective, the site is considered low in sensitivity, reducing the likelihood of adverse impacts on the surrounding ecosystem. Additionally, the presence of established infrastructure for waste disposal and effluent management provides a strong foundation for maintaining environmental standards during operations.

The availability of essential utilities such as electricity, gas, water, and transportation networks directly at the site offers significant operational advantages. These ready-to-use services help

avoid unnecessary delays and reduce both capital and operational expenditures, making the project more cost-effective.

Economically, the site offers competitive land acquisition and construction costs, which contribute to the long-term financial viability of the project. Lower operational expenses, coupled with logistical convenience, further support the efficient functioning of the facility.

Moreover, the site falls under the jurisdiction of the Multan Industrial Estate Development and Management Company (MIEDMC), which actively facilitates industrial development. Their structured support, including streamlined approval processes and industrial incentives, makes this location an ideal choice for the proposed beverage manufacturing unit.

CHAPTER # 5

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACT ASSESSMENT & THEIR MITIGATION MEASURES

The screening of potential environmental impacts is crucial stage used to determine whether a proposed project is likely to cause significant environmental impacts and, therefore, requires a detailed environmental assessment. The objective of screening is to assess the **scale, nature, location, and duration** of potential environmental effects and decide the **appropriate level of environmental review**.

The proposed project involves the installation of machinery, development of production lines, construction of supporting infrastructure, and establishment of an Effluent Treatment Plant (ETP) for a beverage manufacturing facility. Due to the industrial nature of the project and its location within a designated industrial estate, it may seem that environmental risks could be minimized. However, several factors necessitate a comprehensive environmental assessment.

5.1 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:

Table 5.1: Potential Environmental Impacts and Levels of Exposure of Constructional Phase

Environmental Aspect	Potential Impact	Level of Exposure	Affected Receptors

Air Quality	Dust from excavation, material transport	Moderate to High	Workers, local air environment
Noise Pollution	Machinery, trucks, and construction activities	Moderate	Laborers, nearby community
Soil Quality	Possible contamination from fuel/oil spills	Low to Moderate	On-site soil
Water Quality	Runoff, construction wastewater	Moderate	Drains, soil, water bodies
Solid Waste	Debris, packaging, leftover materials	Moderate	On-site environment
Occupational Hazards	Injuries, heat stress, equipment-related accidents	High	Construction workers
Traffic Disruption	Heavy vehicle movement causing congestion	Low to Moderate	Access roads, local traffic
Visual Aesthetics	Temporary visual intrusion due to ongoing works	Low	Nearby population

Operational Phase Impacts

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

Table 5.2: Potential Environmental Impacts and Levels of Exposure of Operational Phase

Environmental Aspect	Potential Impact	Level of Exposure	Affected Receptors
Air Quality	Emission of CO_2 from generators, forklifts, and CO_2 dosing (carbonation)	Low to Moderate	Ambient air, workers
Noise Pollution	Noise from machinery, compressors, conveyors	Moderate	Workers, nearby areas

Wastewater	Discharge of effluents from cleaning, processing, and ETP sludge	Moderate to High	Soil, surface & groundwater
Solid Waste	Packaging waste, bottle rejects, sludge	Moderate	Land, storage areas
Chemical Handling	Cleaning agents, flavouring chemicals, CO_2, etc.	Low to Moderate	Workers, environment
Energy Consumption	High electricity consumption (lighting, chillers, motors)	High	Grid/Energy source
Water Resources	High water usage for processing, cleaning, CIP	High	Groundwater/local supply
Occupational Hazards	Slips, machinery entrapment, exposure to cleaning agents	Moderate to High	On-site staff

5.1.1 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.

Table 5.3: Leopold Matrix for CN Pak (Private) Limited Beverages Construction 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.

5.2 MITIGATION MEASURES

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

Mitigation Measures for Construction Phase

Table 5.4: Proposed Mitigation Measures and their frequency for Constructional Phase

Environmental Aspect	Proposed Mitigation Measures	Monitoring Frequency
Air Quality	• Regular water sprinkling on unpaved roads and dusty surfaces • Cover trucks transporting loose materials. • Maintain construction vehicles to minimize emissions	Daily
Noise Levels	• Use noise-reducing equipment. • Restrict noisy activities to daytime hours. • Provide PPE (earplugs) to workers	Weekly
Soil Contamination	• Designated fuelling/maintenance zones with spill kits • Proper storage of fuel/chemicals on impermeable surfaces	Weekly
Water Quality	• Construct temporary sedimentation pits • Avoid direct discharge of wastewater • Train workers in wastewater handling	Bi-weekly

Solid Waste Generation	• Segregate and reuse materials where possible • Provide designated bins on-site • Hire licensed waste collectors	Weekly
Health and Safety	• Enforce use of PPE (helmets, boots, gloves, masks) • Conduct safety briefings and signage • Ensure first-aid availability	Daily
Traffic and Access Roads	• Schedule material deliveries during off-peak hours • Employ flagmen at entry/exit • Provide signage and barriers	Daily
Visual Aesthetics	• Fence off construction zone • Maintain tidy storage and disposal areas • Landscaping after construction	Weekly

Mitigation Measures for Operational Phase

Table 5.5: Proposed Mitigation Measures and their frequency for Operational Phase

Environmental Aspect	Proposed Mitigation Measures	Monitoring Frequency
Air Quality	• Use fuel-efficient and well-maintained equipment • Install air filters/emission controls • Conduct periodic emissions testing	Monthly
Noise Pollution	• Use low-noise machinery • Maintain equipment regularly • Install acoustic barriers where required	Monthly

Effluent Discharge	• Ensure proper functioning of ETP • Conduct regular testing of treated water as per PEQS • Reuse treated water for landscaping or cleaning	Weekly
Solid Waste Management	• Segregate waste at source • Recycle/reuse where possible • Dispose of waste via certified contractors	Weekly
Chemical Handling & Storage	• Store chemicals in ventilated, labelled, and bunded areas • Train staff on MSDS use • Conduct fire safety drills	Monthly
Occupational Health & Safety	• Provide PPE (gloves, masks, goggles) • Conduct routine safety training • Install safety signage and emergency alarms	Weekly
Water Consumption	• Install water-saving nozzles • Monitor water use with flow meters • Repair leaks promptly	Monthly
Energy Consumption	• Use energy-efficient motors and lighting • Install solar panels where feasible • Monitor energy use trends	Monthly
Community Relations	• Establish complaint response mechanism • Schedule operations to avoid local disturbance • Maintain aesthetic boundaries	As needed

The construction of the Beverage Manufacturing Unit along with an Effluent Treatment Plant (ETP), is expected to result in a range of environmental impacts during different stages of the project. Key areas of concern include air emissions, elevated noise levels, potential contamination of water resources, increased energy usage, and risks related to worker health and safety. Nevertheless, these adverse impacts can be effectively controlled through the implementation of appropriate mitigation strategies, thereby promoting environmental sustainability.

The inclusion of the ETP is anticipated to offer substantial long-term advantages by minimizing water pollution and enhancing adherence to environmental regulations. Through the adoption of forward-thinking environmental management techniques, incorporation of industry best

practices, and regular monitoring to ensure compliance, the project can be executed in an ecologically responsible way while contributing positively to industrial development.

CHAPTER # 6

ENVIRONMENTAL MANAGEMENT AND MONITORING

6.1. PURPOSE AND OBJECTIVES OF THE EMP:

The main objectives of EMP are:

The Environmental Management Plan (EMP) translates the findings of the EIA into a **practical, enforceable action plan** and the main objectives of EMP are:

- To safeguard air, water, soil and community health during **construction and operation**;
- To ensure **full compliance** with the Pakistan Environmental Protection Act (1997), NEQS, and estate by-laws;
- To assign **clear roles, schedules and resources** for mitigation, monitoring and reporting;
- To embed a system of **continual improvement** through adaptive management and periodic audits; and
- To build **institutional capacity** so that environmental performance remains robust throughout the project life-cycle.

6.2 MANAGEMENT APPROACHES

The primary accountability for ensuring adherence to the Environmental Management Plan (EMP) lies with the project proponent. The proponent, will adopt a designed framework to integrate EIA commitments into engineering design, contracts, and budgets. To maintain effective oversight and minimize risks of non-compliance, a deliberate level of overlap in responsibilities is incorporated across various tiers of management. This redundancy serves as a safeguard, allowing continuous monitoring and verification of EMP implementation throughout the project lifecycle. A dedicated **Environment, Health & Safety (EHS) Unit** will report directly to the Project Proponent, ensuring environmental decisions carry executive weight.

6.3 INSTITUTIONAL CAPACITY & RESPONSIBILITIES

Table 6.1: Institutional Capacity & Responsibilities

Institution/Party	Responsibility
Project Proponent	Overall supervision, resource allocation, and ensuring EMP compliance.
Environmental Consultant	Preparation of EMP, monitoring plans, and periodic environmental reporting.
Construction Contractor	Implementation of mitigation measures during construction, reporting violations.
Site Supervisor/Manager	Daily monitoring, coordinating with workers and ensuring PPE usage.
Environmental Monitoring Firm	Conduct air, water, noise, and waste sampling and analysis; submit reports.
EPA (Punjab)	Review and approval of EIA/EMP, site inspections, and enforcement of compliance.
ETP Operator	Regular operation and maintenance of the Effluent Treatment Plant.
Occupational Health & Safety Officer	Enforcement of safety protocols and training of site staff.

6.4 TRAINING SCHEDULE

Comprehensive training sessions will be organized for project management, contractors, engineers, and on-site workers to enhance their understanding of the environmental aspects and regulatory requirements associated with the project. These sessions will be conducted by qualified and experienced environmental professionals. The training will focus on environmental protection measures, safety protocols, waste management practices, and

compliance with the Environmental Management Plan (EMP). Periodic refresher courses and on-the-job training will also be provided to ensure continuous awareness and adherence to environmental responsibilities throughout the project lifecycle.

Table 6.2: Training Schedules for Project Management and On-site Workers

Training Module	Target Group	Provider
EMP Induction & Legal Compliance	All employees & contractors	Environmental Consultant
PPE Usage & Occupational Safety	Shop-floor & ETP staff	HSE Officer
Chemical Handling & MSDS Awareness	Warehouse & mixing staff	Chemical supplier + EHS Officer
Emergency Response & Fire-Drills	Entire site	Estate Fire Brigade
Environment-friendly Housekeeping	Cleaning crew, contractors	EHS Officer
Monitoring & Record-Keeping	EHS & QC laboratory staff	Third-party lab

6.5 TRAINING OF BUILDING CONTRACTOR

Training for building contractors and workers will form an integral component of the Terms of Reference (TORs) established for the construction phase of the project. These TORs will mandate adherence to the environmental provisions outlined in Chapter 5 of the EIA Report, which addresses the screening of potential environmental impacts and their corresponding mitigation measures.

The TORs will include mandatory training and periodic reporting requirements in the following key areas:

- **Safe Operation of Machinery:** Proper handling and safe usage of construction equipment and tools.
- **Use of Personal Protective Equipment (PPEs):** Ensuring the correct and consistent use of safety gear by all personnel.
- **Vehicle Maintenance and Environmental Reporting:** Regular servicing of vehicles and submission of environmental monitoring reports.
- **Water Usage Monitoring:** Maintenance of detailed records on water consumption.
- **Water and Wastewater Testing:** Regular testing of water quality and effluent, along with timely submission of monitoring reports.
- **Placement of Safety Signage:** Installation of safety boards and warning signs at strategic locations on the site.
- **Dust Control Measures:** Sprinkling of water on unpaved roads and dusty surfaces to minimize airborne particulates.
- **Emissions Monitoring:** Routine checks and documentation of emissions from generators.

In addition, the contractor will be responsible for delivering comprehensive training on all aspects of Health, Safety, and Environment (HSE) to ensure a safe and environmentally compliant construction phase.

6.6 RESPONSIBILITY OF ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The Environmental Management Plan (EMP) outlines the institutional framework, responsibilities, and mechanisms required to ensure that the environmental and social impacts associated with the project are effectively mitigated and managed. The ultimate responsibility for the successful implementation of the EMP rests with the project proponent, who shall ensure that all phases of the project from construction to operation which are carried out in strict compliance with applicable national environmental regulations and international best practices.

To fulfill this obligation, the proponent will designate an Environmental Manager or Environmental Coordinator, who will oversee all environmental compliance activities, coordinate with regulatory bodies such as the Environmental Protection Department (EPD) Punjab, and ensure that contractors and workers strictly follow environmental guidelines outlined in the EIA report.

In addition to the proponent, contractors, subcontractors, and construction supervisors will share collective responsibility in adhering to the mitigation measures proposed in the EMP. They will be required to undertake all activities in an environmentally responsible manner, including managing waste, controlling dust and noise, preventing water contamination, and ensuring occupational health and safety.

Regular environmental monitoring, reporting, and training programs will be part of the EMP implementation strategy to track compliance and respond to non-conformities. Periodic audits and inspections will ensure that all stakeholders remain accountable, and any deviation from the approved plan is immediately addressed through corrective measures. The EMP also ensures transparency and community engagement by encouraging communication with nearby communities and incorporating their concerns into the ongoing environmental management process.

6.7 ENVIRONMENTAL TECHNICAL ASSISTANCE AND TRAINING PLAN

To ensure effective implementation of the Environmental Management and Monitoring Program (EMMP), a well-structured Environmental Technical Assistance and Training Plan is essential. This plan is designed to build the environmental management capacity of all personnel involved in the project, including the proponent's team, engineers, contractors, site supervisors, and operational staff.

The primary aim of the plan is to provide technical knowledge, raise awareness, and develop the skills necessary to minimize environmental risks, ensure legal compliance, and foster a culture of environmental responsibility across all phases of the project from construction to operation.

6.7.1 Constructional Phase Training

During the **construction phase**, environmental training will be provided to all workers, site supervisors, engineers, and contractors to minimize environmental degradation and uphold

occupational health and safety standards. This training will include modules on environmental awareness, proper waste management, dust and noise control measures, water and soil conservation practices, and community interaction protocols. Special emphasis will be placed on the use of personal protective equipment (PPE), spill prevention, emergency response, and safe operation of construction machinery. These training sessions will be conducted through toolbox talks, on-site demonstrations, and multilingual visual aids, with an initial induction for new workers and monthly refresher courses. The training will be delivered by environmental consultants, HSE officers, and qualified third-party trainers where necessary.

6.7.2 Operational Phase Training

In the **operational phase**, the focus will shift towards maintaining environmental performance and ensuring sustainable operations. Staff involved in plant operations, maintenance, and administration will receive regular training on effluent treatment plant (ETP) operations, air emission monitoring, solid and hazardous waste management, energy and water conservation, and occupational health and safety. Special attention will be given to the monitoring of key environmental parameters such as BOD, COD, TSS, and stack emissions, alongside ensuring the correct handling of chemicals and the maintenance of emergency response procedures.

Training will also cover the importance of community engagement and corporate social responsibility (CSR) initiatives, particularly for staff residing on-site. These sessions will be conducted quarterly, with bi-annual refresher courses and additional training when new technologies or regulatory requirements are introduced. Each training session will be led by HSE\Project Manager with practical experience in industrial environmental management. Attendance will be mandatory, and training records will be maintained as part of the project's environmental documentation. By equipping the workforce with the necessary environmental skills and knowledge, this plan ensures that all aspects of the EMMP are properly understood and applied in daily operations, ultimately leading to sustainable and environmentally sound project execution.

6.8 ENVIRONMENTAL MITIGATION AND MONITORING PLAN (EMMP)

The Environmental Mitigation and Monitoring Plan (EMMP) forms a core element of the Environmental Management and Monitoring Program for the proposed construction of the CN

Pak (Private) Limited, beverage manufacturing unit. It is designed to proactively manage, monitor, and minimize environmental risks during the construction phase and ensure compliance with applicable environmental laws and standards.

The EMMP addresses key environmental concerns and provides a structured framework for implementing mitigation strategies alongside monitoring plans. The primary environmental aspects covered include:

- **Air Quality Management**
- **Noise Pollution Control**
- **Water Resource Protection**
- **Solid and Hazardous Waste Management**
- **Occupational Health and Safety (OHS)**

Each of these areas is described below with detailed mitigation measures and monitoring arrangements.

6.8.1 Air Quality Management

Potential Impacts:

Air emissions during construction may result from dust (during excavation, clearing, material handling), exhaust emissions from vehicles and machinery, and particulates generated during cement mixing and movement of materials. These emissions can adversely affect local air quality, posing risks to workers and neighbouring communities.

Mitigation Measures:

- Routine sprinkling of water to suppress dust on roads and construction surfaces.
- Covering raw materials such as sand, cement, and gravel during transportation and storage.

Monitoring Plan:

Table 6.3: Monitoring Plan for Air Quality Parameters

Parameter	Monitoring Method	Frequency	Responsibility
PM_{10}, $PM_{2.5}$	Ambient air sampling	Monthly	Environmental Consultant
CO, NO_2, SO_2	Air quality analysis	Monthly	Environmental Consultant

6.8.2 Noise Pollution Control

Potential Impacts:

Construction operations generate noise through heavy equipment, vehicle movement, and manual activities like drilling and cutting. Elevated noise levels can disturb local communities and impact worker health.

Mitigation Measures:

- Use of low-noise equipment where feasible.
- Construction restricted to daylight hours (8 AM to 6 PM).
- Noise barriers installed near sensitive receptors (schools, hospitals, residences).
- Regular servicing of machinery to limit excess noise.
- Use of ear protection for workers.

Monitoring Plan:

Table 6.4: Monitoring Plan for Noise Pollution Control

Source of Noise	Mitigation Measures	Responsible Person	Monitoring Frequency
Heavy Machinery Operation	Use of low-noise equipment and regular Noise levels (dB) measurements	Environmental Consultant	Weekly

Construction Activities	Restrict work to daytime hours (8 AM – 6 PM)	Project Manager	Daily
Worker Exposure	Provide earplugs/earmuffs to workers	Safety Officer	Weekly

6.8.3 Water Resource Protection

Potential Impacts: Construction activities can pollute surface and groundwater through runoff carrying sediments, oils, and chemicals. Concrete washouts and increased water consumption may further stress water resources.

Mitigation Measures:

- Installation of sedimentation ponds to filter stormwater.
- Designated washout areas for concrete equipment.
- Spill prevention via secure storage of oils/chemicals and provision of spill kits.
- Proper disposal of wastewater from worker facilities.

Monitoring Plan:

6.5: Monitoring Plan for Water Resource Quality

Parameter	Monitoring Method	Frequency	Responsibility
pH, TSS, BOD, COD	Laboratory water testing	Monthly	Environmental Consultant

6.8.4 Solid and Hazardous Waste Management

Potential Impacts:

Improper disposal of construction and hazardous waste (e.g., oils, batteries, paints) can cause soil and water contamination, and create unhygienic conditions.

Mitigation Measures:

- Waste segregation at source with labelled color-coded bins.
- Reuse/recycling of construction materials where possible.
- Disposal of hazardous waste through certified EPA vendors.
- Proper storage to avoid leaks and spills.

Monitoring Plan:

Table 6.6: Monitoring Plan for Solid and Hazardous Waste Management

Parameter	Monitoring Method	Frequency	Responsibility
Waste Handling & Disposal	Site inspections	Monthly	Contractor & Environmental Consultant

6.8.5 Occupational Health and Safety (OHS)

Potential Impacts:

Workers may be exposed to risks including falls, machinery-related injuries, dust inhalation, heat stress, and exposure to hazardous materials.

Mitigation Measures:

- Provision of essential PPE (helmets, gloves, boots, masks, earplugs).
- Safety induction and ongoing training for all workers.
- Readily available first-aid kits and firefighting equipment.
- Access to clean drinking water and shaded rest areas on site.

Monitoring Plan:

Table 6.7: Monitoring Plan for Occupational Health and Safety (OHS)

Hazard	Mitigation Measure	Responsible Person	Monitoring Frequency
Machinery related Injuries	Use of PPE, operator training, machine guarding	HSE Officer	Weekly
Falls from Height	Safety harnesses, edge protection, secure scaffolding	Site Supervisor	Weekly
Dust Inhalation	Dust masks, regular site watering	Safety Officer	Weekly
Heat Stress	Shaded rest areas, hydration stations, scheduled breaks	Site Supervisor	Daily
Noise Exposure	Use of earplugs/muffs, schedule rotation	HSE Officer	Monthly
Chemical Exposure	Proper PPE, labelled storage, spill kits available	Store In charge / Safety Officer	Monthly
Fire Hazards	Fire extinguishers, no-smoking signs, fire safety drills	HSE Manager	Quarterly
Emergency Situations	Emergency drills, signage, contact info display	Safety Officer	Quarterly

Responsibility for Implementation of EMP

The ultimate responsibility for implementing the Environmental Management Plan lies with the project proponent, **CN Pak (Pvt.) Ltd.** An experienced HSE/Project Manager will be appointed to serve as the Environmental Manager. This individual will oversee all compliance activities, coordinate with contractors, and ensure adherence to environmental quality standards and the National Environmental Quality Standards (NEQS).

Management Approach for EMP

Effective environmental management will be pursued through a collaborative and hierarchical approach, ensuring responsibility at all levels of the project. While overlaps in roles and checks may occur, they are purposefully built into the system to maintain stringent oversight and reinforce accountability. Regular environmental audits, contractor performance reviews, and stakeholder consultations will be key tools in this process.

6.9 SUMMARY OF IMPACTS AND MITIGATION MEASURES

Table 6.8: Summary of Impacts and Mitigation Measures

Environmental Aspect	Potential Impacts (Construction & Operational Phases)	Mitigation Measures (Applicable to Both Phases)
Project Location & Layout	• Site clearance affecting local vegetation and aesthetics • Poor spatial planning causing congestion or stormwater issues	• Minimal site disturbance • Preserve green areas • Proper drainage design • Buffer zones and boundary walls • Dedicated zones for loading/unloading and waste handling
Design & Infrastructure	• Inadequate infrastructure for waste, drainage, or safety during either phase	• Integrate ETP, safety exits, and bunded chemical storage • Adequate ventilation and fire safety systems • Ergonomic and hazard-free facility layout
Wastewater Management	• Improper disposal from camps or production • Ground/surface water contamination • Poor ETP performance	• Install and operate ETP in compliance with PEQS

		• Conduct monthly water quality tests (BOD, COD, pH, TSS) • ETP staff training and emergency backup system
Air Pollution	• Dust during excavation • Emissions from generators, trucks, and equipment	• Regular water sprinkling • Covered material transport • Stack emission controls • Use of low-emission fuels • Air quality monitoring (PM, SO_2, NOx)
Noise Pollution	• High decibel levels from machinery and vehicles • Health risks to workers and nuisance to nearby communities	• Use of noise-reducing equipment • Installation of sound barriers • Operational time restrictions • Routine noise monitoring • PPE (ear protection) for workers
Solid & Hazardous Waste	• Construction debris, packaging waste, chemical containers, used oil, and sludge	• Waste segregation and labelled storage • Recyclable material reuse • Safe disposal through EPA-certified vendors

		• Maintain waste disposal records
Occupational Health & Safety (OHS)	• Injuries, exposure to chemicals, slips/falls, heat stress, machinery accidents	• Mandatory PPE (helmets, gloves, boots, masks) • First aid and emergency response systems • Regular HSE training • Safety signage and mock drills
Water Consumption	• Excessive use during construction and production (cleaning, processing, utilities)	• Install flow restrictors • Reuse treated water in non-potable areas • Monitor daily consumption • Promote water-saving SOPs
Odor Management	• Odor from waste piles, stagnant water, or ETP-Public nuisance risk	• Frequent site cleaning • Covered sludge drying areas • Odor-neutralizing agents in ETP • Proper drainage to avoid stagnant water
Community Impact	• Disturbances due to noise, dust, or vehicle movement • Social complaints	• Community grievance redress system • Informative signboards • Engagement with locals through CSR programs

		• Regular liaison and feedback mechanisms
Fire & Explosion Risk	• Risk due to storage of flammable materials, short circuits, or machinery overheating	• Fire alarms and extinguishers • Isolation of chemical storage • Fire hydrants, emergency exits • Regular fire safety audits and drills

6.10 ENVIRONMENTAL MANAGEMENT PLAN FOR MANUFACTURING UNIT OF "CN PAK (PVT.) LIMITED"

Constructional Phase Plan

Table 6.9: Environmental Management Plan for Constructional Phase

Environmental Aspect	Potential Impacts	Mitigation Measures	Mitigation Activity	Frequency	Responsibility
Air Quality	Dust emissions from earthwork, transport, and materials	Water sprinkling Covered transportation Minimize exposed soil	Water sprinkling, install covers on trucks	Daily	Site Supervisor
Noise Pollution	Noise from heavy machinery and equipment	Limit work to daytime hours Use of silencers on machines PPE for workers	Equipment maintenance, restrict night work	Weekly	Site Engineer / Safety Officer

Soil Contamination	Leakage of fuel/lubricants, improper storage of materials	Bunded areas for fuel Proper storage and disposal of chemicals	Check for spills, maintain storage protocols	Weekly	HSE Officer
Water Quality	Contamination due to improper wastewater handling	Portable toilets No discharge into stormwater drains Safe septic tank usage	Monitor wastewater disposal	Weekly	Site Supervisor / HSE Officer
Solid Waste	Construction debris, packaging waste	On-site waste segregation Contracted collection and disposal	Place bins, remove waste to approved site	Twice Weekly	Contractor / Waste Management Vendor
Hazardous Waste	Waste oil, paints, solvents	Labelled containers- EPA-licensed disposal vendor	Maintain hazardous waste log	Weekly	HSE Officer
Health & Safety	Accidents, injury due to equipment, falls	PPE use- Safety signage	Toolbox talks, routine inspections	Daily	Safety Officer / Contractor

		First aid availability			
Traffic Disruption	Congestion and safety risks from construction vehicles	Define haul routes Avoid peak hours Trained drivers	Traffic management plan implementation	As Needed	Site Manager / Transport Supervisor
Resource Consumption	High use of water, electricity	Controlled water use Use energy-efficient tools	Monitor usage, optimize machinery use	Weekly	Site Supervisor
Cultural/Archaeological Resources	Potential damage if artifacts are discovered during excavation	Stop work immediately and inform relevant authorities	Awareness training for workers	As needed	Site Manager / Contractor

Operational Phase Plan

Table 6.10: Environmental Management Plan for Operational Phase

Environmental Aspects	Potential Impact	Mitigation Measures	Mitigation Activity	Frequency	Responsibility
Air Emissions	Dust generation from construction activities and material movement	Water sprinkling Use of dust screens and covered trucks	Spraying water, covering material stockpiles	Daily	Site Supervisor / Contractor
Noise Emissions	Machinery noise affecting workers and nearby receptors	Use of silencers Restrict high-noise activities to daytime PPE for workers	Maintain equipment, enforce noise time restrictions	Weekly	HSE Officer / Site Engineer
Wastewater	Runoff from site contaminating	Provide proper drainage	Setup septic tanks, ensure no	Weekly	Contractor / Plumbing Supervisor

	nearby soil or drains	Direct wash water to septic tank or soak pits	discharge to storm drains		
Solid Waste	Debris, packaging, and construction material waste	Segregate waste at source- Reuse recyclable material Proper disposal	Provide labelled bins, hire authorized waste contractor	Daily	Contractor / Waste Officer
Hazardous Materials	Fuel, oil spills, and chemical leakage	Store in bunded areas Use spill containment kits- Trained personnel	Regular inspection of storage areas	Weekly	HSE Officer
Occupational Safety	Risk of injury, fall hazards, and machinery-related incidents	Enforce use of PPE Safety training Warning signs Emergency kits	Safety toolbox talks, first aid checks	Daily / Weekly	Safety Officer / Contractor

Resource Use	Excess water, electricity, and raw material consumption	Install water-saving fixtures Use energy-efficient tools	Monitor and report resource usage	Weekly	Site Supervisor / Admin Officer
Vehicular Movement	Traffic congestion and accidents from material transport	Dedicated vehicle routes Use trained drivers Avoid peak hours	Mark routes, provide security supervision	As Needed	Site Manager / Transport Head
Soil Disturbance	Soil erosion, loss of topsoil due to excavation and stockpiling	Minimize area of disturbance Store topsoil separately for reuse	Barricade open excavations, store topsoil safely	Weekly	Civil Engineer / Contractor
Biodiversity	Possible disturbance to nearby flora/fauna	Avoid unnecessary vegetation clearance	Demarcate work zones, plantation program	Once / post-construction	Environmental Officer

		Restore native plantation post-activity			
Cultural Resources	Accidental damage to historical or cultural assets during excavation	Halt construction if artifacts found Notify authorities	Train workforce to report findings	As Needed	Site Supervisor

CHAPTER # 7

STAKEHOLDER'S CONSULTATION

7.1 INTRODUCTION

Stakeholder consultation is a critical part of the Environmental Impact Assessment (EIA) process for any project. For the proposed project by M/s CN Pak Pvt. Limited, a series of consultations were held with various stakeholders from the local community, government agencies, and other relevant groups to gather their feedback on the project's potential social, economic, and environmental impacts. The consultations aimed to provide a platform for stakeholders to voice their concerns, suggestions, and expectations regarding the project.

7.2 METHODOLOGY OF CONSULTATION OF M/S CN PAK (PRIVATE) LIMITED

The EIA team conducted public consultations through group meetings and individual discussions. A Comprehensive questionnaire was developed in order to conduct the survey. The primary focus was to engage local communities and gather their perspectives on the proposed construction of the Beverage manufacturing unit, its potential benefits, and any concerns related to environmental impacts. The consultations targeted stakeholders including local residents, government officials, and business owners from the surrounding area. Public discussions were held at various locations near the project site, and stakeholders from local communities, educational and health institutions, shops, and other facilities were consulted. The team also made initial visits to the project site and held reconnaissance meetings to understand the local context better.

7.3 STAKEHOLDER IDENTIFICATION

A three-tier approach was adopted for stakeholder identification, which considered the various levels at which stakeholders could be impacted by the project. The stakeholders were classified at the provincial level (e.g., Environmental Protection Agency (EPA), Agriculture Department, Wildlife Department), district level (e.g., local government bodies), and village level (e.g., local residents, shopkeepers, school representatives, etc.). The consultations continued throughout

the project lifecycle, ensuring that feedback was integrated into the environmental management plan. Regular engagement with these stakeholders is crucial to maintain transparency and responsiveness to their concerns.

7.4 PROPONENT'S ENVIRONMENTAL MANAGEMENT TEAM

M/s CN Pak (Pvt.) Limited management assured that all necessary mitigation measures would be implemented to minimize any potential environmental impacts during the construction and operation phases of the project. The proponent's Environmental Management Team will oversee the adoption of these measures, including maintaining the aesthetics of the area and addressing concerns related to environmental degradation.

7.5 RESPONSIBILE AUTHORITY

The responsibility for overseeing the implementation of the proposed mitigation measures lies with the management of M/s CN Pak (Pvt.) Limited. The company is committed to adhering to all environmental regulations and ensuring that the project's impact on the surrounding community and the environment is minimized.

7.6 OTHER DEPARTMENTS AND AGENCIES

For the impact analysis, detailed meetings were held with local community leaders, educational institutions, health facilities, and NGOs. These discussions helped identify key issues related to the project and its potential effects. All relevant concerns were incorporated into the Environmental Management Plan to ensure a holistic approach to mitigating the project's impacts.

7.7 ENVIRONMENTAL PRACTITIONER AND EXPERT

The team of environmental consultants conducted site visits and consultations with stakeholders from nearby villages. They gathered information on the socio-economic impacts of the project and incorporated feedback from different professionals, including local business owners, farmers, teachers, and health professionals. The consultations with women were also conducted, although some hesitated to provide personal information due to social constraints.

7.8 AFFECTED AND WIDER COMMUNITY

No specific community was found to be directly affected by the project within the study area. The consultations with the local population revealed a general positive response toward the

project. Stakeholders emphasized that the project could bring tangible benefits, such as job creation and local development, while ensuring that mitigation measures were taken to preserve the environment.

7.9 CONSULTATION FINDINGS

The results from the consultation meetings with stakeholders indicate a strong overall support for the project. The local community members expressed positive feedback regarding the project's potential to bring socio-economic benefits to the area, particularly in terms of employment opportunities and business growth. Many respondents felt that the construction of the project would improve the local infrastructure, contribute to social mobility, and increase the importance of the area.

However, there were also concerns raised regarding the potential environmental impacts, especially in relation to the potential effects on the area's aesthetic value and the environment. Some participants were worried about the impact on the scenic beauty of the area, but the project proponents assured that mitigation measures, such as land reclamation and maintaining the aesthetics of the area, would be implemented to address these concerns.

7.10 STAKEHOLDER FEEDBACK

The responses from stakeholders, summarized below, provide a more detailed picture of their views:

7.10.1 Sample Size

15 sample size was selected by the Team of consultants for conducting the socioeconomic survey. Women were also consulted for the said survey; some of their names are mentioned in the above list of respondents while most of them were not willing to give personal information.

7.10.2 Statistical Analysis

Two Different statistical software excel and SPSS have been used for the statistical analysis of the data collected during the visit of study site villages through questionnaires.

7.10.3 Results and Discussion

Gender

The consultations involved 15 respondents, including both male and female participants.

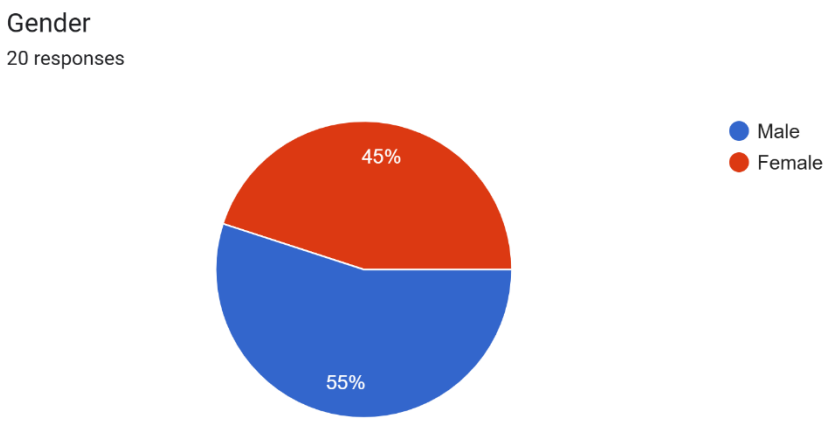

Figure 1: Gender of the Respondents

Project Support and Importance

The majority of the respondents, both male and female, expressed strong support for the proposed project. Most agreed that the construction of the facility would increase the importance of the area, contributing to its overall growth and development. Participants were optimistic about the project's potential to raise the profile of the local community and enhance its standing within the region. The support for the project reflected a shared belief that it would bring significant benefits to the community.

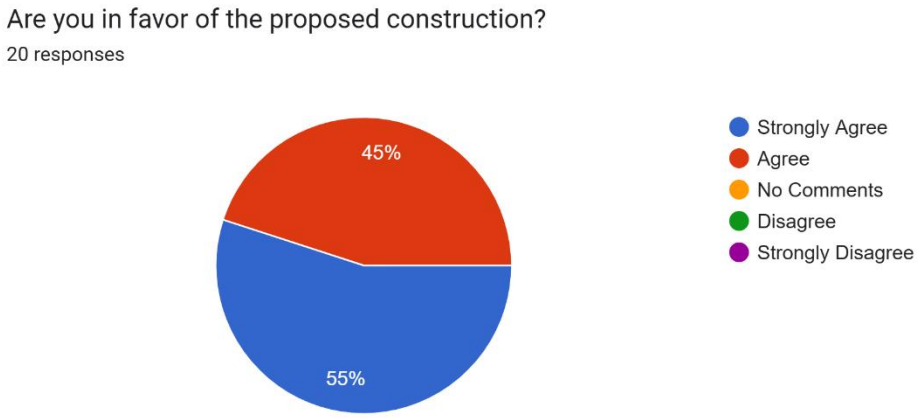

Figure 2: Respondents in favour of the Project

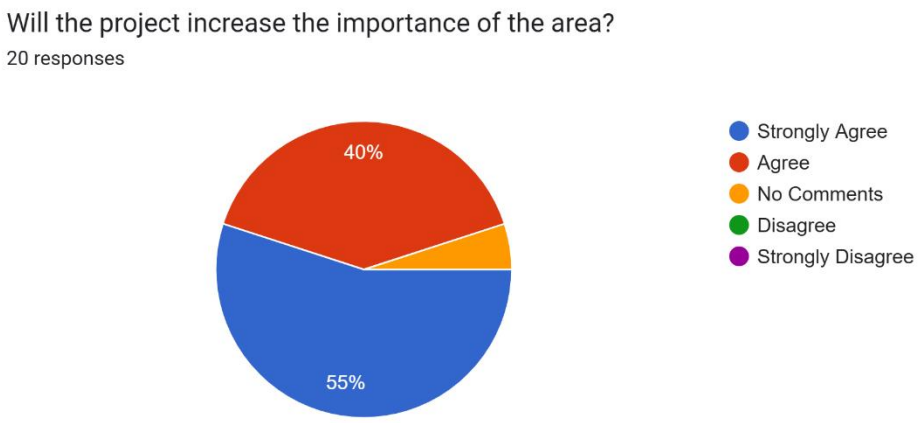

Figure 3: Respondents' Views on the Impact of the Project on the Importance of the Area

Improvement of Living Standards

While many respondents believed that the project would improve the living standards of the area, a few raised concerns. Approximately, respondents strongly agreed or agreed that the project would result in better infrastructure, more employment opportunities, and improved services, which could enhance the overall quality of life. However, individuals disagreed, possibly due to concerns over potential negative environmental impacts or uncertainties about the project's long-term benefits. Despite these reservations, the majority of the community seemed confident that the project would lead to better economic prospects.

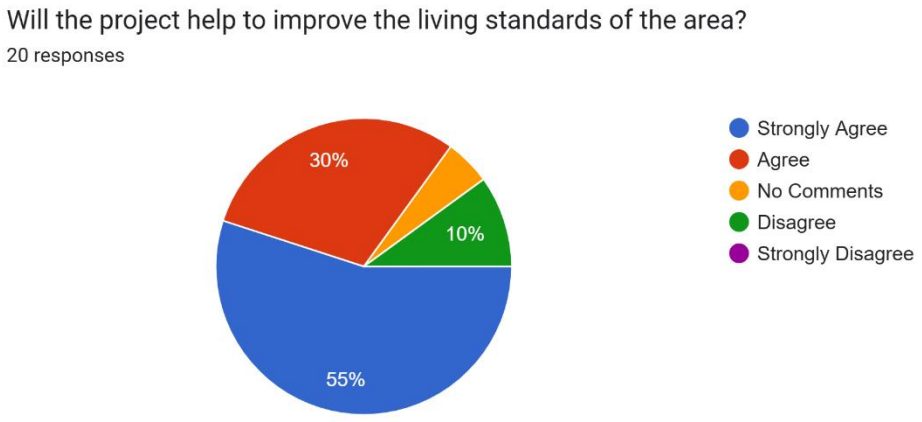

Figure 4: Respondents' Views on the Impact of the Project on the living standards of Area

Environmental Impact Concerns

When asked about the environmental impact of the project, responses were varied. 14 respondents strongly disagreed and few disagreed that the project would have any negative effect on the environment, few showed concern regarding its potential to disrupt area's aesthetic value. 2 responders were neutral and given no comments.

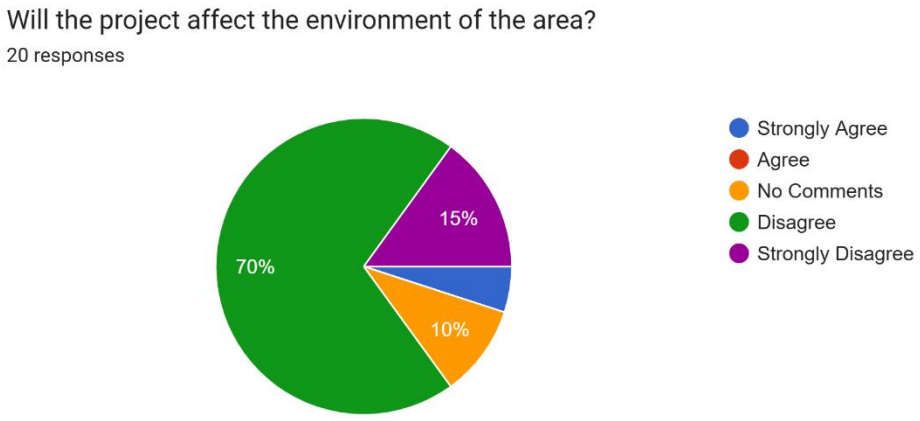

Figure 5: Respondents' Views on the Impact of the Project on the Environment of Area

Satisfaction with the Project

In terms of satisfaction, a substantial number of participants expressed their contentment with the project and its potential benefits. 18 respondents indicated their approval, citing the job creation and economic growth the project would bring. Their positive outlook on the project reflected their anticipation of tangible improvements in their community. However, 2 individuals, were neutral regarding the project satisfaction.

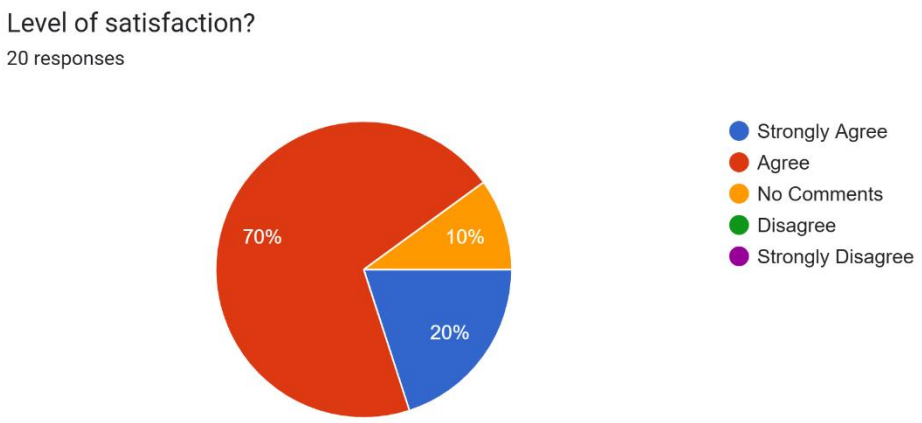

Figure 6: Respondents' Level of Satisfaction Regarding the Proposed Project

Conclusion

The stakeholder consultation process for the M/s CN Pak Pvt. Limited project demonstrated strong support for the initiative from the local community, with a clear recognition of its potential to boost the area's economic development. While environmental concerns were noted, the project proponents have committed to implementing mitigation measures to address these issues and maintain local aesthetic and environmental values. Continuous engagement with stakeholders throughout the project's lifecycle is crucial to ensure that any emerging concerns are promptly addressed.

CHAPTER # 8

Conclusion and Recommendations

8.1 Conclusion

The Environmental Impact Assessment conducted for the proposed construction of Beverage Manufacturing unit and installation of ETP at Plot no. 22, 23 and 23-A, Multan Industrial Estate, Ph 1, Multan has provided a comprehensive evaluation of the potential environmental, ecological, and socioeconomic impacts associated with the project. The study has assessed baseline conditions, identified key environmental sensitivities, and analysed the probable impacts during design, construction, and operational phases.

Overall, the findings indicate that while the project has the potential to cause environmental impacts such as air emissions, wastewater generation, noise pollution, and waste production, these impacts can be effectively mitigated through the implementation of a robust Environmental Management Plan (EMP). The project site's location within an established industrial estate minimizes risks to sensitive ecological and residential areas, and existing infrastructure supports the development with manageable environmental pressures.

The project is expected to bring significant economic benefits, including job creation, technological advancement in Beverage manufacturing, and contribution to local and national healthcare sectors. The socioeconomic environment will benefit from improved employment opportunities and community development initiatives integrated as part of the corporate social responsibility efforts.

The baseline environmental data collected confirms that the site is suitable for the proposed beverage manufacturing unit, provided that strict adherence to recommended mitigation measures and monitoring protocols is maintained. The designed rainwater harvesting system and waste management facilities will further enhance environmental sustainability by reducing resource consumption and minimizing pollution.

In conclusion, with the proposed mitigation and management strategies, the project can proceed without causing significant adverse environmental effects, ensuring sustainable development and regulatory compliance.

8.2 Recommendations

To ensure the continued protection of the environment and maximize the positive outcomes of the project, the following recommendations are proposed:

1. **Strict Implementation of the EMP:** All mitigation measures outlined in the EMP must be enforced rigorously throughout the design, construction, and operational phases. Regular training, supervision, and audits should be conducted to ensure compliance and effectiveness.

2. **Continuous Environmental Monitoring:** Establish a comprehensive environmental monitoring program as detailed in the report, with regular reporting to relevant regulatory authorities. Early detection of any environmental deviations should prompt timely corrective actions.

3. **Stakeholder Engagement**: Maintain open communication channels with local communities, regulatory agencies, and other stakeholders. Address any concerns proactively and incorporate feedback into project management to foster goodwill and social license to operate.

4. **Waste Management Optimization**: Prioritize waste minimization, segregation, and recycling practices. Hazardous waste generated from beverage manufacturing processes should be handled by licensed contractors in accordance with environmental regulations to prevent contamination.

5. **Water Resource Conservation:** Maximize the use of the rainwater harvesting system and implement water-saving technologies to reduce freshwater consumption and minimize wastewater discharge.

6. **Emergency Preparedness:** Develop and maintain an environmental emergency response plan to address accidental spills, leaks, or other unforeseen environmental incidents promptly and effectively.

7. **Periodic EMP Review and Updates:** Conduct annual reviews of the EMP to evaluate its performance and integrate new technological advancements or regulatory changes, ensuring continual improvement of environmental management practices.

8. **Capacity Building:** Invest in ongoing training and capacity-building programs for staff and contractors to maintain high levels of environmental awareness and competence.

By adopting these recommendations, M/s CN Pak (Pvt.) Limited will not only comply with environmental legislation but also demonstrate commitment to sustainable industrial development and corporate environmental responsibility.