

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)



CONSTRUCTION OF COCA COLA GREENFIELD WAREHOUSE & ALLIED FACILITES AT SUNDAR GREEN SPECIAL ECONOMIC ZONE LAHORE

January 2026



The Coca Cola Export Corporation

**Plot A1-A7 Special Economic Zone, Manga Raiwind
Road, Lahore**

Executive summary

Business today is continuously under pressure from Economic, social & environmental factors and last but not the least is the overall impact due to post Covid-19. The challenge is to align and balance with planned growth, while maintaining a lead in environmental and social initiatives. Success will bring great happiness along with the pride that comes with the vigilant stewardship of today's assets for the benefit of future destination plans.

Coca Cola is one of the most recognized soft drink brands in the world. The original recipe for the drink, which has been altered over the years, was created by John Pemberton at the Eagle Drug & Chemical Company in Columbus, GA. Created during the Prohibition to be a nonalcoholic alternative as coca wine, which was sold in pharmacies and touted as a cure-all and an ideal morphine replacement. The most impactful decade for Coke was the 1980's, whose success was catapulted by iconic marketing and a new drink recipe, unfortunately the new recipe was not well received and Coke released a variation of the old recipe Coca Cola Classic, this is the recipe that exists today.

World of Coca-Cola has achieved official "green" status as an environmentally friendly building, and was awarded a "Gold" rating by the U.S. Green Building Council (USGBC).

World of Coca-Cola adheres to the USGBC's standards for Leadership in Energy and Environmental Design (LEED), which encourages development of "high-performance, sustainable buildings" through an emphasis on energy and water efficiency, recycling, reuse of resources and waste reduction. It is one of a growing group of buildings in the state of Georgia to achieve LEED certification.



KORE is the framework of governance and management system in the Coca-Cola system which enables sustainable performance, meets customer and consumer demands, drives continuous improvement, manages risk and enhances the Company's reputation. Some of the benefits it provides are:

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- KORE provides a management system foundation that combines discipline toward producing the highest quality product while allowing flexibility to achieve global implementation.
- KORE brings an increased focus to the area of Food Safety and encourages alignment with the highest international manufacturing standards while recognizing the need to meet applicable government, legal and local regulations.
- KORE enforces necessary requirements to ensure product integrity and quality and to protect our trademark while supporting strategies toward our 2020 Vision.
- KORE enforces requirements not only to protect our products, but also to ensure the safety and well-being of our associates and partners and to be environmentally responsible.
- KORE is designed to create a dialogue of honest information sharing between the Company and our stakeholders.

During the past 20 years, The Coca-Cola Company has kept ahead of emerging trends by developing Quality, Environment and Occupational Safety & Health requirements. These requirements are developed to exceed ISO 9001:2000, ISO 22000:2005 standards. As Company grew globally, new standards evolved with it, but the management system at TCCEC became too centralized and inflexible. All the operations needed the ability to locally customize global requirements. In order to protect the trademark, it is required a revolution in system to suit a changing world with changing expectations.

Coca-Cola was introduced in Pakistan in 1953, when it set up a branch office in Lahore. Coca-Cola was the flagship product and the first product was launched in six-and-a-half ounce returnable glass bottles. Franchise bottling operations were initiated and plants of different capacities were set up in various cities across the country.

The Concentrate Plant, Lahore - Pakistan was established in 1954 which is 100% subsidiary of The Coca-Cola Company, Atlanta, USA. The TCCEC, LAHORE was established for the purpose of manufacturing and supplying of Concentrate and Beverage Bases to the bottlers of The Coca-Cola Company in Pakistan and other neighbouring countries like Afghanistan, etc. or any other destinations as authorized by The Coca-Cola Company.



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The manufacturing activities started on June 1954. For production of the Coca-Cola, the current permanent facility was inaugurated in February 1954 for production of Coca Cola. The facility was initially designed for a capacity for 60,000 SU per annum. This is now expanded to 300,000 SU per annum

Fanta Orange was the second product introduced in 1965 followed by Sprite in 1972. By 1996, 10 bottling plants were being managed and run by the local business partners' (bottlers) under franchise agreements. The partners were responsible for distribution and sales of the company's products into the specified areas assigned to each bottler.

The market shares and product quality was deteriorating substantially under the local business partners, so The Company decided to move away from the franchise system by acquiring all operations in Pakistan. The objective behind this initiative was to build leadership in the market place and enhancing the quality image. Consequently, a separate concentrate plant was established at Pajian, 33 Km Raiwind Lahore in 2009. The capacity of this plant is 1.5 MM Standard Unit. The quality standards of coke have been widely appreciated and accepted by the consumer market of Pakistan. Due to the development of the business in the region TCCEC has decided to set up an auxiliary of the concentrate plant.

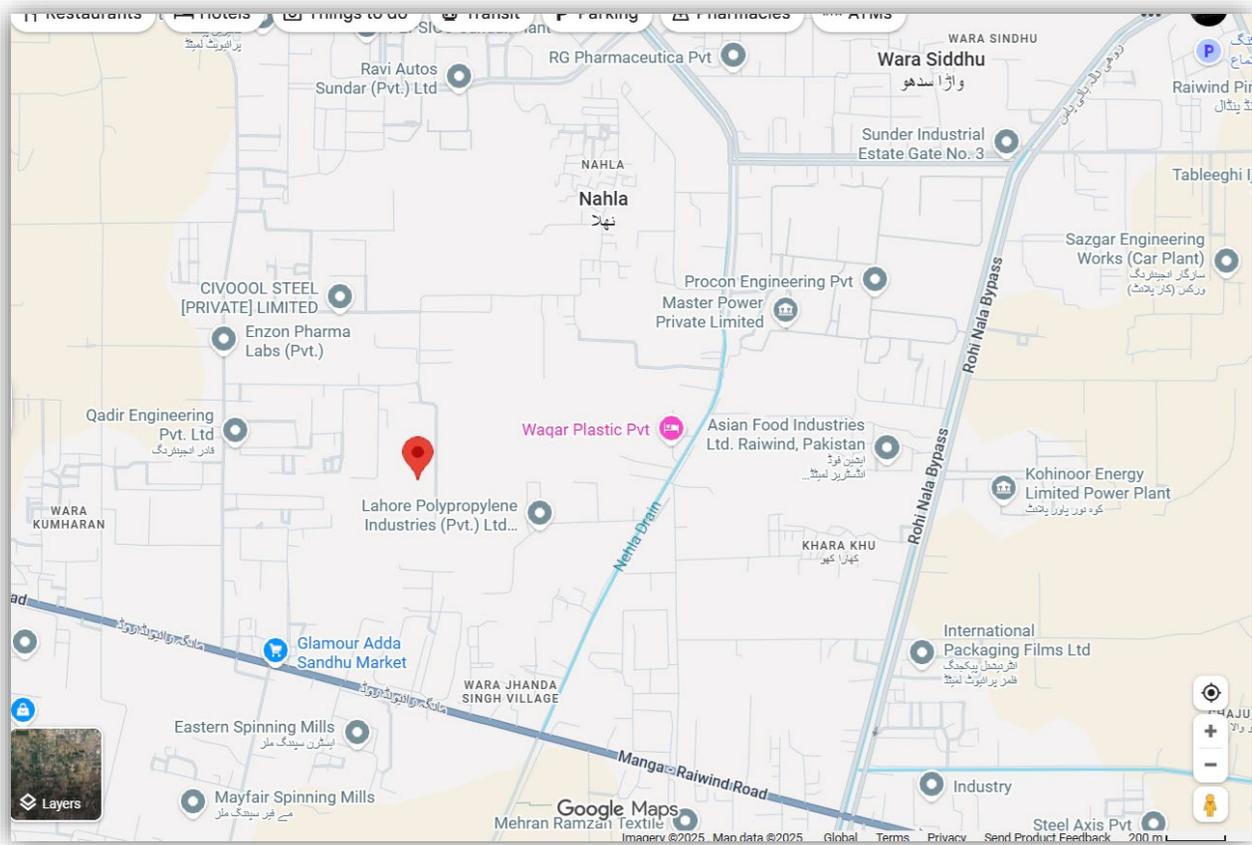
Care Purchasing Services (CPS) is partner with Coca-Cola Company, a world's leading owner and marketer of non-alcoholic beverage brands and the world's largest manufacturer, distributor and marketer of concentrates and syrups used to produce non-alcoholic beverages. Coca-Cola owns or licenses and markets more than 500 non-alcoholic beverage brands, primarily sparkling beverages, and a variety of still beverages such as waters, enhanced waters, juices, juice drinks, ready-to-drink teas, coffees, and energy and sports drinks. The Coca Cola Export Corporation CPS Lahore plant produces 1.5 MM Standard units (SU) concentrate It is operational in Pajian, Raiwind Road, Lahore. The growth of Pakistan population has encouraged the TCCEC to expand its capacity though construction of a of green field new plant at Special Economic Zone (SEZ) which is named as Sunder Green Fields.



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Title, Location and Cost of the Project

Construction of coca cola greenfield warehouse & allied facilities at sundar green special economic zone, Lahore is the title of the project. located at Plot A1-A7 Special Economic Zone, Nahla village, Manga Raiwind Road, Lahore with 113853 Sq. ft covered area The proposed new project of CPS located at Special Economic Zone Namely Sunder Green near Sunder Industrial Zone, Sunder-Raiwind Lahore. The project land is about 24 acre which includes construction/installation of new green field plant. The cost of the project is estimated to an amount of Rupees 3.0 billion PRS which comprises of construction of hall, purchase of equipment and machinery and its installation.



Name of the proponent

Name: Ejaz ul Haq
 Designation in TCCEC: Plant General Manager
 Contact information: Email: eulhaq@coca-cola.com
 Cell: 0301-2258335



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Name of the Consultancy

Sustainable Environmental Solutions (SES) Team comprising of professionally competent staff have prepared the report.

Address: House # 476, F2 block, Johar Town, Lahore,

Ph, office# 0301-4211409

E-mail: sustenvsol@gmail.com

The following team carried out the EIA:

- Mr. Muhammad Farooq Alam, Director (Rtd), EPA, Team Lead
- Usman ul Haq, Senior Environmentalist
- Shafqat Saeed Farooqi, Senior environmentalist
- Mr. Syed Ejaz Hussain Naqvi, Environmental and safety officer,
- Eng. Afnan Farooq, Chief Executive, SES
- Salahuddin, field officer.

Brief outline of the proposal

The Coca Cola Export Corporation (TCCEC) Lahore as the proponent of the project has planned to construct a new green field plant for raw material storage and dry processing of the concentrate. It has capacity to handle ~12 MT per annum

Mineral salts are the raw materials used to form the same quantity of concentrate and base. The cost of the proposed project is 3.0 billion PKR. The proposed project involves only construction/installation of new hall with pre - fabricated material and installing the storage and processing of the raw materials.

Based on successful completion and operation of the existing plant at Pajjian, this green field plant has been planned to be constructed.

The purpose of this project is primarily to increase the capacity of Concentrate in Pakistan while complying the EPA environmental guidelines and rules as well as KORE standards. The covered area (113853 Sq. ft) is marked in the layout map of the project site.



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It will enhance the capacity of concentrate of coke and Dasani production for Pakistan and other regional countries like Afghanistan. It will benefit the proponent in the following manners:

- Increase the production capacity of coke in Pakistan
- Make plant & processes compliant to KORE Standards
- Compliant to EPA rules, regulations and PEQS.
- Allow handling of increased production volumes

Further, it is expected to serve as Standardized quality warehouse complying with KORE standards.

The mineral salts will be used to form base and concentrate for coca cola export corporation at this facility.

The major impacts and Mitigation measures

The project is basically storage of raw materials, dry process therefore no significant environmental impact is foreseen. The main impact is construction phase where environment, safety and health issues may be significant. The proper environmental mitigation and management plan of the coca cola export corporation identifies and rectifies these issues. The same are made part of the EIA report.

The major and irreversible impact of this project is change in land use which is irreversible. From the agriculture land use to industrial production will be the main shift. The EIA report identifies and suggests the mitigation measure to reduce this impact.

The environmental protection has been included in the planning stage of the project. Environmentally friendly materials and designs have been adopted. The latest technologies have been adopted for this plant. Green areas within the plant is the main feature of the project.

The other environmental issues include the generation of municipal waste water from the offices which will be treated in the prefabricated waste water treatment plant. The treated waste water will be reused and if spare will be disposed into the drain / sewerage of SEZ, Sunder.



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Total water requirement is estimated to be 1500 gallon per day which include, municipal and process usage. The water will be taken from underground, rain water harvesting and sewerage treated water. Package type water treatment system for treating estimated sewerage of 10-15 gallons per day. It will reduce the BOD and COD level below the 80 and 150 ppm as permitted in the PEQS. The waste water will be reused for washing and hygienic purposes. If exceed the usage, will be disposed off in SEZ drains.

Operation phase

Industrialization has been widely regarded as a sustainable construction method in terms of its environmental friendliness. And Coca-Cola company consider it as a fundamental responsibility to uphold its role in ensuring a healthy and sustainable environment. This belief is part of their policy applies across the Coca-Cola system therefore PEB is chosen for solving new warehouse requirement. From the sustainability point of view, the advantages from the use of PEB is in fact related to a greater control of quality in the production phase, less waste of material in factory and on site, higher speed in the construction phase. The consequences include the improvement of profitability and productivity for contractors, the increase of guarantees on product final quality for buyers and consumers, the reduction of resources employment and of general investments finalized to the building construction, less impact on the environment during on site works.

According to the scheme of environmental evaluation by the European Program Euro House (Long 1999) the consequential benefits from the employment of prefabricated system are:

- From 30 to 60% in the reduction of times on site through a more efficient coordination of the different construction packages;
- The reduction of 50% of water quantity in comparison to a traditional construction;
- 50 reduction% of the quantity of material utilized and produced by excavations;
- Wider use of recycled materials (like timber, steel, aluminum, etc.);
- Up to 80% in the reduction of waste materials during on site works;
- Up to 60% in the reduction of co2 emissions and of annual energy consumes during building life cycle;
- Possible reutilization and reuse of prefabricated elements.



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The raising of prefabrication is mainly addressed to the diffusion of structural building systems. The production of prefabricated components is in an on-site factory-based activity, where the working conditions are controlled for its environmental impacts, and are relatively independent of on-site activities. Raw materials are the composition of the industrialized building structure itself, which is not considered in the environmental impact.

Characteristics of Prefabricated Building

Compared with traditional methods of site-based construction, industrialized building has brought out many changes, including the construction process and output performance. The characteristics of industrialized buildings is a key precondition step to identify impact factors, which can be summarized as follows:

- (i) Transportation from an off-site factory to the construction site; Prefabricated logistics requiring heavy transport to be used in shipping. Generally, the construction stage was divided into three sub-processes, including material manufacturing, transportation, and on-site construction work. However, in this type of buildings construction stage is divided into transportation of components, stacking, assembling and the cast-in-place.
- (ii) Stacking Stage; this stage involves stacking up all the components to be used on site during assembly stage
- (iii) Assembling Stage; Assembling work is a complex and systematic activity impacting directly on the construction environment in such areas as power consumption, solid waste generation, machine wear, noise pollution, and the safety of workers. All these impacts will be addressed on site as a complete EMP and KORE are in place to handle all management, environmental and safety issues. Details are provided in EMP chapter of this report.

Proposed monitoring

At coke, monthly monitoring is part of the KORE management plan. Monthly monitoring of wastewater, treated water and air emissions will be done on regular bases. All the reports will be uploaded by the EPA certified laboratory and submitted to EPA Lahore office for verification and the for record. These reports will be reviewed by the concerned bodies at Coke.



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and there will be no addition of any new process in new building except the approval of the EPA. EPA carries out its own monitoring from time to time through sampling of air and waste water. It will help to maintain the treatment systems as per environmental practices.

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ACRONYMS

M/S	Messer
ISO	International Organization for Standardization
IDA	Initial depreciation allowance
TCCEC	The Coca-Cola Export Corporation
CPS	Commercial Products Supply
IBC's	Intermediate Bulk Containers
MSDS	Material Safety Data Sheet
SKU's	Stock Keeping Units
ETQ	Excellence Through Quality
HMI	Human Machine Interface
MHE's	Material Handling Equipment
ESLP	Environment Safety and Loss Prevention
(CCI)	Council of Common Interests
(ECC)	Economic Coordination Committee
PEQS	Punjab Environmental Quality standards
PEQSAA	Punjab Environmental Quality standards for Ambient Air
NSDWQ	National Standards for Drinking Water Quality
PEQSN	Punjab Environmental Quality standards for Noise
PEPA)	Pakistan Environmental Protection Act
Ppm	Parts per million
HSE	Health, Safety and Environment
ID	Initial depreciation allowance
EUAD	Environment and Urban Affairs Division
IUCN	International Union for Conservation of Nature
PPC	Pakistan Penal Code
RAP	Resettlement Action Plan
WWF	World Wide Fund for Nature
CITS	Convention of International trade Endangered Species
SRT	Salt Range Thrust
GHG	Greenhouse Gas

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AEM	Air Emission Modeling
CFB	Circulating Fluidized Bed
USA	United States of America
BOD5	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
pH	Pressure of Hydrogen
ESS	Environmental and Social Soundness
SSS	Special Status Species
SMART	Self-Monitoring and Reporting by Industry
PEPC	Punjab Environmental Protection Council
MOU	Memorandum of Understanding
BOP	Balance of Plant
CEO	Chief Executive Officer
CITES	Convention of International Trade Endangered Species
EA	Environmental Approval
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMP	Environmental Monitoring Plan
EPA	Environmental Protection Agency
EPO	Environmental Protection Order
GOP	Government of Pakistan
IEE	Initial Environmental Examination
IPPs	Independent Power Projects
IUCN	International Union for Conservation of Nature
LAA	Land Acquisition Act
MoE	Ministry of Environment
NCS	National Conservation Strategy
NEPRA	National Electric Power Regulatory Authority
PEQS	National Environment Quality Standard
NGO	Non-Government organization
NOC	No-Objection Certificate

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OFA	Over Fire Air
P&D	Planning and Development
Pak- EPA	Pakistan Environmental Protection Agency
Pak-EPC	Pakistan Environmental Protection Council
PC	Public Consultation
PCSIR	Pakistan Council of Scientific and Industrial Research
PEPA	Pakistan Environmental Protection Act
PEPC	Punjab Environmental Protection Council
PM	Particulate Matter
POPs	Parenting Organic Pollutants
Punjab EPA	Punjab Environmental Protection Agency
PEP(A)A	Punjab Environmental Protection (Amendment) Act
RAP	Resettlement Action Plan
TES	Threatened, Endangered and Special Status Species
UET	University of Engineering and Technology
WAPDA	Water and Power Development Authority

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Chapter One: Introduction

1.1 General

The Coca-Cola Export Corporation is an American multinational beverage corporation incorporated under Delaware's General Corporation Law and headquartered in Atlanta, Georgia. The Coca-Cola Company has interests in the manufacturing, retailing, and marketing of nonalcoholic beverage concentrates and syrups. The company produces Coca-Cola, invented in 1886 by pharmacist John Stith Pemberton. In 1889, the formula and brand were sold for \$2,300 to Asa Griggs Candler, who incorporated The Coca-Cola Company in Atlanta in 1892.

The Coca-Cola Company originally marketed as a temperance drink and intended as a patent medicine, it was invented in the late 19th century by John Stith Pemberton and was bought out by businessman Asa Griggs Candler, whose marketing tactics led



Coca-Cola to its dominance of the world soft-drink market throughout the 20th century. The drink's name refers to two of its original ingredients: coca leaves, and kola nuts (a source of caffeine). The current formula of Coca-Cola remains a trade secret; however, a variety of reported recipes and experimental recreations have been published.

The Coca-Cola Company produces concentrate, which is then sold to licensed Coca-Cola bottlers throughout the world. The bottlers, who hold exclusive territory contracts with the company, produce the finished product in cans and bottles from the concentrate, in combination with filtered water and sweeteners. A typical 12-US-fluid-ounce (350 ml) can contains 38 grams (1.3 oz) of sugar (usually in the form of high-fructose corn syrup). The bottlers then sell, distribute, and merchandise Coca-Cola to retail stores, restaurants, and vending machines throughout the world. The Coca-Cola Company also sells concentrate for soda fountains of major restaurants and foodservice distributors.



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Based on Interbrand's "best global brand" study of 2015, Coca-Cola was the world's third most valuable brand, after Apple and Google. In 2013, Coke products were sold in over 200 countries worldwide, with consumers drinking more than 1.8 billion company beverage servings each day. Coca-Cola ranked No. 87 in the 2018 Fortune 500 list of the largest United States corporations by total revenue.

Soon after the country's independence in 1947, Coca-Cola came to Pakistan in 1953. The Coca-Cola Company has been operating in Pakistan for over 60 years under the license of The Coca-Cola Export Corporation, Pakistan Branch (TCCEC-PB) which is headquartered in Lahore.

The company has operated a franchised distribution system since 1889. The Company largely produces syrup concentrate, which is then sold to various bottlers throughout the world who hold exclusive territories. The company owns its anchor bottler in North America, Coca-Cola Refreshments.



The Coca-Cola Company has on occasion introduced other cola drinks under the Coke name. The most common of these is Diet Coke, along with others including Caffeine-Free Coca-Cola, Diet Coke Caffeine-Free, Coca-Cola Zero Sugar, Coca-Cola Cherry, Coca-Cola Vanilla, and special versions with lemon, lime, and coffee. Coca-Cola was called Coca-Cola Classic from July 1985 to 2009, to distinguish it from "New Coke".

1.2 History of Coca-Cola in Pakistan

Soon after the country's independence in 1947, Coca-Cola came to Pakistan in 1953. The Coca-Cola Company has been operating in Pakistan for over 60 years under the license of The Coca-Cola Export Corporation, Pakistan Branch (TCCEC-PB) which



TCCEC Environmental Impact Assessment Report (EIA) for new green field plant is headquartered in Lahore. The first plant was opened in Karachi and others major cities followed.

The Concentrate Plant, Lahore - Pakistan was established in 1954 which is 100% subsidiary of The Coca-Cola Company, Atlanta, USA. The TCCEC, LAHORE was established for the purpose of manufacturing and supplying of Concentrate and Beverage Bases to the bottlers of The Coca-Cola Company in Pakistan. The plant is currently manufacturing concentrate based on licensed formulation which cannot under terms of licensing be disclosed to a third party. Therefore, the concentrate manufacturing is done by mixing the recipe ingredients that are sent by the Coca Cola Export Corporation in described ration to make the same taste and quality.

The Coca-Cola Export Corporation Pakistan has a strong system of managing processes and controls, which will be applied to the proposed project as well. The concentrated plant has the capacity of producing 500,000 SU per annum. New green field proposed project is to increase this capacity in Pakistan.

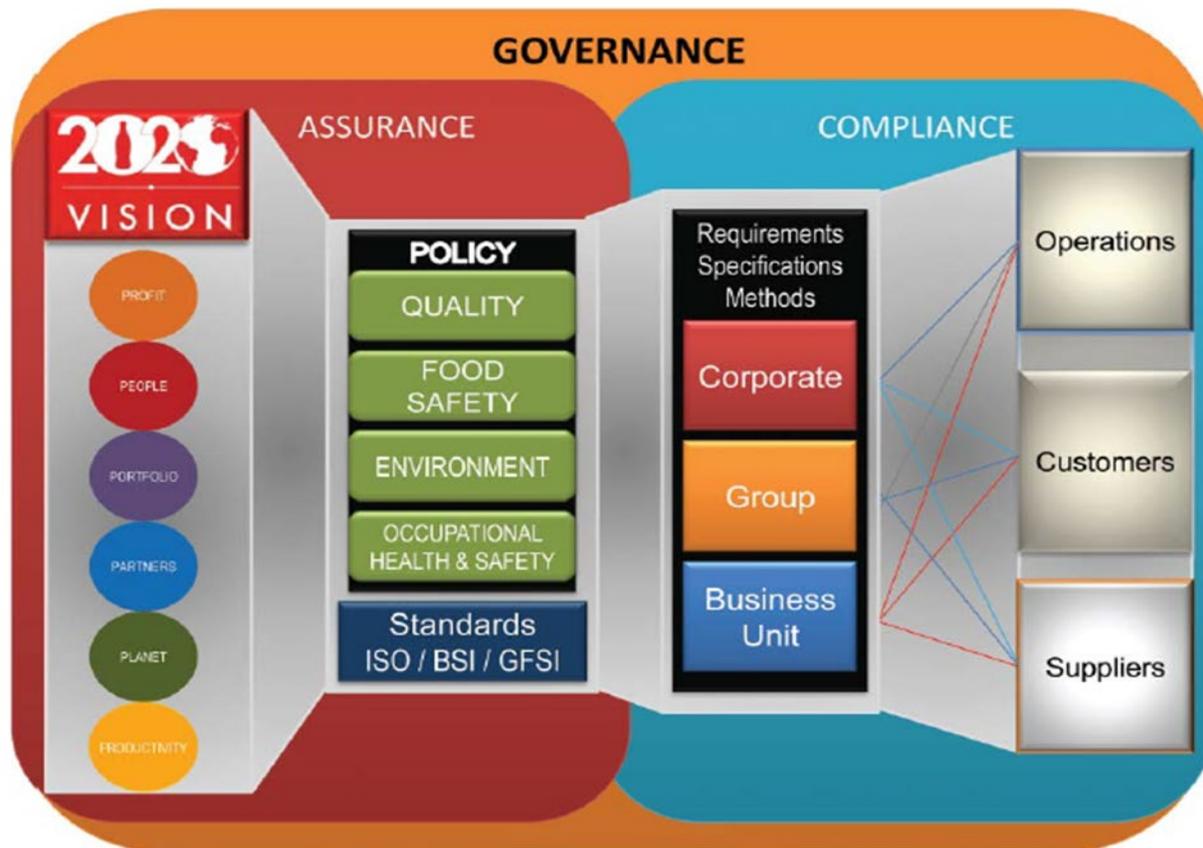
1.3 What is KORE (Coca-Cola Operating Requirements)

In response to the changing needs and expectations of users, customers and stakeholders, a cross-functional and cross-geographical team of TCCEC developed a framework and management system model to replace their previous model known as The Coca-Cola Management System (TCCMS). The new KORE operating requirements focus on quality and sustainability to meet current and future stakeholder demands. Following the development of the new framework, a clear execution plan was created to inspire people within the organization to achieve The Coca-Cola Company's 2020 Vision.



This model builds a management system that links manufacturing operations, customers and suppliers to the processes and documentation they need.





KORE offers assurance in quality, food safety, environment and occupational safety & health through four top-level policies that provide direction in these strategic areas. These policies support the six mission and vision areas of Coca-Cola 2020 Vision. To strengthen this assurance, they align external internationally-recognized standards. From the policies and standards, requirements are established, specifications and methods to afford Corporate, Group and Business Unit organizations a basis of compliance.

1.4 KORE Governance Framework

KORE has five levels:

- i. Policies,
- ii. Standards,
- iii. Specifications,
- iv. Requirements and
- v. References.

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The first four levels make up the “What” of the new framework meaning they focus on the desired outcome, rather than the process. The final level makes up the “How,” or the manner in which the KORE requirements can be achieved.

1.4.1 Policies

The Policies level is the foundation upon which the entire management system is built. The policies state the Company expectations, and they guide the activities and decision-making of the organization. There are four policies that align to support Coca-Cola 2020 Vision:

- **QUALITY** – confirming the Coca-Cola system’s strong commitment to quality in all that they do
- **FOOD SAFETY** – stating adherence to proven food safety systems, processes and controls
- **ENVIRONMENTAL** – strengthening position as environmental leaders
- **OCCUPATIONAL SAFETY & HEALTH** – reaffirming that people are most valuable resources Standards

The Company is aligned with internationally-recognized standards in manufacturing, production and distribution as part of our commitment to global governance and operational excellence. In the past, the Company designed its own management system standards made specific to the Company, but this no longer fits to the streamlined approach of governance.

Because of the global customers’ expectations constantly evolving, company has aligned ourselves with international and industry standards to stay current with the highest level of quality, environment, and safety and health. This new system will confirm management systems standards are in place at the manufacturing and distribution operations. External certification to the standards is necessary when needed to meet customer requirements or local and legal regulations that just is the case for this report to comply with Pakistan NEQS and IEE/EIA requirements, 2000 revised 2016.



1.4.2 Requirements

The Requirements level is a new, streamlined approach that includes only the minimum Company requirements needed to protect trademark and product integrity, and to ensure protection of people and the environment. These are Company and Coca-Cola system-specific documents that provide the details of what must be implemented and the desired output. In the past, requirements were more prescriptive, which allowed operations little flexibility. Now, operations have the opportunity to determine the best way for them to achieve compliance. The Requirements level includes:

- Beverage and Product Requirements
- Facility Environment and Safety & Health Requirements
- Group and Business Unit Quality, Environment, Safety & Health Requirements
- Standard Methods
- Packaging Requirements
- Sales & Marketing Equipment Requirements

1.4.3 References

The References level represents the “How” in the KORE framework. How KORE is achieved is flexible and can be modified at the Group, Business Unit or operational level. The goal is to become an information-driven Company at all levels of the organization and to recognize that the tools and capabilities to realize this vision are available today if we empower our people to use them. Therefore, the guidelines provided in the References section are not mandatory, but instead relate recommended approaches, best practices and shared approaches. The References level includes:

- References
- Guides and Guidelines
- Procedures

1.5 KORE GOVERNANCE

Proper governance is needed to make certain that operations have effectively implemented KORE. The responsibility for this falls upon two organizations. The first is



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Global Quality and Food Safety. The second is Environment and Occupational Safety & Health. The people in these organizations help operations implement the requirements and ensure they are in place to achieve compliance with KORE for their specific requirements areas. These organizations are responsible for:

- Setting and communicating the Policies, Requirements, Specifications and supporting information;
- Leading and overseeing the implementation of the KORE information across the system;
- Ensuring that the operating requirements and polices are in place and monitoring and measuring to verify compliance; and
- Leading and supporting activities to drive continuous improvement and build capability.

1.5.1 Global Quality and Food Safety

Global Quality and Food Safety protects and advances the quality and safety of every branded product, package and equipment, which surpass customers' and consumers' expectations and are trusted everywhere. Global Quality and Food Safety accomplishes this by:

- Setting and communicating Quality standards, leveraging new technologies, encouraging system efficiencies and building quality into innovation.
- Providing governance by auditing to ensure compliance/conformance to international standards;
- Building total beverage capability to meet tomorrow's challenges; leveraging the power of the global landscape by connecting the Subject Matter Expert Networks to one another and to those that need their guidance; and partnering with Coca-Cola key customers like McDonald's, Carrefour, Tesco and Wal-Mart, to ensure coke remain their supplier of choice.

1.5.2 Environment and Occupational Safety & Health

Environment and Occupational Safety & Health (EOSH) provides system leadership in developing and executing strategies, standards, training and



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implementation tools, as well as best-practice methods to preserve and protect the environment and ensure a safe and healthy work environment. Environment and Occupational Safety & Health establishes internal and external partnerships to focus on the key areas where the company have the most impact:

- **Global Water Stewardship** – implementing and enhancing effective wastewater treatment and conservation processes and reaching beyond to create solutions addressing the global challenge of water scarcity.
- **Energy & Climate Protection** – Ensuring that the company ‘**grow the business, but not the carbon**’ by balancing short- and medium-term productivity investments, such as energy efficiency, with longer-term investments in overall climate reputation.
- **Sustainable Packaging** – enhancing the efficiency of packaging by reducing raw material usage, using materials compatible with recycling systems and supporting projects that encourage greater and more efficient recycling.
- **Sustainable Agriculture** – forming partnerships and strategies throughout the supply chain to ensure ingredient supplies are sustainable for our business, as well as for the communities in which they originate.
- **Occupational Safety & Health** – driving toward our vision of a zero incident workplace with an ingrained safety culture, capable resources and a relentless focus on identifying and reducing critical risks.

IMCR requirements help operations effectively manage incidents and identify and monitor potential issues in a manner that protects our consumers, employees, environment, Company assets and the image and trademark of The Coca-Cola Company.

1.6.1 Corrective Action

Corrective Action requirements help eliminate the cause of existing non-conformities in order to prevent recurrence to sustain continuous improvement.

1.6.2 Risk Management

Requirements which support risk management. Risk Management aids in proactive management and/or the mitigation of food safety, environmental, occupational



TCCEC Environmental Impact Assessment Report (EIA) for new green field plant safety and health and business continuity risks to protect The Coca-Cola Company stakeholders, reputation and image of the Coca-Cola system.

1.6.3 Record-Keeping and Retention Samples

Requirements for Record-Keeping and Retention Samples provide a means to maintain records to confirm food regulatory requirements and company specifications.

1.6.4 Customer and Consumer Response

These requirements offer a way to monitor and resolve customer and consumer information requests and product, packaging and service issues to drive consumer and customer satisfaction, to continually improvement and to protect the Company trademark.

1.6.5 Traceability and Date Coding

The Traceability and Date Coding requirements help ensure that trademarked products and materials are uniquely identified to determine status and to enable two-way traceability.

1.6.6 Process Monitoring and Control

Process Monitoring and Control requirements assist to monitor quality through due diligence testing in order to control processes, to drive continuous improvement and to protect the environment, ensure Safety & Health and produce products and packages meeting The Coca-Cola Company specifications.

1.6.7 Calibration and Maintenance of Equipment

Calibration and Maintenance of Equipment requirements help ensure good performance and accurate data in processing, monitoring and testing equipment that may impact the quality of Company products, the safety of our associates and the environment.

1.7 Purpose of report

Environment Assessment (EA) is interdisciplinary and multistep procedure to ensure that environmental considerations are included in decisions regarding the project



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which may affect the environment. In other words, EIA helps identify the possible impacts of proposed activity and how these impacts can be mitigated. **Section 12 of Punjab Environment Protection Act of 1997 binds the developer (proponent) to submit an EIA report to a Provincial/Federal EPAs** and get approval for construction and operation phase of the project in a manner prescribed in IEE/EIA Regulations 2023 and sectorial guidelines. **Food processing industries including sugar mills, beverages, milk and dairy products, with total cost of Rs.100 million and above comes under schedule II** where EIA is mandatory to be submitted to EPA.

The main objective of the EIA study is to assess the environmental impacts likely to occur due to the construction of green field coke new plant mainly for storage and dry processing in Special Economic Zone, near SIE, Sunder Raiwind road, Lahore and to suggest mitigation measures to minimize the likely negative impacts.

For achieving the above objectives, the study was mainly divided into following sections:

- Identification of all requirements as set forth by Pakistan Environmental Protection Act. 1997 and the Guidelines for preparation of EIA reports, etc.
- Study of existing regulatory framework in Pakistan with reference to the developmental projects;
- Study of Guidelines for the preparation of EIA reports;
- Collection and scrutinizing data related to physical, ecological and socio-economic, and physical resources of the project area;
- Evaluation of data and identification of significant environmental impacts;
- Identification of necessary mitigation measures to minimize the negative impacts; and Preparation of an Environmental Management Plan.

To fulfill the social and legal requirements for TCCEC, Lahore for compliance of Punjab Environmental Quality Standards (PEQS) for industrial waste, industrial emissions, ambient air, motor vehicles and noise in true letter and spirit.

To fulfill the legal obligations, the project has been examined for possible positive and negative, social and environmental impacts and their abatement, for submission to



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Punjab-EPA, Lahore for issuance of Environmental approval under above said IEE/ EIA Regulation 2023.

1.8 Identification of the Project and Proponent

Construction of coca cola greenfield warehouse & allied facilities at sundar green special economic zone, Lahore is the title of the project. located at Plot A1-A7 Special Economic Zone, Nahla village, Manga Raiwind Road, Lahore with 113853 Sq. ft covered area The proposed project involves only construction/installation of a new PEB halls, connecting pathways and installing equipment required for storage and dry mixing.

Personal information of the proponent for this report is given below,

Name: Ejaz ul Haq

Designation in TCCEC: Plant General Manager

Contact information: Email: eulhaq@coca-cola.com

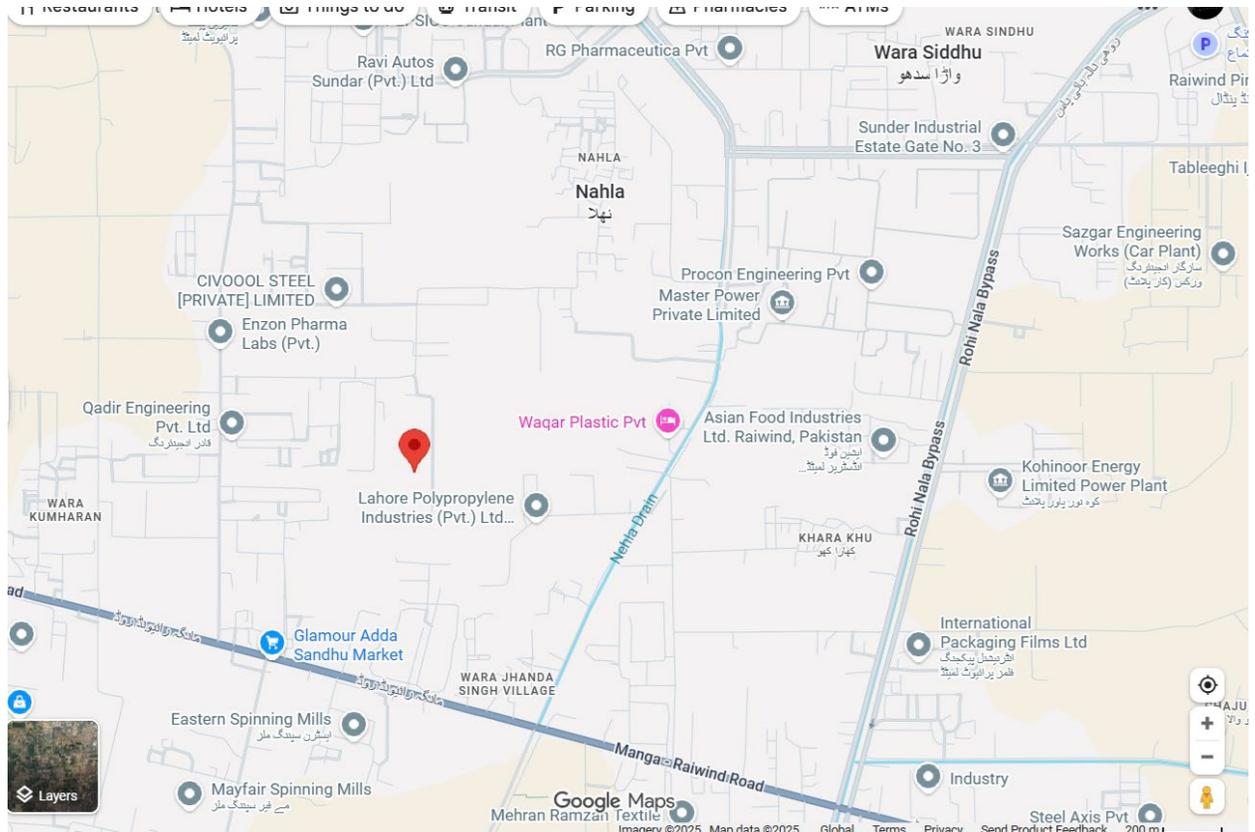
Cell: 0301-2258335

Project brief

of Rupees 3.0 billion PRS which comprises of construction of hall, purchase of equipment and machinery and its installation. Construction of coca cola greenfield warehouse & allied facilities at sundar green special economic zone, Lahore is the title of the project. located at Plot A1-A7 Special Economic Zone, Nahla village, Manga Raiwind Road, Lahore with 113853 Sq. ft covered area The proposed new project of CPS located at Special Economic Zone Namely Sunder Green near Sunder Industrial Zone, Sunder-Raiwind Lahore. The project land is about 24 acre which includes construction/installation of new green field plant. The cost of the project is estimated to an amount



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Name of the proponent

Name: Ejaz ul Haq
 Designation in TCCEC: Plant General Manager
 Contact information: Email: eulhaq@coca-cola.com
 Cell: 0301-2258335

Name of the Consultancy

Sustainable Environmental Solutions (SES) Team comprising of professionally competent staff have prepared the report.

Address: House # 476, F2 block, Johar Town, Lahore,

Ph, office# 0301-4211409

E-mail: sustenvsol@gmail.com

The following team carried out the EIA:



TCCEC Environmental Impact Assessment Report (EIA) for new green field plant

- Mr. Muhammad Farooq Alam, Director Rtd), EPA, Team Lead
- Usman ul Haq, Senior Environmentalist
- Shafqat Saeed Farooqi, Senior environmentalist
- Mr. Syed Ejaz Hussain Naqvi, Environmental and safety officer,
- Eng. Afnan Farooq, Chief Executive, SES
- Salahuddin, field officer.

Brief outline of the proposal

Nature, size and location of project:

The Coca Cola Export Corporation (TCCEC) Lahore as the proponent of the project has planned to construct a new green field plant for raw material storage and dry processing of the concentrate. It has capacity to handle ~12 MT per annum

Mineral salts are the raw materials used to form the same quantity of concentrate and base. The cost of the proposed project is 3.0 billion PKR. The proposed project involves only construction/installation of new hall with pre - fabricated material and installing the storage and processing of the raw materials.

Based on successful completion and operation of the existing plant at Pajian, this green field plant has been planned to be constructed.

The purpose of this project is primarily to increase the capacity of Concentrate in Pakistan while complying the EPA environmental guidelines and rules as well as KORE standards.

The covered area (113853 Sq. ft) is marked in the layout map of the project site.

It will enhance the capacity of concentrate of coke and Dasani production for Pakistan and other regional countries like Afghanistan. It will benefit the proponent in the following manners:

- Increase the production capacity of coke in Pakistan
- Make plant & processes compliant to KORE Standards
- Compliant to EPA rules, regulations and PEQS.
- Allow handling of increased production volumes



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Further, it is expected to serve as Standardized quality warehouse complying with KORE standards.

The mineral salts will be used to form base and concentrate for coca cola export corporation at this facility.

The proponent has decided to make a new Pre-Engineered Building (PEB) for this project.

Pre-Engineered Buildings (PEBs) are the building components which are manufactured at a factory and assembled on site. Usually PEBs are steel structures and can be an alternative to conventional structural steel buildings. PEB structural components are fabricated at the factory to exact size, transported to site and assembled at site, usually with bolted connections. This type of Structural Concept is generally used to build:

1. Industrial and Small Manufacturing Buildings
2. Small Retail and Commercial Office Buildings
3. Warehouses and Storage Units

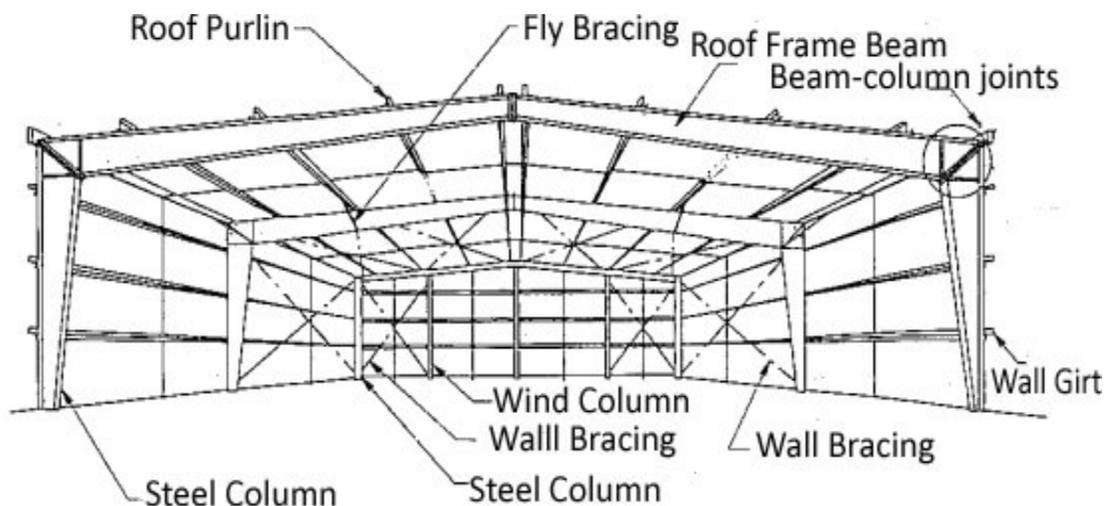
Civil foundations shall be constructed first and foundation bolts shall be fixed to suit the column placements. Mild Steel sheet fabricated Columns shall be fitted with bolts in the already constructed civil foundation. Roughly at 10 meters' height these columns shall be connected together with Mild Steel sheet fabricated beams to form a complete network which can then sustain the roof load

Zinc coated Mild Steel sections called Z sections and referred to as Purlins shall then be connected between the roof support network to form a base for complete covering with sandwich panels for complete covering

- The roof panels shall be provided with sunlight access from various places
- The side walls again shall be of sandwich panels fastened with the columns and beams network
- For access doors shall be provided.
- Floor will be of concrete



The whole structure with nomenclature is as shown below:



Drawing 1.1: structure of the proposed Building

1.8.1 Structure of the Report

The Environmental Impact Assessment (EIA) Study comprises of Executive Summary following nine chapters as detailed below;

Chapter 1, Introduction; gives rationale and overview of the Project, need for Environmental Impact Assessment study, its objectives and finally structure of the report.

Chapter 2, Environmental Legislative, Regulatory and Institutional Framework; provides an overview of the policy framework and national legislation that applies to the proposed Project. The Project is expected to comply with all national/provincial legislation relating to environment in Pakistan, and to obtain all the required regulatory clearances. It also deals with the requirements of international agencies and other international protocols for protection of biodiversity for which Pakistan has firm commitment.

Chapter 3, Project Description; gives a rather detailed account of the Project particularly emphasizing those Project components which are of importance in relation with environmental and social aspects.

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Chapter 4, Description of the Baseline Conditions; provides information about the environmental and social settings of the Project Area including geology, climate, flora, fauna, water resources, socioeconomic conditions etc.

Chapter 5, Review of Project Alternatives; describes the analysis of alternatives, which could be site alternative, design or technology alternatives.

Chapter 6, Stakeholders and Public Consultations; deals with the outcome of the consultation carried out with the local communities, knowledgeable people, public representatives, etc. It discusses the concern of various types of the people and provides an outline how these have been addressed within the EIA of the Project.

Chapter 7, Screening of potential Environmental and Social Impacts and Mitigation Measures; identifies the potential impacts due to the implementation of Project on the physical, biological and social environment of the Project Area.

Chapter 8, Environmental Management and Monitoring Plan; outlines the environmental management plan, identifies the roles and responsibilities to implement EMMP, suggest monitoring frequencies of various parameters and EMMP costs etc.

Chapter 9, Conclusion and Recommendations; sums up the report and conclusions and recommendations resulting from the study.

1.9.2 Methodology

The methodology adopted by the consultants for this assignment was agreed with the proponents at the proposal stage. The following methodology was adopted:

1.9.2.1 Orientation Session:

Meetings and discussions were held with the relevant key officials of the client and the project design team. This activity was aimed at achieving a common ground of understanding on various issues of the EIA study.

1.9.2.2 Development of Data Acquisition Plan:

Following the concept clarification and understanding, a detailed data acquisition plan was developed for the internal use of the consulting team. This plan was revised and



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updated throughout the EIA process. The plan identified specific requirements of the primary and secondary data and their sources; determined time schedules and responsibilities for their collection; and indicated the logistics and facilitation needs for the execution of the data acquisition plan.

1.9.2.3 Primary Data Collection:

Primary data was collected for the parameters identified in the gap analysis. Socioeconomic surveys were conducted to validate the data available through other primary sources of this project. The survey tools included questionnaires and focused discussions. The Socio-economic Questionnaire is attached as Annexure I at the end of this report. A more detailed description of socioeconomic data acquisition is also given in Chapter 6 of this report.

1.9.2.4 Secondary Data Collection and Review:

The secondary data about the physical, technical, and institutional aspects of similar projects available with the proponents was also reviewed. The additional data was collected from Pakistan Meteorological Department and Geological Survey of Pakistan. On the basis of the secondary information and its review, primary survey plan was developed. Gap analysis was also carried out to exhaustively identify all the data required to conduct the EIA study.

1.9.2.5 Site Visits:

The consulting team made visits to the proposed site and its surroundings. These visits were made by all team members to collect necessary data pertaining to their respective areas of responsibility for the assignment.

A conceptual environmental management plan for smooth and effective implementation of all recommended mitigation measures was developed and included in the EIA report.



1.9.2.6 Reporting

The draft EIA report was prepared under the guidelines issued by the PEPA 1997 and submitted to the client for their comments.

The report has been finalized, after review and comments by the client's management. The consultant discussed the comments with the client before incorporating them in the final Report.

The main text of this EIA report is focused on findings, conclusions and recommended actions. It is supported by summaries of the data collected and citations for any references used in interpreting those data.

1.10 Limitations

This EIA document has been prepared drawing inferences from site visits, primary data and secondary information. The study has been conducted by the consultant in a manner consistent with the level of care and skill exercised by members of environmental and social Sciences and consulting professionals. The consultants have tried to cover all important aspects and relevant impacts of the proposed project.

The conclusions in this study are based on primary and secondary data, results derived from earlier studies, and a subjective evaluation of the possible environmental aspects during construction and operations of the proposed project. In evaluating the proposed project, the consulting team has relied on information provided by the management of the client. The consultant assume that the information provided is factual and accurate. Also the consultant accepts no responsibility for any deficiency, misstatement, or inaccuracies contained in this report as a result of omission or misrepresentation by any person interviewed or contacted. The mitigation measures and other recommendations put forth in this report are of the level of implementation framework.

Chapter 2: Policy, Legal & Administrative Framework

2.1 General:

As a legal requirement under section 12 of Punjab Environmental Protection Act of 1997 (Amended 2012) Initial Environmental Examination/ Environmental Impact Assessment of all development projects whether public or private is mandatory. The study has been conducted in accordance with The Punjab Environmental Protection Agency (Review of IEE & EIA) Regulations, 2022. The Regulations also listed the project categories, which require an IEE in its Project Schedule-I and the projects for which an EIA is required are in Project Schedule-II. For projects not listed in Project Schedule I and II, IEE or EIA is not required, unless the project is likely to cause an adverse environmental effect and the projects for which EPA has issued guidelines for construction and operation, an application for approval accompanied by an undertaking and an affidavit that the aforesaid guidelines will be followed is also required. The EPA has issued a number of executive orders under section 6 of the ACT ibid for stream lining the operation of the plant in an environmentally friendly manner.

2.2 Policy Framework:

The ministry of climate change was the responsible authority for policy making on environmental protection in Pakistan. The following policies are considered during the preparation of the EIA/IEE report:

- National Environment Policy, 2005
- National Resettlement Policy, 2002

In addition to these policies, EPA Punjab has established laws and regulations for environmental assessment studied. These legislations include:

- Punjab Environmental Protection Act, 1997 (Amended 2012)
- PEPA Review of IEE/ EIA Regulations of 2022.



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In addition to the legislative framework, there are certain guidelines notified by the Pakistan Environmental Protection Agency which provide a standard course of actions to be pursued during such studies. These guidelines are:

- Guidelines for the Preparation and Review of Environmental Reports
- Guidelines for new township development
- Guidelines for Public Consultation
- Guidelines for Sensitive and Critical Areas
- Guidelines for Solid Waste Management 2005
- Environmental, Health, and Safety General Guidelines of the World Bank Group
- Punjab Environmental Quality Standards

2.3 Legal Framework

After the devolution of the powers to the provinces under 18th amendment in the constitution, GOVERNMENT OF PUNJAB has promulgated laws, acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In addition to this, they have also developed environmental assessment procedures governing developmental projects. The relevant excerpts of these laws and procedures are attached below.

2.3.1 Pakistan Environmental Protection Act, 1997 (AMENDED 2012)

The Act was enacted on December 06, 1997 by repealing the Pakistan Environmental Protection Ordinance, 1983. It provides the framework for implementation of the PNCS, 1992, establishment of provincial sustainable development funds, protection and conservation of species, conservation of renewable resources, and establishment of Environmental Tribunals, appointment of Environmental Magistrates, Initial Environmental Examinations (IEE), and Environmental Impact Assessments (EIA). Section 12 of the Act stresses the need to carry out EIA/IEE study prior to construction or operation of a project. PEPA, 1997 is available at official website of EPD, Punjab.

After the passing of the 18th Amendment to the Constitution of Pakistan, Pakistan's Federal Ministry of Environment was devolved to the provincial level on June



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30, 2011. Thus, a recent amendment in Pakistan Environmental Protection Act, 1997 was presented and published in Punjab Gazette on April 18, 2012 as an Act of Provincial Assembly of Punjab.

Twenty-three amendments have been made in the ***Punjab Environmental Protection (Amendment) Act, 2012***. The amendments can be categorized as follows:

- Amendments in Short Title and commencement as Punjab Environmental Protection Act and it extends to the whole of Punjab only;
- Amendments in administrative jurisdiction (Transfer of powers and control from Federal to Provincial Government);
- Definitions and reference to the territorial waters, exclusive economic zone and historic waters shall be omitted based on the devolution of powers from Federal to provincial levels and
- Amendments in penalties.

In accordance to this Act ***Food processing industries including sugar mills, beverages, milk and dairy products, with total cost of Rs.100 million and above comes under schedule II*** where EIA is mandatory to be submitted to EPA. Therefore, TCCEC has conducted this study to comply with PEPA Act and get NOC from EPA Punjab to in order to complete their Site Master Plan II.

2.3.2 The Punjab Environmental Protection Agency (Review of IEE and EIA) Regulations, 2023

These regulations may be called the Punjab Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2023. They also briefly describe the outlines for preparation, submission and review of environmental reports. These Regulations are also available at official website of EPA, Punjab.

2.3.3 Pakistan Environmental Assessment Procedures, 1997

Protection of the environment with regards to toxic and hazardous waste is



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covered by the Pakistan Penal Code (PPC), 1860. Environment Protection Department (EPD), Punjab, is mandated to monitor the transportation of hazardous materials within the provincial limits. Pakistan Environmental Assessment Procedures (1997) contains the following sets of information relevant to the proposed project.

1 Policy and Procedures for Filing, Review and Approval of Environmental Assessment Reports

It describes environmental policy and administrative procedures to be followed for filing of environmental examination/assessment reports by the proponents and their review and approval by the concerned environmental protection agencies.

2 Guidelines for the Preparation and Review of Environmental Reports

These guidelines are developed to facilitate both the proponents and decision makers to prepare reports (inclusive of all the information contained therein) and carry out their review so as to take informed decisions.

c) Provincial Environmental Quality Standards (PEQS), 2010

Pakistan Environmental Protection Council (PEPC) first approved these standards in 1993. They were later revised in 1995, 2000 and 2010. They furnish information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to control environmental pollution. The National Environmental Quality Standards (PEQS), 2010 are available at official website of EPA, Punjab. After 18th amendment these standards have been adopted by the government of Punjab, naming it PEQS in 2016. Many amendments have been made and some of the standards have been revised and made more stringent motor vehicle and cement industry, power plants, boilers etc.

2.3.4 Other Relevant Laws

- **Canal and Drainage Act, 1873**

This Act entails provisions for the prevention of pollution of natural or man-made water bodies.

- **Pakistan Penal Code, 1860**

This defines the penalties for violations concerning pollution of air, water bodies



TCCEC Environmental Impact Assessment Report (EIA) for new green field plant and land.

- **Guideline for Solid Waste Management (2005)**

Guidelines for Solid Waste Management have been issued as a draft by the Pakistan Environmental Protection Agency in coordination with JICA and UNDP. These guidelines explain the waste generation, discharge and composition.

Sectoral Guidelines (1997)

Pakistan Environmental Assessment procedure deals with general guidelines as well as the sectoral guideline for the Environmental Assessment Studies. The sectoral guidelines have been given for some categories of the projects and deals with the following:

1. Major thermal power stations
2. Major chemical manufacturing plants
3. Municipal waste disposal
4. New township development
5. Oil and gas exploration and production
6. Major roads
7. Water supply projects
8. Sewerage Schemes
9. Industrial estates, etc.

2.3.5 Occupational Health

Construction and operational activities can affect the occupational health of the workers. Quantitative national standards with respect to these aspects are yet to be developed in Pakistan. However, guidance in qualitative terms can be obtained from the Labor Laws (Amended) Ordinance, 1972.

2.3.6 Toxic or Hazardous Waste

Protection of the environment with regards to toxic and hazardous waste is covered by the Pakistan Penal Code (PPC), 1860. Environment Protection Department (EPD), Punjab, is mandated to monitor the transportation of hazardous materials within



TCCEC Environmental Impact Assessment Report (EIA) for new green field plant the provincial limits.

2.3.7 Preservation of Cultural Heritage

The Antiquities Act, 1975, administered by the Provincial Government, is aimed at safeguarding the preservation of cultural heritage. Destruction, damage or defacement of antiquities is an offence under the Act.

2.4 Other relevant Regulations

2.4.1 Land Acquisition Procedures

Under the Land Acquisition Act (1894), the provincial Revenue Departments are empowered to carry out the acquisition of private land or built-up property for public purposes, including on behalf of Federal Agency or private developer. The acquisition of land and payment of compensation as such will be the responsibility of the client and the implementing agency.

2.4.2 Forest Act 1927 and the Forest (AMENDEMENT) Act 2010.

“An Act to consolidate the law relating to forests, the transit of forest-produce and the duty leviable on timber and other forest-produce”.

The Act inter alia, deals with the matters related with protection and conservation of natural vegetation/habitats. Cutting of trees for construction purposes or otherwise, prior permission is required from the forest department of the concerned province.

2.4.3 Wildlife Act of 1975

In part of project area in Punjab, Punjab wildlife protection, preservation, conservation, and management Act 1974 (amended up to 2007 and rules amended up to 2010) shall enforce for overall protection of wildlife flora and fauna. Fisheries department also has the basic responsibility to ensure enforcement of Act.



2.4.4 Antiquities Act 1975

The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The act is designed to protect "antiquities" from destruction, theft, negligence," unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments etc. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Punjab to prohibit excavation in any area, which may contain articles of archaeological significance. There are no gazette archaeological sites located within the close vicinity of proposed site area.

2.4.5 Pakistan Penal Code (1860)

The Pakistan Penal Code (1860) authorizes fines, imprisonment or both for voluntary corruption or fouling of public springs or reservoirs so as to make them less fit for ordinary use. This code also includes toxic and hazardous waste handling. According to the code, handling and negligent conduct with respect to poisonous, toxic and hazardous waste is an offence. The code is to be monitored by the provincial government.

2.4.6 Canal and Drainage Act (1873)

The Canal and Drainage Act (1873) prohibits corruption or fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of drainage.

These acts have relevance to the study due to the presence of non-perennial water streams in the proposed site area. Any discharge of waste into these streams shall also be prohibited.

2.4.7 Highways Safety Ordinance of 2000

The ordinance includes provisions for: licensing and registration of vehicles and construction equipment; maintenance of road; vehicles; traffic control offences, penalties and procedures; and the establishment of a police force for motorways and national highways to regulate and control the traffic as well as keep the highways clear for encroachment.

2.5 TCCEC Operation Requirements (KORE)

Within the TCCEC all operations and management system work under a well-organized operating system that extends in all “The Coca-Cola” partners worldwide. This operating manual is named as “KORE” i.e. COCA-COLA OPERATING REQUIREMENTS”. These requirements give a complete guidance for all the management, policy framework, auditing, quality, environment, health and safety and other disciplines.

Benefits and advantages of following KORE can be summarized as under;

- KORE is the framework of governance and management system around which the Coca-Cola system enables sustainable performance, meets customer and consumer demands, drives continuous improvement, manages risk and enhances the Company’s reputation.
- KORE provides a management system foundation that combines discipline toward producing the highest quality product while allowing flexibility to achieve global implementation.
- KORE brings an increased focus to Food Safety and encourages alignment with the highest International manufacturing standards while recognizing the need to meet applicable government, legal and local regulations.
- KORE enforces necessary requirements to ensure product integrity and quality and to protect its trademark while supporting strategies toward 2020 Vision.



- KORE enforces requirements not only to protect its products, but also to ensure the safety and well-being of its associates and partners and to be environmentally responsible.
- KORE is designed to create a dialogue of honest information sharing between the Company and its stakeholders.

2.6 KORE POLICIES

2.6.1 Quality

QUALITY

Policy Statement

Consumers across the globe trust The Coca-Cola Company to deliver refreshing, high-quality products. Quality shows itself in our every action; it encompasses everything that we do. Each person within the Coca-Cola System takes this mission seriously and works tirelessly to ensure that our system keeps its promise of quality products and services.



We believe that quality is the cornerstone of our success because it is an integral part of our heritage; inherent in this belief is our dedication to our gold standard: **PERFECT PRODUCT, TRUSTED EVERYWHERE.**

The global nature of our business requires the Coca-Cola system and its supply chain to have the highest standards and processes for maintaining consistent product and service quality—from the design of our products and packaging to the purchasing of our ingredients, from our concentrate production to our bottling and product delivery. By implementing quality management systems, we ensure compliance to applicable regulations, internationally recognized standards and Coca-Cola-specific requirements across our supply chain, from start to finish.

Our commitment to delivering quality excellence effectively and efficiently includes the following focus areas:

- **Supplier Management:** production of high-quality finished products using the best available raw materials.
- **Global Standards:** consistent execution by our Company, our suppliers and our bottling partners.
- **Global Governance:** assurance that our products and services meet or exceed the expectations of our customers, consumers and other stakeholders.
- **Continuous Improvement across our global system:** proactive evaluation and attention to emerging issues and trends affecting our products, customers and consumers.
- **Productivity:** operation of the lowest-cost manufacturing and logistics while maintaining our quality excellence.

Policy Details

Each organizational level within the Coca-Cola system must adhere to the following objectives, keeping in mind that the scope and details of each element below should be consistent with the specific circumstances of the operations taking place at that locality.

Gold Standard of Quality

Produce, store, handle and distribute intermediate and final products of the Company in accordance with approved processes and procedures that meet The Coca-Cola Company requirements and specifications.

Management Systems

Implement quality policy, standards and management programs; ensure the provision of resources necessary to achieve the organization's quality objectives; and foster continual improvement in quality performance.

Risk Assessment and Management

Identify, evaluate and proactively address quality risks and emerging trends. Use internal and external assessments to ensure compliance with Company and applicable legal requirements.

Legal Compliance

The Company maintains its commitment to follow and respect applicable local laws in each of our markets.

Incident Management and Crisis Resolution (IMCR)

Handle incidents in a manner that protects our customers and consumers, as well as the image and trademarks of the Company.

Manufacturing

Our manufacturing practices align with our commitment to quality.

- **Coding and Labeling:** Finished products and fountain syrup have a legible date code and are properly labeled.
- **Processing and Filling:** Equipment and manufacturing processes produce products that are fit for purpose and meet the specifications of the Company.
- **Monitoring and Control:** Processes are capable and are continually assessed and monitored.

Distribution and Marketplace

Our customers must believe in the excellence of our products. To that end, store, handle, distribute, dispense, vend and merchandise ingredients and intermediate and finished products to assure quality and integrity.



2.6.2 Food Safety Policy

FOOD SAFETY

Policy Statement

At The Coca-Cola Company our fundamental responsibility is to ensure uncompromising safety standards for the products we produce and distribute.



Food safety is integral to our gold standard of quality: **PERFECT PRODUCT, TRUSTED EVERYWHERE**. We strive to protect our products and our consumers along the entire supply chain—from start to finish. The Coca-Cola system aspires to grow the reputation of the brands we produce and maintain consumer confidence in our products. Each employee who has a direct impact on the ingredients, packaging, manufacturing, storage or transport of products throughout the supply chain is responsible for food safety.

Our food safety commitment includes the following focus areas:

- **Risk Assessment and Mitigation:** to implement food safety programs in manufacturing, warehousing and distribution facilities.
- **Supplier Management:** to ensure safety of raw materials, ingredients and packaging.
- **Legal Compliance:** to guarantee consistent execution of our policies from our suppliers, our co-packers, our customers and our bottling and distribution partners.
- **Continual Improvement across our global system:** to provide proactive identification and effective management of food safety risks associated with products, processes and technologies.

Policy Details

Each organizational level within the Coca-Cola system (i.e., each site/facility, bottler, business unit and corporate entity) must adhere to the following objectives, keeping in mind that the scope and details of each element below should be consistent with the specific circumstances of the operations taking place at that locality.

Risk Assessment and Management

Demonstrate that we are committed to mitigating risk by keeping an eye to the future. Manage and control conditions impacting food safety by the following programs:

- **GMP:** Systems must operate under current Good Manufacturing Practices, which include cleaning and sanitation, personal hygiene, pest control and housekeeping.
- **HACCP:** Establish Hazard Analysis Critical Control Point programs to prevent and address physical, chemical and biological hazards.
- **Assessment of Processes:** Use internal and external assessments to ensure compliance with Company and applicable legal requirements.

Management Systems

Management must create a workplace environment and way of doing business that demonstrates our reliance on proven food safety systems, processes and controls. Manufacturing and distribution operations must implement a formal food safety management system compliant with ISO 22000:2005. Certification to GFSI-approved scheme if required by customers.

Legal Compliance

The Company maintains its commitment to follow and respect applicable local laws in each of our markets.

Incident Management and Crisis Resolution (IMCR)

No matter what adversity comes, handle incidents in a manner that protects our customers and our consumers, as well as the image and trademarks of the Company.

Traceability and Product Recovery

The ability to recover product from distribution and the marketplace quickly and efficiently is an essential characteristic of the Coca-Cola system. Maintain two-way traceability throughout the supply chain.

Food Defense

Consumers should always be able to trust that Coca-Cola Company products are safe. To ensure this:

- Have tamper-evidence features in place from start to finish—on ingredients, intermediate products and final products throughout the supply chain; and
- Control access to storage and production facilities.

Supplier Management

The Company must have quality supplies to produce our quality products. Purchase ingredients, materials and equipment used in the manufacture and distribution of Company products from Company-authorized suppliers and ensure the ingredients and materials meet specifications prior to use.



2.6.3 Environmental Policy

ENVIRONMENTAL

Policy Statement

The Coca-Cola Company and its bottling partners, understand that our environmental performance is critical to our success. We have a fundamental responsibility to uphold our role in ensuring a healthy and sustainable environment. This belief is part of our culture and this policy applies across the Coca-Cola system.



We, The Coca-Cola Company and our bottling partners, will strive to conduct our business in ways that protect and preserve the environment and to reduce our environmental footprint. To drive toward this ambition, we will actively engage our employees and will adhere to applicable legal and The Coca-Cola Company requirements relating to the environment.

Our environmental efforts are focused on key areas where we have the most opportunity to make a difference and are defined by the following long-term aspirational goals:

- **Water Stewardship:** We will be good stewards of our most critical shared resource in the communities where we operate.
- **Climate Protection:** We will work to reduce our carbon emissions, even as we grow our business.
- **Sustainable Packaging:** We envision a world in which, through recycling and innovation, our packaging is seen as a valuable resource for the future.

Policy Details

Each organizational level within the Coca-Cola system (site/facility, bottler, business unit, and corporate entity) must adhere to the following objectives, keeping in mind that the required scope and details of each element below should be consistent with the risks and circumstances of individual operations as approved by The Coca-Cola Company.

Management System

Management must create a workplace culture and way of doing business that strengthens our position as environmental leaders. To do so, implement environmental policy, standards and management programs;

Legal Compliance

Ensure compliance with the more stringent of applicable legal requirements (all applicable laws, regulations and legal rules) or Company requirements (all internal requirements issued by The Coca-Cola Company that apply to the operation in question) relating to environmental stewardship.

Risk Assessment and Management

Identify, evaluate and proactively address environmental risks and emerging trends. Use regular, periodic and objective assessments to ensure compliance with The Coca-Cola Company and applicable legal requirements.

Engaged, Capable Employees

The Coca-Cola Company's commitment to environmental stewardship is not solely a management function. Provide clearly defined roles and responsibilities, training, communication systems and participation opportunities to promote effective engagement by employees at each level.

Objectives and Performance Tracking

We must continually ensure that we are on course to reach our four long-term environmental aspirations. To do so, establish and track the organization's environmental performance goals and objectives.

Incident Management and Crisis Resolution (IMCR)

Manage environmental incidents in a manner that protects our assets, employees, contractors, customers and the public, as well as the image and trademarks of The Coca-Cola Company and the Coca-Cola system, consistent with applicable legal and The Coca-Cola Company requirements.

Stakeholder Engagement

Collaborate, as appropriate, with public and private entities, including governments, non-governmental organizations, other businesses and local communities to advance environmental stewardship initiatives, a sustainable business and sustainable communities.

2.6.4 Occupational Safety and Health Policy

SAFETY & HEALTH



Policy Statement

The Coca-Cola Company and our bottling partners believe that our people are our most valuable asset. Providing a safe and healthy working environment is one of our primary responsibilities and is fundamental to our success. This belief is part of our culture, and this policy applies across the Coca-Cola system.

We will conduct our business with a goal of zero work-related injuries and illnesses for our employees, contractors and others. We will strive to improve workplace safety and health by engaging with our employees and adhering to applicable legal and The Coca-Cola Company requirements relating to occupational safety & health.

Our commitment is founded on six (6) basic principles:

- **Safety and health can and will be managed.** Management is ultimately accountable for improved occupational safety and health performance and must be supported with the necessary resources.
- **Occupational injuries and illnesses are preventable.** It requires a systematic process of building awareness, assigning accountabilities, training, setting goals, measuring performance and continually improving.
- **Nothing we do is worth being injured for.** Concern and care for the health and safety of people is as important as other business objectives.
- **Safe behavior is a fundamental job requirement.** We promote a culture that values safe behavior in all of our actions, and we commit to comply with applicable legal and The Coca-Cola Company occupational safety and health requirements.
- **Everyone is responsible for safety and health.** We recognize that maintaining a safe and healthy work environment is dependent on a culture of safety, where everyone is involved and accountable.
- **Our safety performance is important for our business.** It is integral to operational excellence and the integrity of our brand.

Policy Details

Each organizational level within the Coca-Cola system (site/facility, bottler, business unit, and corporate entity) must adhere to the following objectives, keeping in mind that the required scope and details of each element below should be consistent with the specific risks and circumstances of individual operations as approved by The Coca-Cola Company.

Management System

Management must create a workplace environment and way of doing business that reaffirms that people are our most valuable asset. To do so, implement occupational safety and health policy, standards and management programs; ensure the provision of resources necessary to achieve the organization's occupational safety and health objectives; and foster continual improvement in occupational safety and health performance.

Legal Compliance

Ensure compliance with the more stringent of applicable legal requirements (all applicable laws, regulations and legal rules) or The Coca-Cola Company requirements (all internal requirements issued by The Coca-Cola Company that apply to the operation in question) relating to occupational health and safety.

Risk Assessment and Management

Demonstrate that we are committed to mitigating risk by keeping an eye to the future. Identify, evaluate and proactively address occupational safety and health risks and emerging trends. Use regular, periodic and objective assessments to ensure compliance with The Coca-Cola Company and applicable legal requirements.

Engaged, Capable Employees

The Coca-Cola Company's commitment to occupational safety and health is not solely a management function. Provide clearly defined roles and responsibilities, training, communication systems and participation opportunities to promote effective engagement by employees at each level.

Incident Management and Crisis Resolution (IMCR)

Manage occupational safety and health incidents in a manner that protects our assets, employees, contractors, customers and the public, as well as the image and trademarks of The Coca-Cola Company and the Coca-Cola system, consistent with applicable legal and TCCC requirements.



Stakeholder Engagement

Collaborate, as appropriate, with internal and external stakeholders through communication and sharing of lessons learned and best practices in order to leverage the organization's ability to reduce workplace risk.

Leadership Commitment

Business leadership is committed to occupational safety and health performance and improvement. Establish visible demonstration of this commitment through:

- Occupational safety and health integration in business plans, results, performance reviews and other business routines; and
- Regular and visible leadership involvement in occupational safety and health communication and improvement activities, including annual updates of the organization's occupational safety and health performance goals and objectives.



2.6.5 The Vision of The Coca Cola Export Corporation(TCCEC)

The vision of The Coca Cola Export Corporation serves as the framework for their roadmap and guides every aspect of their business by describing what they need to accomplish in order to continue achieving sustainable growth & quality.

- People: Be a great place to work where people are inspired to be the best they can be.
- Portfolio: Bring to the world a portfolio of quality beverage brands that anticipate and satisfy people's desires and needs.
- Partners: Nurture a winning network of customers and suppliers, together we create mutual, enduring value.
- Planet: Be a responsible citizen that makes a difference by helping build and support sustainable communities.
- Profit: Maximize long-term return to shareowners while being mindful of our overall responsibilities.
- Productivity: Be a highly effective, lean and fast-moving organization.

KORE requires that the manufacturing and distribution facilities working under The Coca Cola Export Corporation must implement BS OHSAS 18001 (British Standard Occupational Health and Safety Assessment Series 18001, a framework for an effective occupational health and safety management system) or an equivalent Internationally recognized safety management system. IT embraces the power of management systems, and empowers and motivates individuals at various levels toward compliance, which will promote sustainability and ensure higher certification achievements through Bi annual meetings focused on Standards and the implementation. KORE requirements are beyond reproach, challenge the status quo and will result in outputs that is good for the Company, the community and the planet.

2.7 Administrative orders of the EPA under section 6 of PEPA

Since last two years EPA Punjab has been issuing executive orders under section 6 of PEPA, 1997. The orders pertain to compulsory installation and operation of Emission Control Systems, installation of WWTP and its operation, compulsory compliance of PEQS by the motor vehicles and segregation of solid



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waste at the source point. Different color codes of the waste bins are some of the examples.



No.409/PA to DG/EPA/2025
GOVERNMENT OF THE PUNJAB
ENVIRONMENTAL PROTECTION AGENCY
NATIONAL HOCKEY STADIUM, LAHORE
 Dated:25.11.2025



Subject:- ESTABLISHMENT OF STANDARDS FOR MANDATORY PLACEMENT OF WASTE BINS AT COMMERCIAL CENTERS, SHOPPING MALLS, PLAZAS, BAZARS, OFFICE BUILDINGS AND EDUCATIONAL INSTITUTIONS

ORDER

WHEREAS, the Environmental Protection Agency (EPA) Punjab is mandated to provide for the protection, conservation, rehabilitation, and improvement of the environment, prevention and control of pollution, and promotion of sustainable development;

2. **AND WHEREAS**, unsegregated solid waste is adding additional load on waste management and disposal facilities which can otherwise be reduced through at source segregation and subsequent efficient disposal of the generated waste;

3. **AND WHEREAS**, waste recycling process directly contributes towards achieving the Sustainable Development Goals, in particular SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action);

4. **AND WHEREAS**, the Climate Resilient Punjab Vision and Action Plan 2024, under Clause 5.14, underscores the importance of introducing segregation of waste at source, recycling, and institutional capacity-building as a critical measure to reduce environmental stress and build resilience;

5. **AND WHEREAS**, Section 6(1)(n) of the Punjab Environmental Protection Act 1997 empowers the Environmental Protection Agency to establish standard for proper disposal of wastes and to assist the local councils, local authorities, Government Agencies and other persons to implement schemes so as to ensure compliance with the said standards;

6. **AND WHEREAS**, Section 6(1)(t) of the Punjab Environmental Protection Act, 1997 empowers the Environmental Protection Agency (EPA) Punjab to take or cause to be taken all necessary measure for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development;

7. **NOW, THEREFORE**, in exercise of the powers conferred upon me under Section 6(1)(n) read with Section 5(4) of the Punjab Environmental Protection Act, 1997, I, Dr. Imran Hamid Sheikh (PAS), Director General, Environmental Protection Agency, Punjab, do hereby establish the following standards for classification and color coding of waste bins to be placed at Commercial centers, Shopping malls, Plazas, Bazars, Office buildings and Educational institutions, for at source segregation:

- a) **Yellow Bin – Paper waste** (paper, cartons, office paper, packaging material)
- b) **Green Bin – Glass waste** (bottles, jars, broken glass items, laboratory glassware)
- c) **Grey Bin – Organic / Biodegradable waste** (food scraps, fruit peels, leaves, garden waste)
- d) **Red Bin – Metal waste** (aluminum cans, tins, foils, small scrap)
- e) **Orange Bin – Plastic waste** (wrappers, bottles, disposable cutlery, bags)

8. In addition, under Section 6(1)(t) of the Punjab Environmental Protection Act, 1997, it is hereby ordered that the concerned managements of Commercial centers, Shopping malls, Plazas, Bazars, Office buildings and Educational institutions shall ensure the placement of waste bins with the said classification and color coding in their respective establishments at conspicuous places.

9. Any contravention to this order shall be dealt with as per relevant legal framework.

10. This order comes into force with immediate effect and shall remain in force until modified or withdrawn.

Issued under my hand and seal on this 25th day of November, 2025.

DR. IMRAN HAMID SHEIKH (PAS)
DIRECTOR GENERAL
ENVIRONMENTAL PROTECTION AGENCY
PUNJAB

Copy forwarded for information & necessary action to:

1. The Secretary Environment Protection and Climate Change Department Punjab
2. All the Commissioners of Punjab
3. All the Deputy Commissioners of Punjab

Chapter Three: Description of the Project

General

The Coca Cola Export Corporation (TCCEC) Lahore has planned CONSTRUCTION OF COCA COLA GREENFIELD WAREHOUSE & ALLIED FACILITIES AT SUNDAR GREEN SPECIAL ECONOMIC ZONE LAHORE to enhance the capacity of coke concentrate to compete with the requirement in Pakistan, Iran, Afghanistan and etc. Proposed project is a part of Site Master Plan which is required to make concentrate plant in compliance to their KORE governance system requirements. It is TCCEC responsibility to ensure uncompromising safety standards for products and conduct audits and collect documentation for quality, safety and health, Risk Assessment and Mitigation and continual improvement as a compliance of their KORE operating requirement system.

The Concentrate plant is proposed at village Nahla, Special Economic Zone established by the government of Pakistan on Sunder - Raiwind Road outside Sunder Industrial Zone. Coca-Cola Export Corporation – Pakistan Branch intends the construction of following works at Sundar Green Special Economic Zone, Lahore:

Construction of production facility with warehouse, utilities and necessary infrastructure

3.1 Type and category of project

Section 12 of Pakistan Environment Protection Act of 1997 binds the developer (proponent) to submit an EIA report to a Provincial/Federal EPAs and get approval for construction and operation phase of the project in a manner prescribed in IEE/EIA Regulations 2000 and sectorial guidelines. This project falls under **category B. Manufacturing and processing;**

Food processing industries including sugar mills, beverages, milk and dairy products, with total cost of Rs.100 million and above comes under schedule II where EIA is mandatory to be submitted to EPA. Therefore, it needs the preparation and submission of EIA for the approval under section 12 as it has cost of about 3.0 billion PKR



3.2 Objectives of project

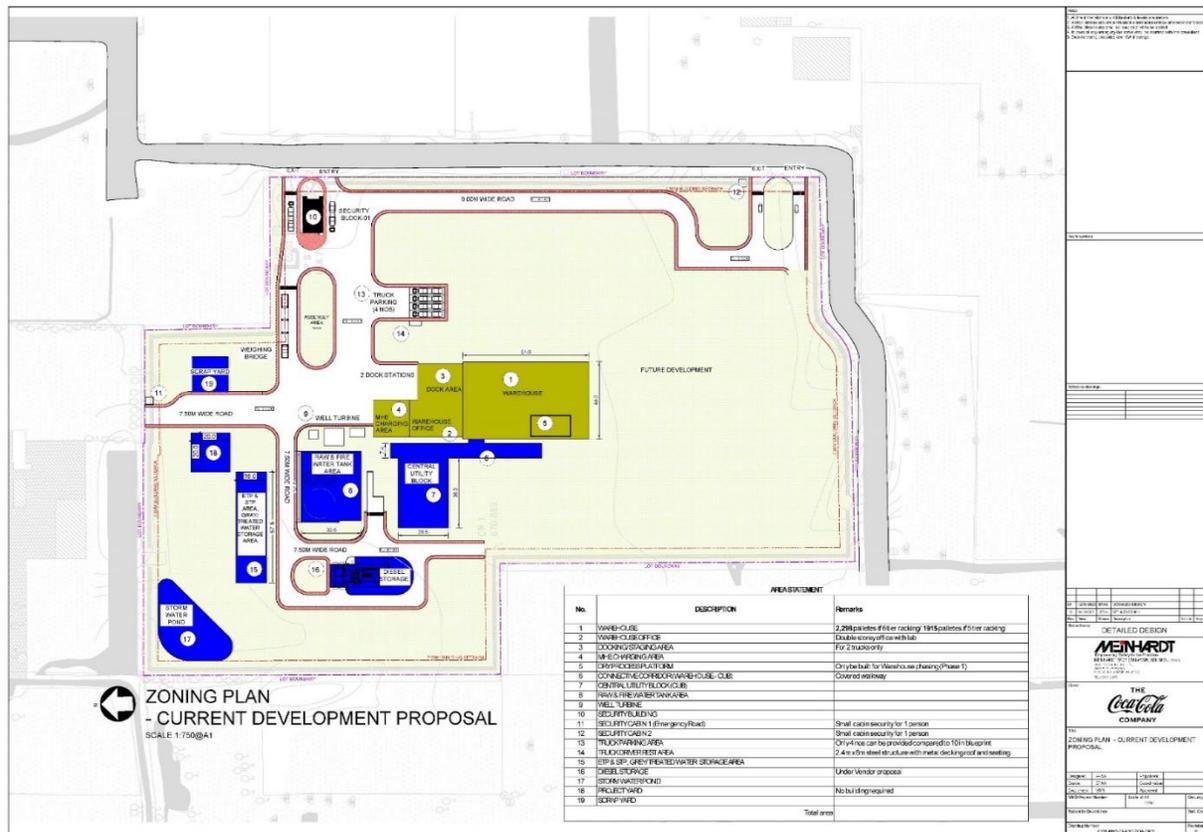
The purpose of this new green field project is primarily to increase storage and dry processing capacity of raw materials used in the concentrate preparation. The increased capacity will enable the coke plant to market the concentrate to Pakistan and other region

3.3 Alternatives

Proposed project is capacity building of the present coke concentrate preparation in Pakistan. The alternative has been discussed in chapter # 57 of this report.

3.4 Location and site layout of the project

The new plant will be located at Village Nahla SEZ, Sunder -Manga road in Sunder Green fields, Lahore. Total area of the project is 1001880 square feet. The covered area is 113853 sq. feet. The site layout map is given in map 3.1. The construction design is shown in diagram 3.1 below.



3.5 Land use on the site

The present land use is vacant land surrounded by the boundary wall. It was green field when government decided to convert it into special economic zone for special industries. Basically the agriculture land use has been changed into the industrial one.



3.6 Road access

It is an industrial belt where many industries are working before the establishment of Sundar industrial estate. The hundreds of industries in the SIE and outside the estate have been set up.



TCCEC Environmental Impact Assessment Report (EIA) for new green field plant

The main excess road is yet to be constructed by the government however, present Nahla road is its excess road which links Sunder Manga road to the site.

3.7 Vegetation features of the site

No more vegetation exists on the site. Only grass and wild herbs are present on the site which will be removed for construction. Hence, no loss of biodiversity is involved in this project.

3.8 Cost and Magnitude of the Project

The cost of the proposed project is Rs.3.0 Billion approximately. The area of the project is 24 acres approximately. The capacity of the concentrate plant will be 12 metric Tons / annum. The proposed project is basically construction of new concentrate plant on the site which will have mainly storage of the food grade raw material and dry mixing of these raw materials

3.9 Schedule of implementation

Layout of the project has already been finalized. The proponent will begin the construction phase upon the receiving the environmental approval in 2026. It is estimated that the entire project will be completed by end of 2026, if the activities go as per the plan.

Activities involved are:

- Land acquisition – land 24 acre acquired in SEZ, Sunder.
- Approval of lay out plan: will be completed during the construction
- Construction of the Industrial hall and allied facilities
- Central utility block
- Installation and operation of the halls.

3.10 Description of the proposed project

The proposed project is construction of industrial halls along with allied facilities and utilities liking storage, loading, unloading, dry mixing for concentrate of coke to be sent to the bottling plants. Pre-engineered buildings are factory-built buildings of steel that are shipped to site and bolted together. What distinguishes them from other buildings is



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that the contractor also designs the building - a practice called design & build. This style of construction is ideally suited to industrial buildings and warehouses; it is cheap, very fast to erect, and can also be dismantled and moved to another site. These structures are sometimes called 'metal boxes' or 'tin sheds' by laymen - they are essentially rectangular boxes enclosed in a skin of corrugated metal sheeting.

Great speed is achieved because while the foundations and floor slab are being constructed, the beams and columns - the structural system - are being fabricated in the factory. Once the foundations and floor are done, the columns are shipped to the site, lifted into place by cranes, and bolted together.

3.10.1 Construction phase

The structural system of pre-engineered steel buildings gives it its speed and flexibility. This system consists of factory-fabricated and factory-painted steel column and beam segments that are simply bolted together at site. The columns and beams are custom-fabricated I-section members that have an end plate with holes for bolting at both ends. These are made by cutting steel plates of the desired thickness, and welding them together to make I sections. The cutting and welding is done by industrial robots for speed and accuracy; operators will simply feed a CAD drawing of the beams into the machines, and they do the rest. This production line style of work makes for great speed and consistency in fabrication.

The shape of the beams can be tailored to optimum structural efficiency: they are deeper where the forces are greater, and shallow where they are not. This is one form of construction in which the structures are designed to carry exactly the loads envisioned.

3.10.1.1 Foundations and Floor Slab

The foundations for pre-engineered metal buildings are made with conventional concrete systems, usually open foundations. Since these structures are usually quite large, they attract a fair amount of wind forces. Wind can cause a net upwards force on a building, called uplift. Since these structures are very light (they can weigh as little as 50 kg per square meter, excluding the foundations and floor slab), the foundations are designed to firmly anchor the structures to the ground, preventing them from being blown

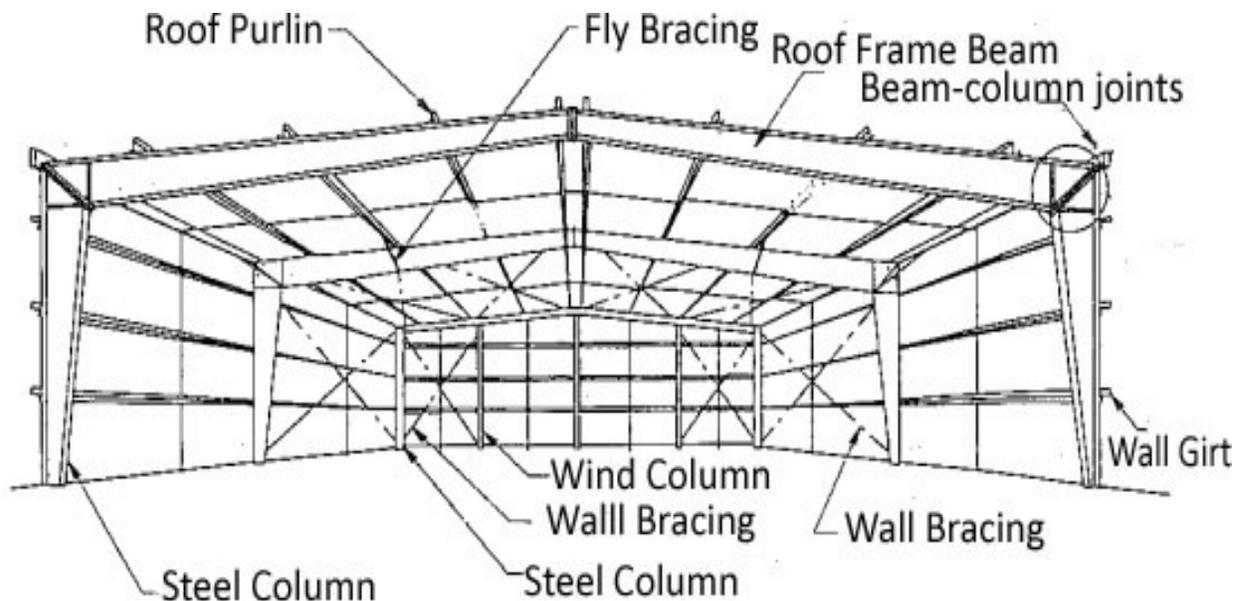


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away by the wind. The floor system for industrial and storage buildings is usually a thick (about 8" to 12" / 200 to 300mm) concrete grade slab that rests directly on the prepared earth beneath it. The concrete can be topped with a thin, abrasion resistant smooth coating called an epoxy floor or polyurethane floor if desired.

3.10.1.2 Cladding and Roofing - The Building Envelope

The most economical cladding for these structures is light corrugated metal sheeting, on both the roof and the external walls. These steel sheets, barely 0.5mm thick, are coated with an aluminum-zinc alloy for corrosion protection on both sides, and come with an attractive, durable paint finish on the outside. These sheets are installed over a grid of purlins, a steel member that rests on the main structural frame and supports the roofing material. In pre-engineered buildings, cold formed Z sections are the member of choice for purlins.



Before installing the sheets, contractors will install layers of insulation and vapor barriers. Rolls of glass wool or mineral wool are the most common type of insulation for such buildings. Since there is no inner wall over which to fix these layers, a layer of galvanized chicken wire mesh is first laid over the purlins. Over this, the insulation and vapor barriers are laid, and then the corrugated sheets are laid. The sheets are fixed with self-tapping screws that run through the sheets and layers of insulation directly into the

TCCEC Environmental Impact Assessment Report (EIA) for new green field plant

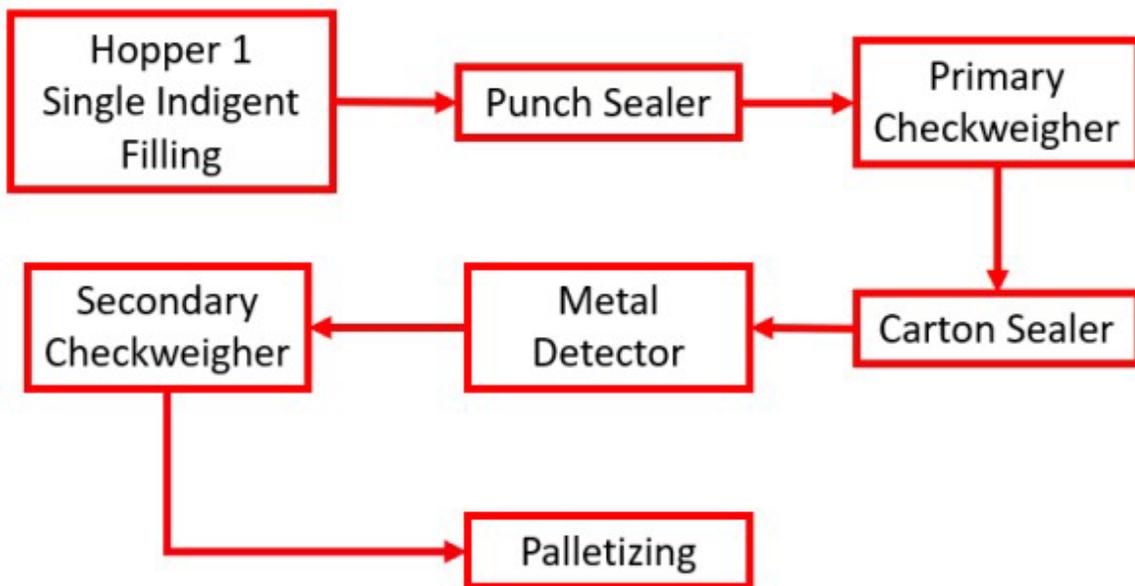
purlins. The purlins, chicken mesh and insulation are thus visible from below, and can be left as such or covered with a false ceiling. Polycarbonate skylights can be installed in the roof sheeting to create natural lighting.

It is common for industrial buildings to have a masonry wall up to a height of 10 or 15 feet (3 to 5m). This allows doors and windows to be easily fitted, and provides security. This wall can be built behind the metal sheeting, making it invisible from the outside.

3.10.2 operation Phase

Base and concentrate for the beverages are the products which will be obtained from the mineral salts.

1. Flow diagram of the process



2. Mass flows of raw materials and products (inputs and outputs)

About 12 MT per annum raw materials are expected to be utilized for production of the same quantity of concentrate. Mineral salts will be used for making concentrate plant.

3 Water Consumption quantity to be used for the project

About 1500 gallons or (5678.118 Litre daily water will be used in the facility which will be taken from three sources:

- (a) Underground water turbine
- (b) Rain water harvesting pond storage
- (c) Effluent/sewerage treated water

The water is expected to be used for the municipal and process purpose. About 10-15 gallon or 56 Liters per day will be generation of waste water. This waste water will be treated in a Package type water treatment system. The following facilities and Utilities are intended to be constructed include:

- i. ware house
- ii. ware house office
- iii. dock /staging area for trucks
- iv. E-charging area
- v. Concentrate mixing platfor
- vi. Connective corridor,
- vii. Security building
- viii. Truck parking area
- ix. ETP
- x. grey water storage area,
- xi. storm water pond
- xii. diesel storage for generator
- xiii. open area for future development.

3.11.1. Incoming Raw material receiving / Sampling QC checks

When the material is received as per the quantity and pack size, material is sampled as per the Company requirement for Merchandise and Ingredient Sampling.

Sampling Procedure:

1. Preparation for sampling is done as; collection of bottles / polythene bags, thief, "Ingredient / Merchandise sampling form", hand gloves, nose mask, goggles, funnel,



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'sampled 'labels, tamper evident seals/ labels and other sampling material like stainless steel dipper, scoop, etc. Equipment used for the sampling of merchandise and ingredients are cleaned and where needed (for sensitive ingredients) sanitized prior to use.

2. Person sampling visually inspects the material to be sampled for - seals/ labels on containers, any damage, spillage, intact labels with all details.
3. Before sampling lab chemist verifies the lot number, manufacturer, ingredient, and date of manufacture is checked against the paperwork received from the supplier (In voice, Certificate of Analysis, etc.)
4. Sampling personnel use applicable personal protective equipment to prevent contamination of the material and to avoid potential mix up between batches and ensure their safety.
5. Lab Chemist samples the incoming ingredient / merchandise as per Company's procedure. Any deviation has to be validated by the QC Manager and approved by Corporate Quality and authorized by QC Manager.
6. The sampling checklist" is completed which is filled in all respect during sampling.

Sampling Practices

1. One container at random per lot is sampled unless otherwise specified in the individual monograph which is attached to the container.
2. The appropriate sampling plan is followed, for all incoming Merchandises and Ingredients received by the plant
3. Containers are selected randomly to be sampled to ensure final sample is representative of the entire lot received as per company's sampling requirements.

Sampling Plan

1. The sampling plan and sampling procedures are provided by the corporate Quality. These plans are based on statistical methods.
2. Normal sample plan is used when commencing with new merchandise and ingredient.



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3. Based on supplier's demonstrated history of quality performance plant move to a reduced sampling plan based on switching rule. Similarly plant move to a tightened sampling plan when non-conformances have been noted.

3.11.2 Cleaning and Sanitation

Plant has designed a cleaning and sanitation plan to ensure that all equipment in contact with ingredients, intermediates, or final Products are free from contaminants.

It is ensured that prior to use any equipment must be:

- Clean, sanitary and free of foreign odor
- Free of residual detergent and chemical sanitizing agents
- Re-sanitized if not used for 72 hours. (Applies to equipment that has been sanitized and the next use is longer than 72 hours from the last sanitation.
- Rinsed with treated water for a final rinse
- Only the approved cleaning and sanitizing agents are used to carry out cleaning and sanitizing activities refer to – "Approved cleaning and sanitizing agents".
- Residual test is performed to ensure that no residual cleaning and sanitizing agent is present inside the equipment, which can have an adverse effect on product quality or consumer health. Whenever a change is made to present cleaning and sanitizing agents used inside plant, it will be ensured that no such chemical is accepted with testing procedure requiring toxic chemicals or pyridine compounds. The use of these chemicals is restricted inside the facility.

3.11.3 Mixing & Blending

- Inspect the Mix Room and processing equipment for hygiene and cleanliness and take necessary action in case of any non-compliance.
- After Cleaning and sanitization transfer lines are purged / drained and ensure / checked for all water removal prior to use.
- After sanitation tanks must be inspected by Quality Control.
- Check the critical control point and control points and record in the Liquid Mixing Worksheet.



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- Re-sanitize the tanks if more than 72 Hrs have passed since last sanitization

Dry Part Filling includes;

- Check for the utilities like compressed air for scale, treated water, raw water and electrical power at filling area.
- Relative humidity should be maintained lower than 50%
- Start the dust collector prior to the filling activity.
- Arrange the ingredient as per product and batch size requirement.
- Verify the released lot no of ingredient as per working note.
- Lab chemist also verifies the color / appearance of product. It is rejected if any non-conformance is observed after QC advice.
- In case of any non-conformance immediately inform the lab chemist and Production supervisor to decide either accept or reject the ingredient.
- Switch on the concerned scales and inform to PS / Lab chemist who will enters the target fill weight, Batch No, product name, Tolerance Limits and other concerned information in the Data acquisition system, before the start of the filling.
- Metal detector is located on bag conveyor prior to placing the bags in SKUs.
- Lab chemist passes the three test pieces 1). Ferrous 2mm 2). Non-Ferrous 2.5 mm 3). Stainless steel 3.0 mm, from the detector 3 times per day (first, middle and last of the filling process) for its verification in the presence of the area operators and records it on the working note.
- Collect required quantity of PE bags, PE bag stickers, labeler for batch no., Cartons (if required), DOM labels, temper evident seal.
- Prepare cartons for by labeling DOM, EXP and Batch #, if all parts are ready for packing.
- Verify the working of sealing machine by sealing an empty bag before the start of production process.
- Collect a sample, equal to square root of the expected no of bags to be produced at equal intervals and make weight checks to ensure the filling of ingredient with in the tolerance limit.



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- Seal the filled PE bags adequately to prevent any leakage. Remove the air from the PE bag prior to sealing it.
- Ensure the bags must have company identifiable seal.
- In case of any breakdown / loss of product immediately inform to the Production supervisor, QC chemist and maintenance team for further action. Incident report should be made and corrective action should be taken on the root cause basis.
- All PE bags are packed and sealed in Secondary packaging after filling all dry parts of the product.
- All cartons are sealed with company named temper evident seal.
- After packing all the cartons are weighed on separate scale and then stacked on pallet after conformation of the net weight.
- Finished product is stored at appropriate place carefully.
- Use PPEs during filling hours.
- Verify the calibration of the scales before every batch filling
- QC personnel check the filling is within the tolerance limit, closest to the target.
- Keep the calibrant at their proper place after every use in cleaned form.
- Transfer the solid waste to the scrap disposal area immediately after filling / or during filling if needed.
- Wash down the filler with all of its accessories after completion of filling activity.
- Maintain the housekeeping in the area during filling process.
- The door of the Filling Room is access controlled. No unauthorized person (other than plant employees) or vendor without holding the work permit is allowed to enter in filling room without the prior approval of Plant Head.
- The working sheet and the Working formula to be kept in a secured place when need to be stored.

Shipping

To ensure sales orders are properly dispatched and documented as per central excise rules.

- Company's Attorney (CPM, or QCM in the absence of CPM).
- SCM: To prepare the shipping documents.



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- Operators: To draw the product from the store for shipment.
- Supply Register: Recording day to day sales.
- CPM: Concentrate plant Manager.
- QCM: Quality Control Manager.
- SCM: Supply Chain Manager

Procedure:

- Receive sales advice from Country office.
- Prepare two sets of gate pass.
- Prepare Shipping Memo in triplicate.
- Enter date, Batch#, Package, Quantity and Consignee in stock - note book.
- Write date, Product, Package, Quantity, Batch # and Consignee in the Shipping Memo.
- Operator is given the information by SCM through record book about the Quantity, Batch No. & Package size to be shipped, operator draws out the product from cold and dry part stores and places total quantity in the shipping hall.
- Meanwhile, papers in carbonized / duplicate copies are prepared, which are as follows:
- Get the gate pass signed by the company attorney.
- Get the shipping Memo verified & signed from QC Manager. QC Manager checks the said document for product drawn if the quantity and batch numbers issued are correct and according to FIFO basis.
 - Load / dispatch the consignment in the presence of company attorney or his representative or as per current excise rules. Presently the company follows the un supervised clearance procedures of the excise and taxation.
 - Blue copy of dangerous goods document given to the consignee & carbonized copy is retained.
 - Pink copy of Shipping Memo is given to the Consignee. Yellow copy of shipping memo is sent to country office; blue copies of shipping memo are retained in the respective books. One copy of gate pass is given to the Consignee and the second copy is retained on the plant.
 - Shipping memo is faxed to the respective insurance co. for insured goods, in case of Coca-Cola Beverages Pakistan Ltd.



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- Supply register is updated and signed by the Company attorney.
- Update the finished goods stock record - subject to production and sales.

3.11.4 Water Consumption Rationale

There are two uses of water i.e. Process and Sanitary. Sanitary water uses involve drinking and sewerage use while process water is used for concentrate preparation. Key initiative on controlling water consumption are;

- 1- Reuse of recycled wastewater,
- 2- Reuse of rainwater by collecting rain water in storm water collection pond,
- 3- Deploying photo sensing valve on all hand washing stations,
- 4- Monitoring of monthly water consumption through flow totalizer,
- 5- By deploying automatic sprinklers.

3.11.5 Power Requirement & Generation

Estimated Electrical load is 658 kW. The Coca Cola Export Corporation will depend upon WAPDA supply through Sunder greens. Stand by Diesel generators for standby arrangement.

3.11.6 Fuel consumption

HSD (high speed diesel) is used when needed for stand-by generators etc. for this purpose diesel is stored within the plant with storage tank.

3.11.7 Firefighting

Firefighting pump room for the purpose will be built to support fire hydrants, monitors, pumpers heads, ESFR sprinklers for cold stores, sprinkler system for warehouse.

3.11.8 Wastewater treatment

The waste water is domestic sewerage (from toilets) and sewage water (hand wash, cleaning). Treated water shall be purified to the level of drinkable water as per



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WHO standards. Waste water will be treated and used for housekeeping/cleaning purposes. Surplus water will ultimately be discharged into the society main drains.

WWTP in TCCEC will be based on activated sludge process with alum dosing to remove biological and non-biological waste from the effluent water stream.

Activated sludge is a biological process that utilizes microorganisms to convert organic and certain inorganic matter from wastewater into cell mass. The activated sludge is then separated from the liquid by clarification. The settled sludge is then returned (RAS). Activated sludge is commonly used as a wastewater treatment process because it is an effective and versatile treatment process and capable of a high degree of treatment.

The process takes advantage of aerobic micro-organisms that can digest organic matter in sewage, and clump together (by flocculation) as they do so. It thereby produces a liquid that is relatively free from suspended solids and organic material, and flocculated particles that will readily settle out and can be removed.

The general arrangement of an activated sludge process for removing carbonaceous pollution includes the following items:

1. Aeration tank where air (or oxygen) is injected in the mixed liquor.
2. Settling tank (usually referred to as "final clarifier" or "secondary settling tank") to allow the biological flocs (the sludge blanket) to settle, thus separating the biological sludge from the clear treated water.

3.12 Restoration and rehabilitation plans

Proposed project site is a green field site where the site will be restored after the completion of the construction phase in the following manner:

- a. The waste generated from the construction phase will be removed and will be used for road construction and levelling of the plant area.
- b. The grassy lawns and orchards will be developed to reduce the carbon foot prints of the project.
- c. Horticulture elevation will be done in front of the plant entrance.



Government Approval

The important approvals are:

1. Approval from EPA under section 12 of PEPA, 1997 for construction and operation phase.
2. Approval of building plan by the SEZ.

Chapter 4: Description of The Environment

Environmental baseline study is a comprehensive description of the baseline conditions of the project area and includes environmental attributes or resources which are expected to be affected directly or indirectly due to the construction and operation of the project. The proposed new green field TCCEC project is located in district Lahore which is the biggest city of the province of Punjab, Pakistan. Lahore is the city of extreme economic activity as well as it has become densely populated and polluted during past few decades. This chapter of the report describe some main features of environment, culture and norms of this historical city to provide baseline conditions that exist without the project.

Normally baseline is collected for environmental parameters which are identified during the scoping stage. The existing environmental conditions around the project have been considered with respect to physical, biological, human environment and cultural Heritage aspects. The site visits were conducted for the data collection on environmental, physical, human, and biological parameters. Moreover, the public consultation was done with general public and main stakeholders in order to seek their opinion.

This section describes the prevailing environmental and social conditions present within the proposed project area, and details the importance of these resources in terms of the local, national and international context. The information presented in this section has been derived by a combination of desk study and field survey. The field surveys have included the air, water, soil, noise and socioeconomic.

4.1 Physical Environment

Location of Lahore City is bounded on the North and West by Sheikhpura district, on the east by India and on the south Kasur district River Ravi flows on the northern side of Lahore. Total land area of the city is 404 sq. Km. Altitude of the city lies between 31-15 and 31-45 North latitudes and 74-01 and 74-39 East longitude. Climate of Lahore city faces extremes climate, May, June, and July are hottest months. While December, January and February are the coldest months. Languages spoken in the city are Punjabi,



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Urdu and English. Extravagant language, maybe, but admirers have always vied with each other to immortalize this Pearl of the Punjab.

The physical environment includes the abiotic component of the environment on which biological life is dependent to survive. The physical environment of the project area is explained below:

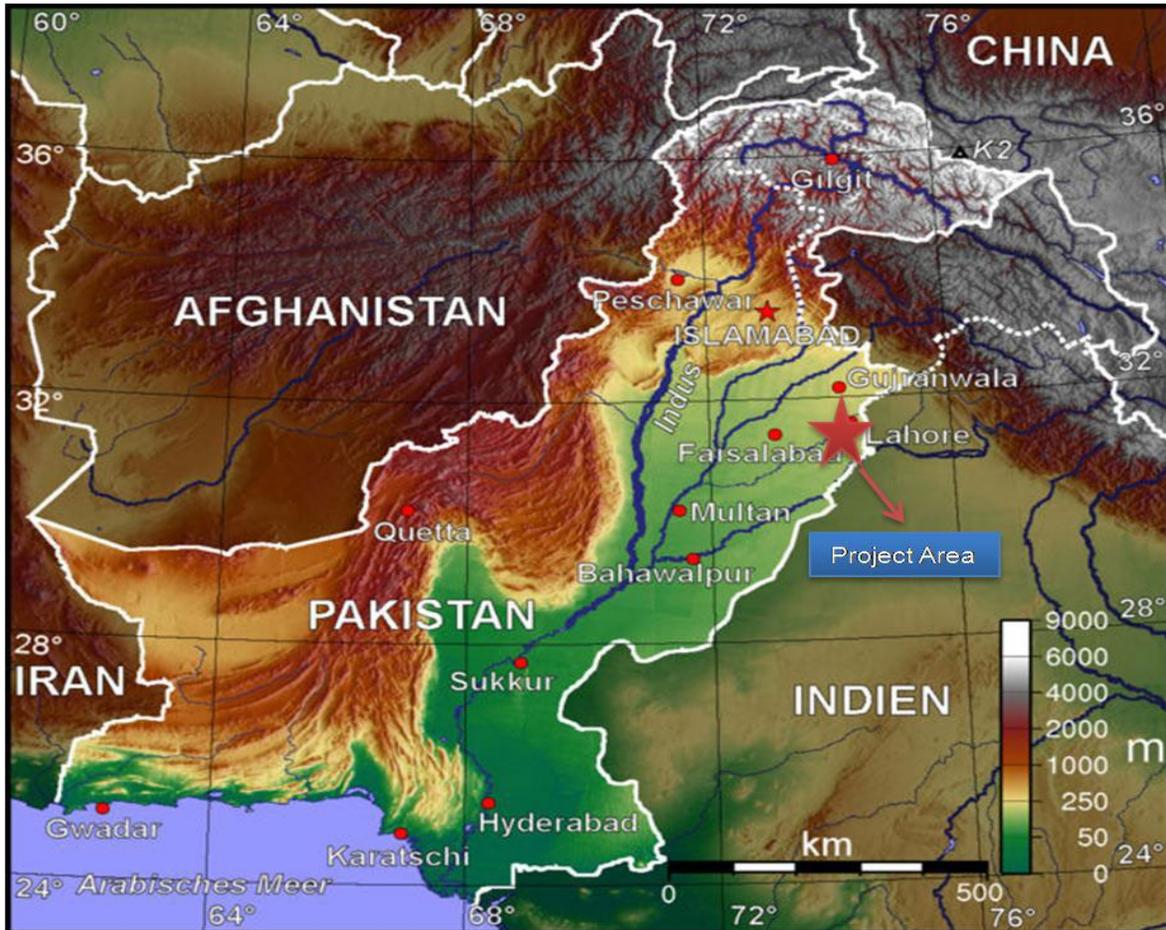
4.1.1 Lahore City Geography & Topography:

The topography of the area is flat. The height of the area is 220 meters above the mean sea level (MSL). The area of Lahore is divided into two parts. The low lying alluvial soil is along the Ravi River, and the Upland in the East. Upland is a plain slope from North-east to South-west. The low lands are generally inundated during the monsoon season by Ravi River, flowing in the West of district along its boundary with district Sheikhupura. Figure 4.1 represents the topography of the Lahore.

The soil deposits at the project area belong to the Chung Formation which shows the last glacial cycle. The clay, silt, and sand deposits are from late Pleistocene to Recent in age. Because of the withdrawal of the sea in late Tertiary time, shallow water and deltaic deposits were laid down. After that it became a huge flood plain in which debris from the different streams have mingled to load with huge thickness of alluvial material derived from the Himalaya. The great climate change during the Pleistocene period had impact on the sedimentation and physiography of this region. The presence of old channels of Ravi River indicates conformity of the stream oscillation to terrestrial rotation in the deflection of the streams. The abrupt migration shows excessive flooding due to which the earlier channels were choked with sediments and streams were forced to create new channels. These alluvial deposits comprise earthy brown to black silt, sand, and clay. The beds are largely hard, laminated, and sandy with interbeds of clay and layers and lenses of sand.

Geological map of the study area is given in the Figure 4.1. Project site is located in meander belt deposits. The project area does not have any valuable materials whereas scientific in depth investigations haven't been carried out. The economic minerals are kallar, kankar, sand, and clay.



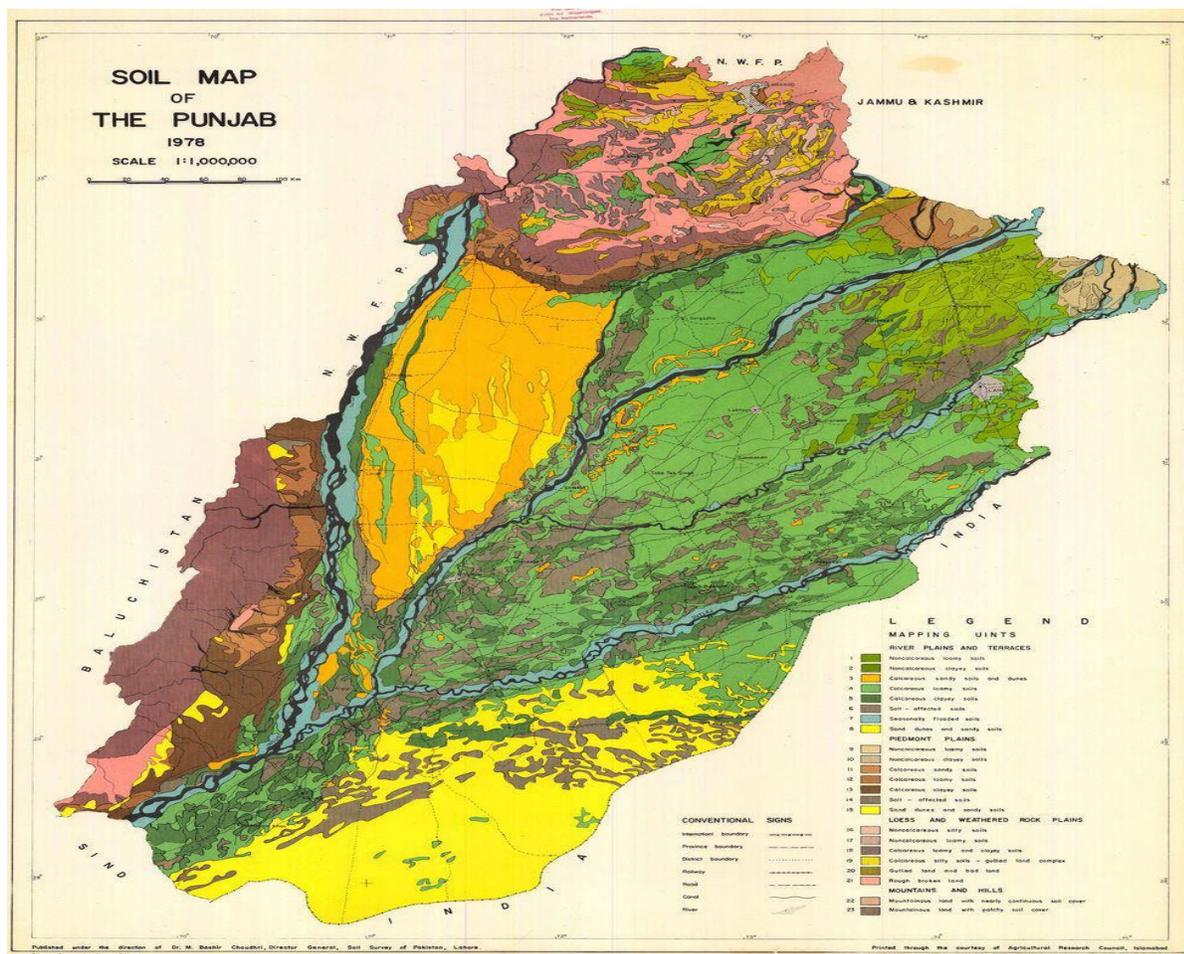
Figure 4.1: Topography of the Lahore

4.1.2 Soils

The soil in the project area is cohesion-less and is of alluvial type deposited by Ravi River. Soil layers includes silt, silty clay, silty sand, poorly graded sand with silt, lean clay etc. Soil map of the project area is given in the figure 4.2. Whereas it is rich is a potential plant nutrient. Rainfall is low and groundwater is saline and brackish at the shallow depth and irrigation is dependent on the canals. Tube wells have also been sunk at the greater depth where fresh water is available.

The chemical quality of the groundwater in the district varies with depth. However, the sweet potable water is available in a belt five to twenty miles wide paralleling River Ravi. Alluvium is soil or sediments deposited by the river or other running water. Alluvium is made up of variety of materials including fine particles of silt and clay and larger particles of sand and gravel. A river is continually picking up and dropping solid particles of rock and soil from its bed throughout its length. Where the river flow is slow, more particles are dropped than picked up. The areas where more particles are dropped are called alluvial or flood plains and the dropped particles are called alluvium.

Figure 4.2: Soil Map of Punjab (source: CDGL)



4.1.3 Climate

For the project design seasonal climatic conditions must be considered. The factors which influence the climatic conditions are air, humidity, precipitation, temperature, and evaporation.

For determination of overall effect of the climatic stresses, daily and seasonal temperature changes, site altitude, direct solar radiation, and precipitation must be considered. The project area has extreme climate, it has hot summers and cold winters. The summer starts from April and lasts till September. May, June, and July are hottest months. The mean maximum and minimum temperatures are 40.4°C and 27.3°C for these months. The winter season lasts from November to March. December, January, and February are the coldest months. The mean maximum and mean minimum temperature ranges from 21.1°C to 7.2°C in January. Temperatures in the project area vary from - 2.2°C to 40.4°C. The project area receives rain in all the seasons but monsoon rain is pronounced and constitutes a definite rainy seasons between the months of July and September. The average rainfall is about **630 to 760 millimeters** per year.

4.1.4 Noise

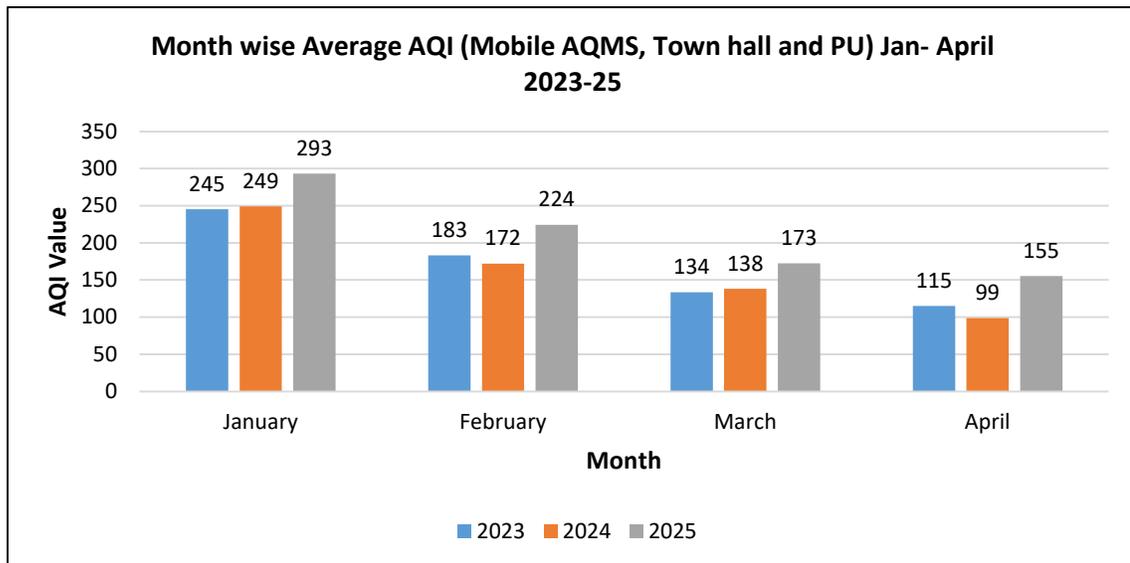
Noise pollution (environmental noise) is unpleasant to human or machine created sound that disrupts the activity or balance of human or animal life. A common form of noise pollution is from transportation, mostly from motor vehicles. The sources of most noise worldwide are transportation system, motor vehicle noise, along with aircraft noise and rail noise. Poor urban planning may give rise to noise pollution in the residential area. Other sources are car alarms, office equipment, factory machinery, construction work, audio entertainment systems, loudspeakers etc. the urban area has elevated levels of noise which may reach till 85 to 90 dBA at busy roads but the SEZ has silent area where noise ranges from 40-60 dB(A) depending upon the location.



4.1.5 Air Quality

Atmospheric pollution, particularly in urban areas like Lahore, has a strong impact on daily life. According to a study conducted by the Urban Unit of P&D department, 82 percent air pollution is contributed by the motor vehicles. However, factories and cottage industry inside the Lahore city are also contributing to the air pollution which has 9% role in air pollution. Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂), carbon dioxide (CO₂), Carbon monoxide (CO), Ozone (O₃), and particulate matter (PM_{2.5}) are considered pollution indicators.

Month wise Average AQI (Mobile AQMS, Town hall and PU) Jan- April 2023-25			
Month	2023	2024	2025
January	245	249	293
February	183	172	224
March	134	138	173
April	115	99	155



According to the data of air quality notified on the website of EPD October to December are the major polluted months where AQI remains in the range of 300 to 400. However, pollution only rose to the top of the public's consciousness in early 2017, when actionable air quality data was published for the first time in Pakistan. In the absence of publicly available government data, a network of citizen-operated sensors began to

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monitor fine particulate matter, also known as PM_{2.5}, and report data in real-time. The data laid bare Lahore's high levels of air pollution, shocking the public and becoming a media talking point.

The resulting publicity led to a public interest petition to review the government's response to the smog crisis, which was heard at Lahore's High Court in November 2017. The court ordered authorities to prepare an updated smog response action plan, and publish daily pollution updates until able to publish hourly updates, as the non-government monitors do.

Government Punjab has come up with special policy and laws to combat air pollution in the city. Punjab Clean Air Policy 2023 and Punjab Smog rules 2023 are one of them. Punjab government has spent 15000 million rupees on special measures to curb air pollution in the city but still smog prevails in the city up to hazardous level.

4.1.6 Waste Management

Lahore having a population of approximately 11 million is experiencing urban sprawl and industrialization leading to generation of huge amount of solid waste from many sources like house hold waste, commercial activities, industries, hospitals, construction and demolition waste, animal waste all of which are contributing to environmental and health hazards.

Estimated per capita per day waste generated is 0.65 kg and the total waste generated is about 5700 tons/day. The lifting capacity of the solid waste management department is about 4500 tons/day. Around 350-450 tons of organic waste is utilized for compost preparation by private contractors under public private partnership contract with city district government Lahore (CDGL).





Environment Protection Agency Punjab through executive orders has bound the business companies to adopt solid waste segregation at source and adopt colored plastic bins for different kinds of wastes.

1. Glass green bin
2. Metal red bin
3. Organic grey bins
4. Plastic orange bin
5. Papers yellow bins



**THIS BUSINESS IS
EPA WASTE WISE
CERTIFIED**

Paper



Glass



Organic



Metal



Plastic



Call 1139
for Waste Collection
Call 1373
for Certification

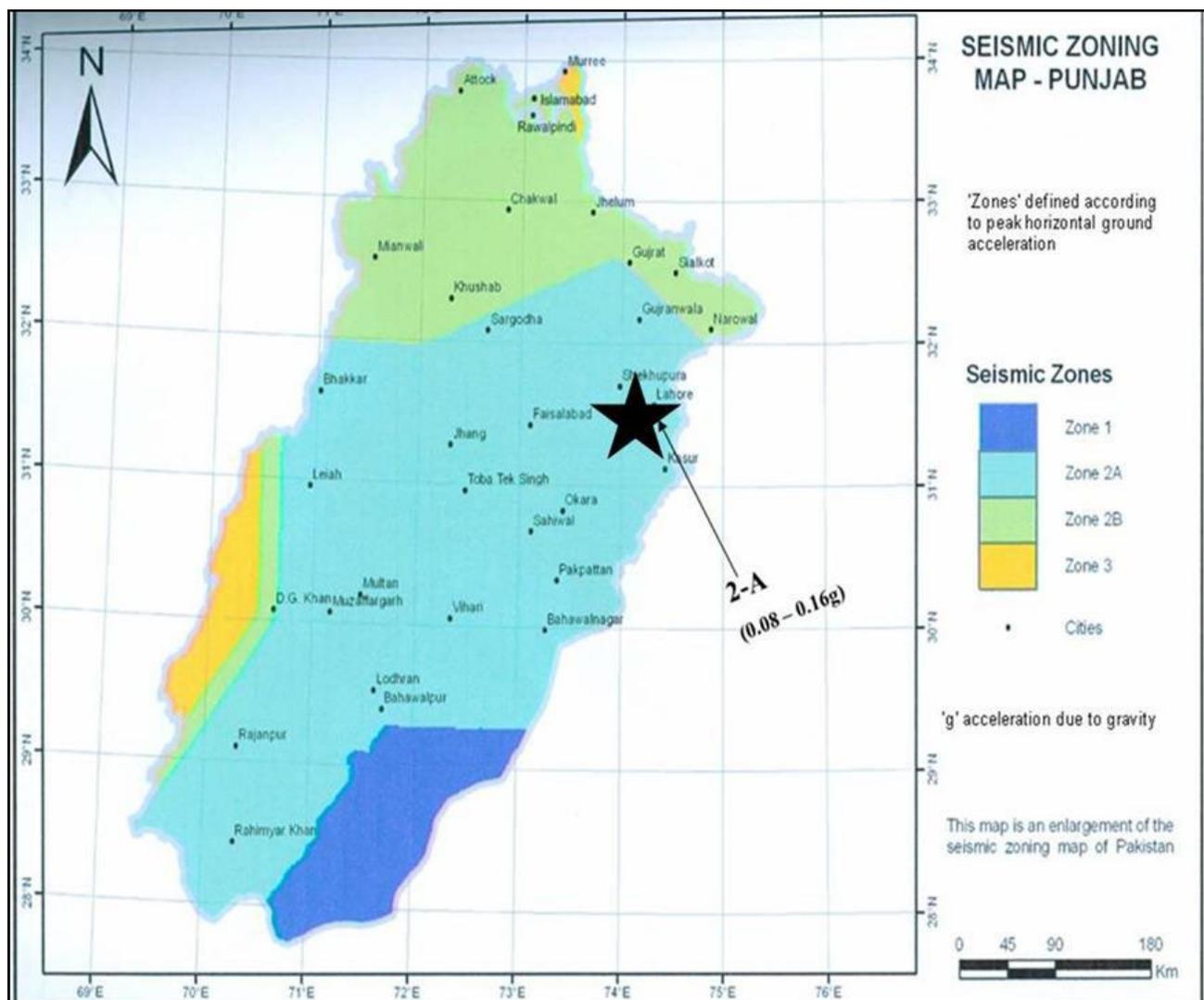




4.1.7 Seismology

The study area is located in the tectonic zone of down wrap and platform slop in the seismic zone of noticeable earthquake from 3.1 to 4.9 on Richter scale. According to the building code of Pakistan it is located in the seismic zone 2A of Pakistan. Zone 2A represents peak ground acceleration (PGA) from 0.08 to 0.16 g. The map showing the seismic zoning is given in figure 4.3.

Figure 4.3: Seismic zoning map



4.2 Water Resources

The study area forms the upper part of the Punjab plain, which is a part of Indo-Gangetic depression. The depression is of synclinal nature. Synclinal depression is a fore deep downward of the Himalayan foreland of variable depth, converted into flat plains by simple process of alluvial deposition. The aquifer underlying the study area comprises unconfined alluvium with a thickness of about 1050 feet as a part of regional ground water investigation.

It is parts of larger inter alluvial Upper Bari Doab, which is bounded by the River Ravi in Northwest and the Sutlej River to the Southeast. The Bari doab along with other Doabs like Rechna, and Chaj form the vast alluvial plains which are part of the Indus plain in the Punjab. The alluvium is derived from the erosion of mountain ranges in North. It has been deposited and reworked by the large meandering rivers and tributaries of the Indus River and comprises a random distribution of fine to coarse sand with lenses of silty clay and clay of varying thickness and extensions. Borehole logs for tube wells shows that the lenses of less permeable material are neither thick nor continuous so, in spite of their heterogeneity, the alluvial sediments constitute an aquifer which on regional basis behaves as a single homogenous unconfined water body.



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But the proposed project will not have any adverse effect on neither surface water body nor underground resources as it is equipped with up to date management system that recycle and reuse wastewater along with rain water collection.

The project area is irrigated through water canals built for this purpose during 1901 to 1910 AD. This area is irrigated by the butcher khana distributary bringing water from the BRB canal.

4.2.1 Drinking Water Quality

The major source of drinking water supplied to Lahore is through ground water reservoirs. Thus, quality of groundwater is very important in terms of public health. The proposed project is a warehousing facility with no extra burden on any of the resources of water.

4.3 Biological Environment

Biodiversity is the degree of variation of life. It is a measure of the variety of organisms present in ecosystems. This can refer to genetic variation, ecosystem variation, or species variation (number of species) within an area. Ecological data presents the entire detail of the biological parameters of the project area; i.e. flora and fauna of the area; specifically mentioning the endangered plant and animal species and the prevailing vector organisms and pathogens (if any) in the project area.

The climate of Lahore is semi-arid and subtropical, the vegetation of the area falls under scrub, dry, tropical thorn forest type as per Phyto-geographical classification of the area. The project area was once covered with thick vegetation consisting of trees like Karir (*Capparis deciduas*), Wan (*Salvadora Oleoides*), and Jand (*Prosopis Spicigera*). With passage of time and rapid urbanization and development this vegetation was cleared earlier for agriculture purpose and then for industrial and commercial activities. These agriculture lands were then converted into business centers, Multi story Plazas and Industrial colonies.



4.3.1 Flora

Lahore is famous for its gardens and also known as “City of Gardens.” Once Lahore had beautiful old gardens, trees, but now with the rapid development all such things are vanishing rapidly. These green areas and old endemic trees of Lahore were home to many resident birds’ species as well as many summer, winter, and transit migrants, so Lahore is very important due to its ecological conditions. Several types of floral species are present in Lahore, whereas principal trees, shrubs, and herbs are given in the table with their nomenclature including local names, English names and botanical names. These trees data is acquired from PHA (Parks and Horticulture Authority).

Table 4.1 Inventory of some Flora of Lahore

No.	Common Names	Botanical Names
1	Arjun	<i>Terminalia arjuna</i>
2	Dhak	<i>Butea frondosa</i>
3	Mahwa	<i>Bassia latifolia</i>
4	Bahara	<i>Terminalia bellerica</i>
5	Amaltas	<i>Cassia fistula</i>
6	Gul-e-nishter	<i>Erytrina subrosa</i>
7	Barringtonia	<i>Barringtonia acutengula</i>
8	Neam	<i>Melia indica</i>
9	Gab	<i>Diospyores embryopteris</i>
10	Berna	<i>Crateva religiosa</i>
11	Khark	<i>Celtus australis</i>
12	Putajan	<i>Putranjiva roxburgi</i>
13	Fiddle wood/Kashmir Lagotis	<i>Eithrxillum ruberratum</i>

14	Gul-e-mast	<i>Dalinia indica</i>
15	Gul-e-mohr	<i>Poinciana regia</i>
16	Alstonia	<i>Alstonia scholaris</i>
17	Ashoke	<i>Saraca indica</i>
18	Sheesham	<i>Dalbergia sisso</i>
19	Alata	<i>Stercolia colorata</i>
20	Kenair	<i>Nerium grandiflora</i>
21	Weeping Willow	<i>Salix babylonica</i>
22	Keekar	<i>Parkinsonia aculeate</i>
23	Nilem	<i>Jacaranda mimosfolia</i>
24	Kachnar	<i>Bauhinia purpurea</i>
25	Molsary	<i>Mimosop elengi</i>
26	Bel	<i>Aegle marmelos</i>
27	Siris	<i>Albizia lebbek</i>

Lahore is rich in ecological species, but along with that it also has different types of shrubs and herbs. Table 4.2 represents the details of shrubs and herbs with their common and English names.

Table 4.2: Inventory of Shrubs in Lahore

No.	Common Names	Botanical Names
1	Marwa	<i>Murraya exotica</i>
2	Gul-e-fanoos	<i>Lagerstromia indica</i>

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3	Golden Durant	Duranta plumier
4	-	Exocaria bicolor
5	Jasmin	Gardenia jasmonoidis
6	Firebush	Hamelia patens
7	Jasmine	Jasminum grandiflora
8	-	Lantana alba
9	Henna	Lawsonia inermis
10	Haar Singhaar	Nyctanthes arbotrists
11	Tecoma	Tecoma stans
12	Queen of night	Cestrum nocturnum



4.3.2 Fauna

4.3.2.1 Mammals

Commonly found mammals in the area include dogs, cats, horses, house rats, and bats. However Small Indian Mongoose and Indian Palm Squirrel are also found in the area.

4.3.2.2 Reptiles

Lizards such as Spiny tailed lizard (*Uromastix hardwickii*) and fingered toed lizard (*Acanthodactylus cantoris*) are also found in the area.

4.3.2.3 Amphibians

The amphibians found in the area include common frog (*Rana tigrina*) and Indus valley toad.

4.3.2.4 Birds

House Sparrow (*Passer domesticus*), House crow (*Corvus Splenders*), are commonly found in the area. Along with these some of other birds were also found such as:

1. Nightingale (*Pycnonotus cafer*)
2. Parrot (*Psittacula krameri*)
3. Pigeon (*Columba livia*)
4. Hoopoe (*Upupa epops*).

4.3.3 Endangered Species

No threatened or endangered species are found in the project site. Similarly, no wildlife is present.



4.4 Socio Economic Assessment

Lahore has the most developed education and health sectors in Pakistan, making it the economic, Technological, political and educational hub of the Pakistan.

Social change is the consequence of almost any intrusion into the community life of any society. The intrusion can be in the form of any developmental projects or nonspecific, less tangible forms such as increased exposure to other cultures, technological changes and so on. The social change that results from intrusion into community life can also be beneficial, but can have undesirable or negative outcomes. Even that change in the long run may have positive effect on the social wellbeing of a community.

Social Impact Assessment is a methodology used for examining social change due to external sources, especially specific developmental projects, but also government policies, technological changes and social processes or anything that has a social impact.

The objectives of the given study are outlined as follow:

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

4.5 Social Environment

This section explains the social conditions of the people living in the area. It was determined through field surveys and interviews were conducted with residents, shopkeepers, road users, and major stakeholders. Their livelihood and professions



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were also identified so that their role and conditions in environment can be better understood.

4.5.1 Demographic Characteristics of the project area

The total population of Lahore District was 6,318,745 as counted in March 1998 with an increase of 78.3% since March 1981 when it was 3,544,942 souls. The average annual growth rate of population in the district during 1981-1998 was 3.5 percent. The total area of the district is 1772 square kilometers, which gives population density of 3,566 persons per square kilometer as against 2000 persons observed in 1981 indicating a fast growth rate of the population, its increase, and average annual growth rate since 1951 of Lahore district.

The results of the **2017 Census** determined the population to be at 11,126,285, with an annual growth rate of 4.07% since **1998**. Gender-wise, 52.35% of the population is male, while 47.64% is female and transgender make only 0.01% of the population.

4.5.2 Religion

The city has a Muslim majority and Christian minority population. There is also a small but longstanding Zoroastrian community. Additionally, Lahore contains some of Sikhism's holiest sites, and is a major Sikh pilgrimage site. According to the 1998 census, 94% of Lahore's population is Muslim, up from 60% in 1941. Other religions include Christians (5.80% of the total population, though they form around 9.0% of the rural population) and small numbers of Bahá'ís, Hindus, Ahmediya, Parsis and Sikhs. Lahore's first church was built during the reign of Emperor Akbar in the late 16th century, which was then leveled by Shah Jahan in 1632.





4.6 Health Facilities

- Health care services are provided to the citizens by both public and private sector hospitals. List of private hospitals is given below:
- Cosmos Health Services (Muslim Town, next to Inmol and CPSP)
- Bilquees Sarwar Hospital (Ferozpur Road)
- ZhongBa Hospital (Johar Town)
- Aadil Hospital (D.H.A Lahore)
- Physiotherapy Hospital (Lahore, Johar Town)
- Al-Khidmat Hospital, Multan Road
- Ali eye hospital
- Arif Memorial Teaching Hospital
- Shaukat Khanum Memorial Cancer Hospital & Research Centre, Lahore
- Avicenna Hospital
- Pain Hospital Lahore
- Bahria Town Hospital
- Bajwa Hospital, Iqbal Town

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- City Hospital Mohlanwal Lahore
- Chaudhary Muhammad Akram Teaching & Research Hospital 17 km Raiwind road,Lahore
- Doctors Hospital
- Farooq Hospital
- Fatima Memorial Hospital
- Family Hospital
- Fauji Foundation Hospital
- Ganj Baksh Spinal Research & Rehabilitation Hospital
- Ghurki Trust Hospital
- Gulberg Hospital
- Hameedah Memorial Hospital (Valencia Housing Society)
- Haleema Memorial Foundation Hospital
- Hameed Latif Hospital
- Hijaz Hospital
- Ittefaq Hospital
- Masood Hospital
- Mid City Hospital, Lahore
- Mumtaz Bukhtawar Memorial Trust Hospital Raiwind Road,Lahore. Unit 2
- National Hospital
- Prime Care Hospital
- Ramzan Ali Memorial Hospital
- Salma Sarfraz Hospital
- Shalamar Hospital (Institute of Health Sciences)
- Shaukat Khanum Memorial Cancer Hospital & Research Centre
- Omar Hospital & Carddiac Center (Jail Road)
- OMC, Jail Road
- Surgimed Hospital
- Surraya Azeem Hospital, Chowburji Chowk, Lahore
- Makhdoom Hospital



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- Zahida Welfare hospital
- Mumtaz Bukhtawar Memorial Trust Hospital Wahdat Road, Lahore. Unit 1
- University Dental Hospital - University of Lahore
- University Teaching Hospital - University of Lahore
- Zia Hospital, Ferozpur Road
- Health Bridge Hospital



Military Hospitals

- Combined Military Hospital Lahore

Semi-Private Hospitals

- Gulab Devi Chest Hospital
- Public Hospitals
- Jinnah Hospital
- The Children's Hospital
- Lady Aitchison Hospital
- Lady Willingdon Hospital
- Lahore General Hospital
- Mayo Hospital
- Nawaz Sharif Social Security Hospital, Multan Road

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- Punjab Institute of Cardiology
- Punjab Social Security Hospital
- Railway Karen Hospital
- Services Hospital
- Punjab Institute of Mental Health
- Shaikh Zayed Hospital
- Sir Ganga Ram Hospital
- Janki Devi Hospital
- Wapda Hospital

4.7 Educational Facilities

Lahore is known as Pakistan's educational capital, with more colleges and universities than any other city in Pakistan. Lahore is Pakistan's largest producer of professionals in the fields of science, technology, IT, engineering, medicine, nuclear sciences, pharmacology, telecommunication, biotechnology and microelectronics, nanotechnology and the only future hyper high-tech center of Pakistan. Most of the reputable universities are public, but in recent years there has also been an upsurge in the number of private universities. The literacy rate of Lahore is 74%.



Coca-Cola

- Lahore hosts some of Pakistan's oldest educational institutes:
- St. Francis High School, established in 1842
- King Edward Medical University, established in 1860
- Forman Christian College, established in 1864
- Government College University, Lahore, established in 1864
- Convent of Jesus and Mary, established in 1867
- University Law College, established in 1868
- National College of Arts, established in 1875
- Oriental College, established in 1876
- University of the Punjab, established in 1882[149]
- University of Veterinary and Animal Sciences, established in 1882
- Central Model School, established in 1883
- Aitchison College, established in 1886
- Muslim Model High School, established in 1890
- Islamia College, established in 1892
- St. Anthony's High School, established in 1892
- Sacred Heart High School, established in 1906
- Queen Mary College, established in 1908
- Dayal Singh College, established 1910
- Kinnaird College for Women University, established in 1913
- University of Engineering and Technology, Lahore, established in 1921
- Lahore College for Women University, established in 1922
- Hailey College of Commerce, established in 1927

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- De'Montmorency College of Dentistry, established in 1929
- M.A.O College, established in 1933
- Lady MacLagan Training College, established in 1933
- Lady Willingdon Nursing School, established in 1933
- University College of Pharmacy, established in 1944
- Jamia Ashrafia, established in 1947
- Fatima Jinnah Medical University, established in 1948
- College of Statistical and Actuarial Sciences, established in 1950
- College of Home Economics, established in 1955
- Don Bosco High School, established in 1956

	
<p>Superior university in the project area</p>	<p>Nur international university in the project area.</p>

4.8 Transportation and Communication

Lahore enjoys air, rail & road connections with rest of the country. The Allama Iqbal International Airport caters the needs of Lahore and its adjacent cities, as regular national & international flights are made from here. Lahore is a major railway junction serving links to major cities. On the south of Lahore National Highway N-5 links Multan, on North West & North runs Motorway M-1 and National Highway N-5 towards Gujranwala. On the west it is linked with Textile city of Faisalabad with a 4-lane highway, built on BOO (Built operate & Own) basis.

A historical Grand Trunk road which was a major artery during subcontinent era, originally built by Sher Shah Suri, the Afghan ruler, leads toward Indian border passing through the city. There is a network of metaled roads in the district. It is connected other major cities and towns with a very sophisticated network of roads. It is also connected with the capital of Pakistan and other major cities through the M2 Motorway link.

The Lahore Railway station is one of the oldest station in the country, and serves as the main connecting point for rail services to many cities and routes. The station building is another example of the magnificent architectural beauty of the city.

Lahore airport is one of the busiest airports of the country after Karachi international terminal. A newly built international terminal, Allama Iqbal International Terminal, helps in the locomotion of passengers to other countries. It greatly facilitates and improves the air transits to and from the Lahore city. Major roads are:

- Controlled access
 - Lahore Ring Road
- Major streets
 - Canal Bank Road
 - Ferozpur Road
 - Gulberg Boulevard
 - Hall Road



- Jail Road
- Mall Road
- M. M. Alam Road
- Multan Road
- Shalimar Road

4.9 Economical Activities

The economy of Lahore has a diversified base spanning from telecommunication, information technology, manufacturing industry, engineering, pharmaceuticals, steel, chemicals and construction material. As a major urban center, the economy of Lahore has relatively prospered. Lahore is hailed as the industrial belt of Pakistan and is home to the largest IT park in Pakistan. It is the country's second largest economic hub and the commercial capital of Punjab. In 2008, the city was ranked with high efficiency to be classified as a gamma world city.

The economy is also enhanced by Lahore's historic and cultural importance. Being the capital of the largest province in Pakistan brings the city one of the largest development budgets in the country. It is also the most advanced in terms of infrastructure, having extensive and relatively well developed road links to all major cities in Punjab and Khyber Pakhtunkhwa, a rail link with India and the province's biggest international airport. As Lahore expands, former residential areas are being turned into commercial centers, and the suburban population is constantly moving outwards. This has resulted in the development of the Liberty Market, M. M. Alam Road, the new Jail Road (which has some of the largest office buildings in Lahore), and the Main Boulevard.

	
<p>Modern transport in Lahore.</p>	<p>Orange line another modern transport, Lahore.</p>

4.10 Electric Supply

LESCO Power supply will be available at the proposed site.

4.11 Telephone Facilities

Lahore has the most developed communications infrastructure in the province, which includes a wide network of fiber optic telephone and cable lines, GSM mobile network, IPP and WiMAX.

4.12 Quality of Life Values

Quality of life values is represented by the human and economic development and quality of life values. For the study of socio-economic environment of the project area, field surveys were conducted and interviews were held with the general public and neighbors.

4.12.1 Dress

Majority of the people wears Qamiz and Shalwar. English dress; shirt and trousers are rarely seen. Workers normally wear shalwar qamiz in other small factories but there are factories where uniform are the necessary requirement.

4.12.2 Sites of Historical Significance

Lahore remains a major tourist destination in Pakistan. The Walled City of Lahore was renovated in 2014 and is popular due to the presence of two recognized UNESCO World Heritage Sites.

Among the most popular sights are the Lahore Fort, adjacent to the Walled City, and home to the Sheesh Mahal, the Alamgiri Gate, the Naulakha pavilion, and the Moti Masjid. The fort along with the Shalimar Gardens has been a UNESCO World Heritage Site since 1981.

The city is home to several ancient religious sites including prominent Hindu temples, the Krishna Temple and Valmiki Mandir. The Samadhi of Ranjit Singh, also located near the Walled City, houses the funerary urns of the Sikh ruler Maharaja Ranjit Singh. The most prominent religious building is the Badshahi Mosque, constructed in 1673; it was the largest mosque in the world upon construction. Another popular sight is the Wazir Khan Mosque, known for its extensive *faience* tile work and constructed in 1635.

Old city of Lahore is known for the grandeur of its Mughal architecture and is unique in ancient wooden balconies, temples, gurdawaras, havelis, narrow winding streets and busy bazaars.

4.13 Lab Reports

In order to assess the baseline conditions of the project area, following environmental components were monitored by the Pak Green certified environmental lab;

- Ambient air quality monitoring,
- Noise monitoring,
- Water sampling and analysis

Environmental baseline monitoring was conducted at different locations. The details of the sampling/ monitoring locations along with discussions on result are given in subsequent sections.



4.13.1 Ambient Air Quality

Pakistan lacks a comprehensive and effective air quality monitoring system that can be used to track and address specific instances of air pollution and air quality degradation. At present, monitoring of urban air pollution in Pakistan is limited to isolated instances where air pollutants are measured for brief periods at selected locations. Urban locality, city, region, or countrywide continuous or repeated air quality monitoring data does not exist. Similarly, there is no formal system of air quality data storage and reporting.



PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
(Environmental Laboratories Division)

ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +92-42-35441444 Cell: 0303-4442334

PGG/IMS/FF/063 Rev.#03 Rev date: 16-06-25

EPA Certified

Report Limitation: "This report is not valid for any Court Cases, Environmental Protection Orders, Compliance Reports for Operational Phase Approvals, or any regulatory action under Punjab Environmental Protection (Smog Prevention and Control) Rules, 2023, etc."

TEST REPORT

Ref #: PGG/LAB/2025-9939/AA

Issue date: 10-Dec-25

Name of Industry/Client:
Site Location:
Nature of Monitoring:
Monitoring By:
Monitoring Instrument:
Monitoring Date:

The Coca Cola Export Corporation (TCCEC) New CPS Plant
Near Sunder Industrial Estate, Lahore
Ambient Air (24 Hours)
Pak Green Laboratories
AQMS
03-Dec-25 to 04-Dec-25

Results:

Sr. No.	Time	CO	NO	NO ₂	SO ₂	PM ₁₀	PM _{2.5}
		mg/m ³	µg/m ³				
1.	10:00 AM	1.96	11.36	28.21	44.76	167.5*	64.2*
2.	11:00AM	1.80	12.12	29.22	45.75		
3.	12:00 PM	2.06	13.33	30.84	50.98		
4.	1:00 PM	1.99	11.92	32.27	42.02		
5.	2:00 PM	2.12	11.11	33.48	42.86		
6.	3:00 PM	1.88	12.39	29.63	41.39		
7.	4:00 PM	1.86	10.88	33.69	41.98		
8.	5:00 PM	1.91	11.81	35.11	40.95		
9.	6:00 PM	2.02	13.55	36.33	41.42		
10.	7:00 PM	2.08	13.62	33.28	40.80		
11.	8:00 PM	1.95	11.29	31.05	41.45		
12.	9:00 PM	1.97	12.48	29.42	43.91		
13.	10:00 PM	1.87	10.35	28.81	42.02		
14.	11:00 PM	1.95	12.35	28.00	40.84		
15.	12:00 AM	1.90	14.24	29.63	44.02		
16.	1:00 AM	2.01	11.81	33.08	41.53		
17.	2:00 AM	2.04	12.79	28.61	41.66		
18.	3:00 AM	1.77	11.49	29.42	43.24		
19.	4:00 AM	2.01	12.73	29.63	40.05		
20.	5:00 AM	1.73	11.30	32.87	39.91		
21.	6:00 AM	2.33	12.42	33.48	47.71		
22.	7:00 AM	1.80	9.99	34.90	42.63		
23.	8:00 AM	2.06	12.11	36.33	41.64		
24.	9:00 AM	1.01	13.84	37.14	43.50		
Average (24 Hours)		1.92	12.14	31.85	42.79	167.5*	64.2*
PEQS		5 8hours	40 24hours	80 24hours	120 24hours	150 24hours	35 24hours

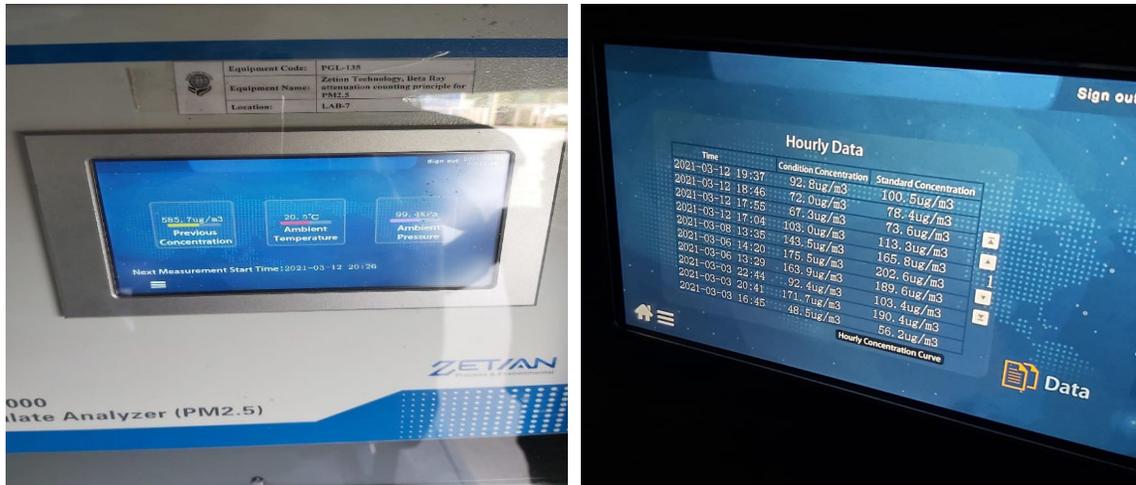
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The proposed project is located in fairly open and clean air and is mostly surrounded by diverse agriculture lands and villages. Ambient Air quality monitoring was carried out to observe the present condition of the project area. The recent monitoring was carried out within the premises of project site in order to find the present concentration values of SO₂, NO_x, ozone and CO and PM₁₀. The results given below shows that all the parameters are within PEQS limits except PM₁₀. The particulate matter remains high during the winter season in the atmosphere of Lahore. So it was found higher to PEQS at the site as well.

Ambient air quality was measured with monitoring devices by Pak green Laboratory, that have the capability to capture & analyze criteria air borne pollutants including CO, NO₂ and SO₂ at micro levels. Complete report results are also attached as Annexure I of the report.

The proposed project does not involve any process at all during operation phase that may deteriorate air quality. Therefore, air quality will be changed because of the proposed TCCEC project. At CPS plant CO, SO₂ and PMs are monitored on hourly basis during plant operation to ensure air quality remains undisturbed. As shown below:



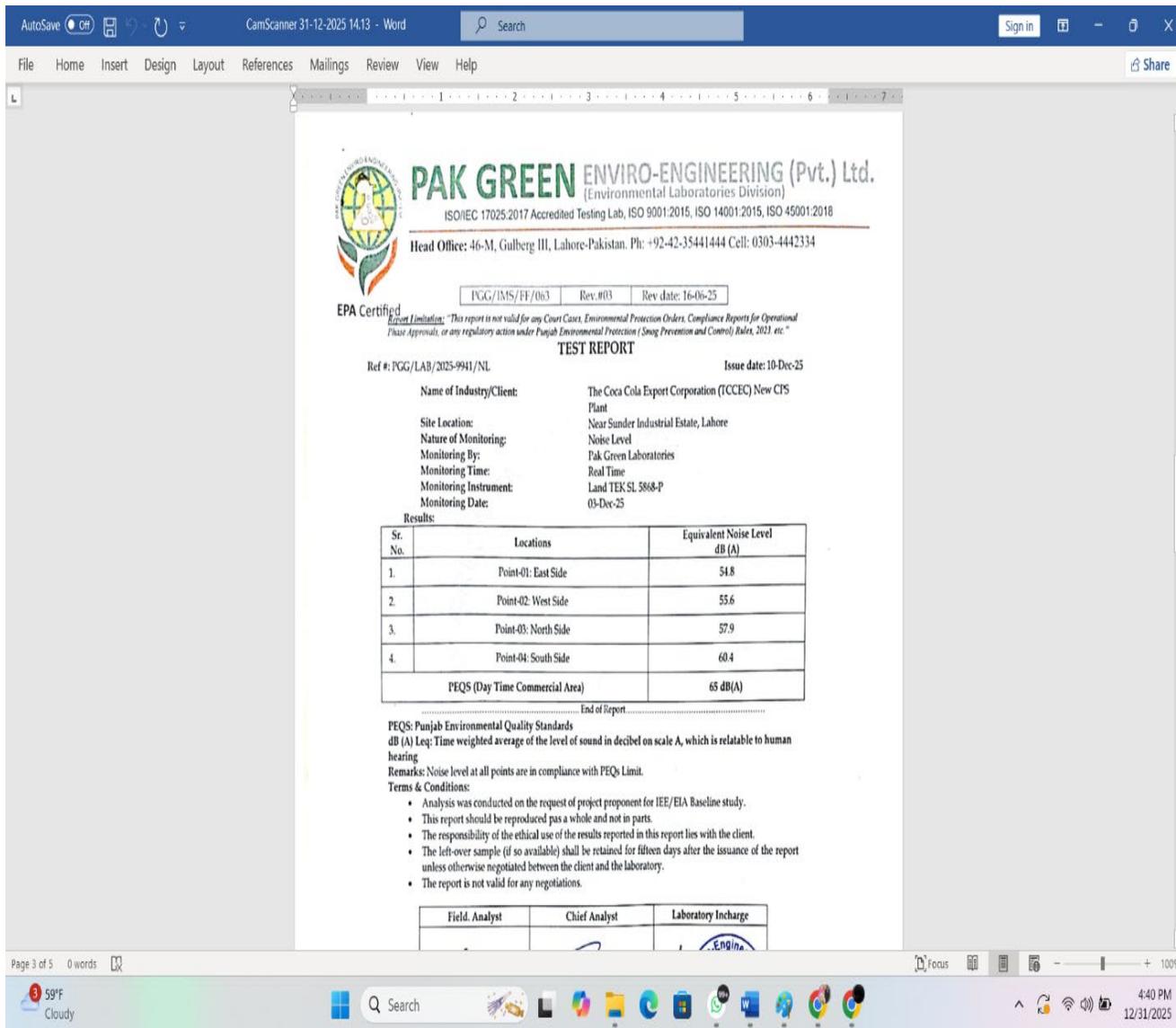


4.13.2 Noise Monitoring

There is no continuous major source of noise in the project area. Intermittent sources include farm tractors, farm equipment, road and operational activities of some industries. Considering the intermittent nature of these noise sources, it can be concluded that the noise pollution in the area is low. The Punjab Environmental Quality Standards (PEQS) for industrial area are 75 d B(A)L, while 65 d B(A)L for night.



Noise monitoring at the site

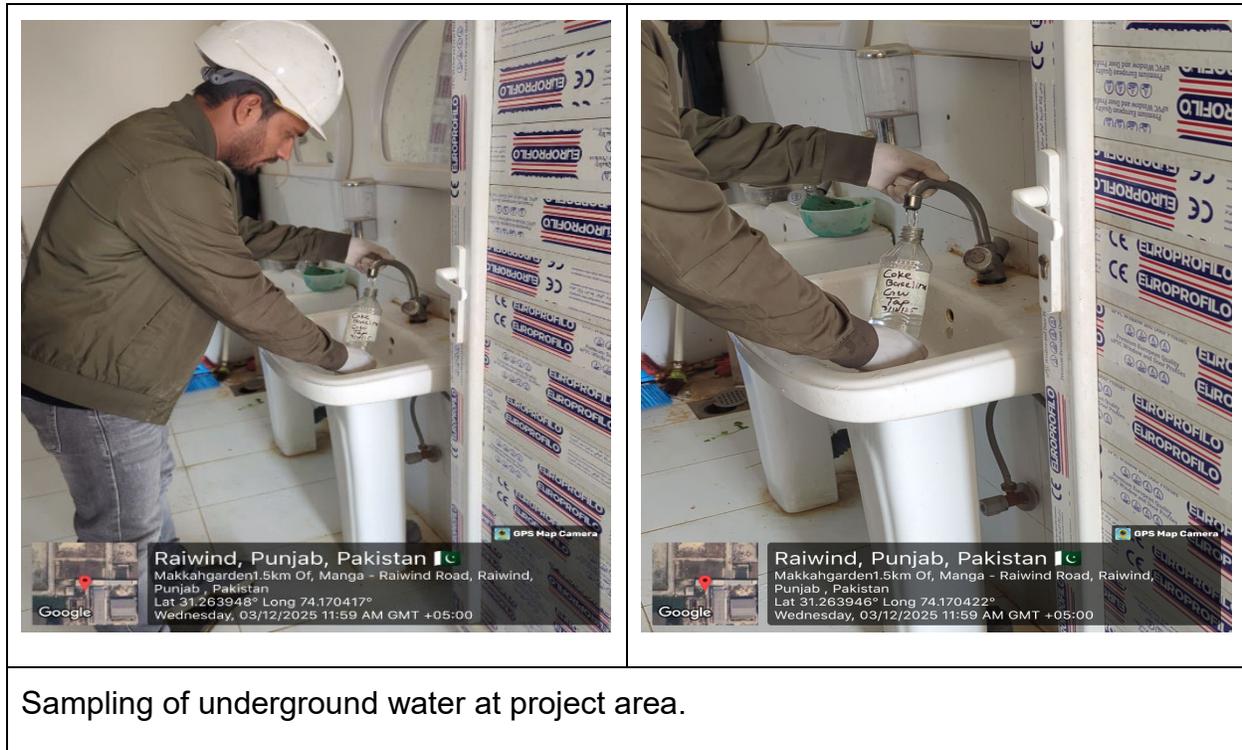


The results of the noise survey conducted on plant boundary are presented in **Annexure II**. It can be inferred from the results that the noise levels for 24 hours are within the prescribed limits and therefore do not have a harmful effect on the communities living in the vicinity of the proposed project.



4.13.3 Water Quality

To assess the water quality of the project area the physical, chemical and biological parameters of ground water were analyzed. The shallow water turbine sample at site sample was taken and analyzed. Results of the laboratory analysis of water are below (**annexure III**).



Chapter 5: Review of Project Alternatives

Alternatives are generated and examined to determine the best method of achieving project objectives, while minimizing environmental impacts. The discussion and analysis of alternatives in Environmental Impact Assessment (EIA) should consider other practicable strategies that will promote the elimination of negative environmental impacts identified.

This section covers the project alternatives which were examined for the proposed project at Lahore district, Punjab Province. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options will be adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of appropriate option that was required to ensure optimal results within defined set of economic, environmental, health and safety constraints. In particular, it outlines the following project options:

- The “No Development Option”.
- Alternative Project Timelines
- Alternative Site Option.
- Technology Alternatives

5.1 No Development Option

The purpose of this expansion is primarily to increase storage capacity at the Concentrate Plant, Raw Materials Warehouse & the finished goods in Pakistan and neighboring countries. If not development is done, the capacity of the TCCEC in Pakistan will remain as such and no development in the coke business will be made. Further, it is very difficult to find a Standardized 3rd Party quality warehouse complying with KORE. An external/rental warehouse of 2000 pallet positions shall have extremely high rental



TCCEC Environmental Impact Assessment Report (EIA) for new green field plant cost approximately around \$500 K per year. Therefore, it is unavoidable to not built a new warehouse for finished goods and other equipment packing the operation hall.

5.2 Alternative Project Timelines

Coke is one of the most famous brand not only worldwide but also in Pakistan it is consumed in large amount. Its demand is increasing every year with increase in population. To fulfill the increasing demands coke plant needs to store more finalized product before sending them to bottles. Present plant at Pajian has reached its full capacity and there is no space in it for expansion.

With the development of Pak-China corridor new horizons will be opened for TCCEC Lahore plant to export coke concentrate other countries like Afghanistan, Iran and other neighboring countries, in that case existing capacity of coke is to be increased to compete with the market demand.

5.3 Alternative Site Option.

The existing plant has no space to be expanded. Furthermore, the area has been declared green in the master plan. Therefore, new land for industrial establishment cannot be purchased in Pajian.

Construction of new plant requires a lot of Land and infrastructure. Special Economic Zone has been declared offering incentives and modern infrastructure for export-oriented industries, built near the established Sunder Industrial Estate (SIE). It focuses on sustainable, future-ready growth, attracting major investments, and aims to boost Pakistan's industrial and export potential. It has following features:

i.Prime Location

Strategically located adjacent to Sunder Industrial Estate — Lahore's largest industrial hub — Sunder Green offers unmatched connectivity.

ii. 500 Million FDI

Attracting \$500 Million in Foreign Direct Investment (FDI), Sunder Green stands as a testament to global confidence in Pakistan's industrial future.



iii. Tax Holidays

Enjoy all standard benefits of a Special Economic Zone (SEZ) — including zero duty on imported machinery and a 10-year tax holiday.



- 10-Year exemption on all income taxes (till tax year 2035).
- Turnover tax / minimum tax exemption under Section 113.
- Alternative Corporate Tax (17% of specified accounting income) exempted under Section 113C.
- Income tax exemption under Section 235 on utility bills (electricity, gas, etc.).
- Super tax exemption under Section 4C.
- Tax exemption on certain imports under Section 148.
- Tax exemption under Section 236K for Zone Enterprises for purchase of property in SEZ.

Keeping in view the all benefits of SEZ, TCCEC has decided to establish green field project in SEZ which has been converted to the industrial land use by the government.

5.4 Technology Alternatives

According to the EPA definition: ***“Green building is the practice of creating structures and using processes that are environmentally responsible and resource efficient throughout a building’s lifecycle from siting to design, construction, operation, maintenance, renovation and deconstruction”***.

The use of new technology of PEB as compared to the older technology has many environmental and cost benefits. Pre-engineered buildings are environmentally friendly and resource-efficient throughout its life-cycle. The structures are a construct of 100% steel which is recyclable up to 90%. This saves primary resources and reduces waste, and saves energy in the life cycle of the plant building and:

1. Construction and demolition (C&D) waste make up for a great portion of the refuse thrown into landfills. Steel-framed buildings last more compared to most standardized structures, instantly decreasing C&D waste. As steel recycles so quickly, trains, ships, cars, most old steel bridges, pipes, cans and other products. It ends up at the recycling center as against to the local dump ground.
2. A correctly insulated prefabricated steel building reduces heating and cooling expenses enormously. This significantly reduces energy cost over the lifetime of the building.
3. When it has truly outlasted its utility, the steel framing recycles again. Even if we fast-forward 100 of years, the steel in today’s structures will always prove to be very useful.

The use of new technology in the new plant is also matter of technological gains which introduces automation with respect to the present plant. The automation saves the energy and turn Greenhouse gases in the life cycle of the project.

The use of metallic tanks rather than plastic storage is an effort to reduce the plastics in world and cokes appreciated effort for reducing plastic in the world.

Based on these following points, it is beyond a doubt true that Pre-engineered steel buildings and proposed project is technically viable are eco-friendly in nature.



Chapter 6: Public & Stakeholders Consultation

6.1 Background

The consultation process with various stakeholders about the proposed project has been carried out with community and other stakeholders at earlier stages. Information dissemination during public consultation is fundamental to successful conclusion of the Project. This chapter describes the objectives and details of the consultative process adopted; its outcome and the conclusions drawn thereafter.

6.2 Objectives of Stakeholder Consultation

According to Pakistan Environmental Protection Act (PEPA), stakeholder consultation is an integral part of EIA. The basic purpose of conducting the stakeholder consultation is to address the appropriate environmental and social concerns of important stakeholders and local people, if any, pertinent to proposed project. This section explains in depth the stakeholder consultation process carried out for the proposed project.

6.3 Socio-Economic Survey of the Project Area

Consultation with the stakeholders is a tool for managing two-way communication between the project sponsors and the public. Its goal is to improve quality of decisions and build understanding by actively involving individuals, groups and organizations which have a stake in the project. This involvement increases project's long-term viability and addresses the issues and perceived impacts for the locally affected people and other stakeholders. A formal public consultation was conducted for this project keeping in view the above theme.

6.3.1 Methodology

Identification of Stakeholders

Stakeholders in this project were identified keeping in view the Guidelines for Public consultation published by Pakistan EPA, 1997. The stakeholders were identified from the following groups:



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- Local people
- Affected Communities
- Proponents
- Government Agencies
- NGOs
- Influential people
- Technical persons
- Poor People

Techniques for Public Consultation

The following principals were kept to select the techniques or public consultation

- Provision of material / information in easy language
- Providing sufficient time to understand
- Providing discussion to understand the information in a friendly way
- Portraying the actual issues relating to the project
- Discussion at the place which is in convenient access of the people
- Selection of time when maximum people are available
- Selection of influential people of project area
- Including technical people who have good knowledge on the issues relating bridge and road construction projects
- Concerned government departments were selected who had liaison with the execution of the project and environmental approval.

6.3.2 Dissemination of information

Environmental team reviewed the available information, held meetings with the proponent and designer and prepared a leaflet containing all the necessary information about the proposed project. The leaflet was distributed to the public in informal meetings, group discussion and corner meetings at public and work places in proposed project area.



Public Meetings and Group discussions

The project area is semi urban and industrial in nature therefore, we preferred one to one contact instead of using print or electronic media. Group discussion is one of the most authentic and traditionally used way of opinion making used in Punjab for centuries. It is reliable and unbiased way to get opinion of the people. The seminar or public gathering was avoided due to ongoing situation of pandemic.

Convenient Time and Place

People in the project area are mostly workers of different industries and daily wagers who cannot move away from their working locations. Our teams visited their residences and work places. This not only resulted in a larger penetration into the local community but also did not transfer any financial burden onto them while we got indiscriminate access to the most concerned people. People who could not afford otherwise to travel to government departments got access to information and had opportunity to express their opinion in a liberal way.

Limitations of the Public Consultation

We tried our best to include opinion of all segments of life according to education and professions as per local distribution of the social formation. But we could not include women in public consultation process due to closeness of the society for women's exposure to alien people and social taboos.

Questionnaire

After review of the available information a questionnaire was developed containing all necessary information and based on most commonly asked questions and covering all positive and negative aspects of the proposed project. The questionnaire comprised of two segments, first part had a brief description of the project while second part was again sub divided as under:

- Socioeconomic background
- Positive impact of the proposed project



- Negative Impacts of proposed project
- Acceptance level of the Project

6.4 Public Consultation

The following stakeholders were identified and meetings were held with them to share with them about the project design and to capture their response:

- Nobles of the area
- Shopkeepers
- Businessman
- Farmers
- Laborers

The socio -economic information was gathered through different techniques and methodologies and was derived from primary and secondary sources. Primary data was collected by using following tools:

- (i) Project area profiles;
- (ii) Socio economic survey;

Project area profiles were carried out for all settlements falling in Project area. An introductory leaflet about basic information of the project was prepared and distributed among the people at public places. This helped the people to understand about the project pros and cons. After one week the area was revisited by the team of experts of SES and again asked the opinion of the people about the project in the form of well-designed social survey questionnaire. Public consultations were also conducted in the project area.

6.4.1 Issues Discussed

Following issues were discussed during the stakeholder consultation:

- i) Personal information
- ii) Education status
- iii) Residence status
- iv) Information about project



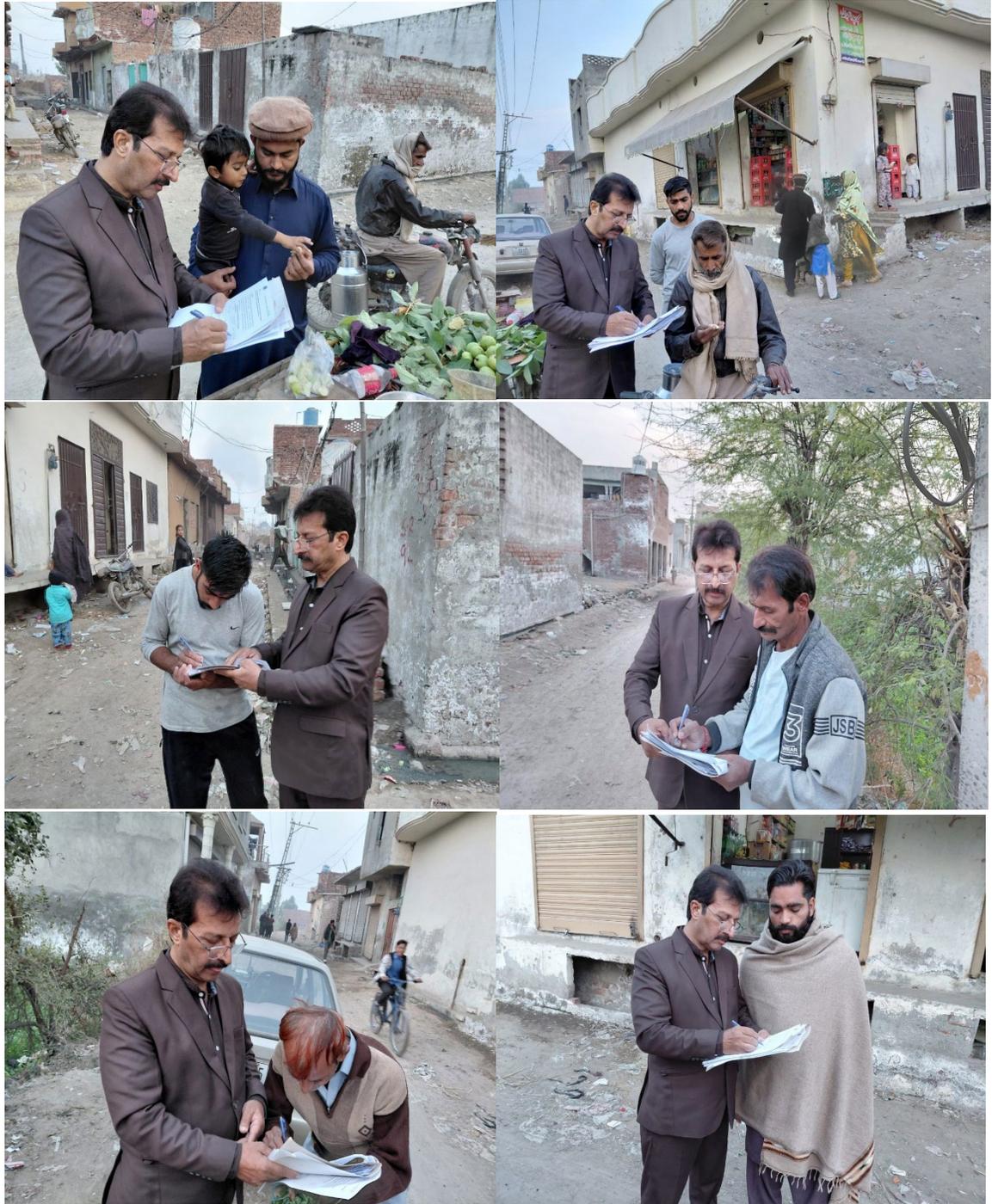
Images of Public Consultation in the Project area



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TCCEC Environmental Impact Assessment Report (EIA) for new green field plant



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Possible impacts on natural vegetation, land and properties

- i. Beneficial factors and involvement
- ii. Opportunities for the local people
- iii. Adverse effects of the project
- iv. Acceptance of the project by people of the area
- v. Scope of the environmental assessment report

Different segments of the society were included to reflect the true and unbiased opinion.

6.4.2 Sample Size

For effective public consultation it is necessary that principles of public consultation given in section 2.1 of the guidelines are adhered to. Though no specific sample size has

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been specified, however based on the guidelines this socio-economic survey was planned with focus on stakeholders referred to in the guidelines. The purpose was to capture the true picture of views of the people in favor or otherwise.

A total number of 33 persons were interviewed, list is given below.

Table 6.1: List of individuals consulted

Sr. No	Name	Designation	Address	Contact
1	Muhammad Shafique	Gardner	Nahla village	0333-4436948
2	Muhammad yasin	Labour	Nahla village	-
3	Shahid Iqbal	Shopkeeper	Nahla village	0305-1236868
4	Ferzand Ali	Shopkeeper	Nahla village	0301-4560786
5	Muhammad Irfan	Labour	Nahla village	0318-4657897
6	Atif Ali	Labour	Nahla village	0326-0048341
7	Muhammad Ejaz	Office boy	Nahla village	0306-2523858
8	Asad Raza	Labour	Nahla village	-
9	Abdul Ghaffar	Worker	Nahla village	0309-7654807
10	Muhammad Javed	Property dealer	Nahla village	0300-8888399
11	Haji Ashraf	Labour	Nahla village	0304-9458168
12	Muhammad Pervaiz	Factory worker	Nahla village	0302-4704803
13	Muhammad Hussain	Tailor Master	Nahla village	0321-1418503
14	Muhammad Ashaq	Shopkeeper	Nahla village	0304-4871486
15	Muhammad Noman	Businessman	Nahla village	0300-4409263
16	Waqas Ahmad	Worldwide Cable	Nahla village	0315-7485754



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17	Muhammad Mushtaq	Milkman	Nahla village	0345-4339540
18	Amir Shahzad	Mistry	Nahla village	0308-4829991
19	Muhammad Sadiq	Labour	Nahla village	-
20	Bashir Ahmad	Factory worker	Nahla village	0306-5656985
21	Munawar Hussain	Mechanic	Nahla village	0304-4583392
22	Muhammad Arshad	Mechanic	Nahla village	0300-8758170
23	Zafar Hussain	Factory worker	Nahla village	0322-1122320
24	Muhammad Muneeb	Welder	Nahla village	0307-4534067
25	Naeem Ali	Driver	Nahla village	0300-2592362
26	Muhammad Fiaz	Mistri	Nahla village	0305-2742600
27	Manzoor Hussain	Numberdar	Nahla village	0300-6972375
28	Muhammad Umer	Mechanic	Nahla village	0303-8297709
29	Sajjad	Fruit shop	Nahla village	0344-9180266
30	Iftikhar Ahmad	Pharmacist	Nahla village	0312-4646978

Consultation with Proponent

Name	Designation	Address
Ejaz ul Haq	Plant General Manager	TCCEC, Kingra Karyal Road, near Pajjian village, 33-Km Raiwind Road, Lahore

Environmental Experts

Name	Designation	Address	Contact
Iftikhar Ahmad	Environmental Consultant Pak Green Environmental Lab	Gulberg, Lahore	0303-4442334
Fahim Nasim	Consultant	Gulshal Ravi, Lahore	0333-6878606



Education Status

The survey results indicate that 26.66 percent of the respondents were illiterate, 36.66 % were primary level, 16.66% were middle level, 10 % were up to Matric, 10 % were educated up to Intermediate level.

Education status of the respondents

Sr#	Education Level	No. of Respondents	Percentage
1	Illiterate	08	26.66
2	Primary	11	36.66
3	Under Matric	05	16.66
4	Matric	03	10
5	Intermediate	03	10

6.4.3 Perception about the Project

The table sheds light on the respondent's views about the project. 100 percent of the respondents were excited about the project and had the opinion that proposed project shall be beneficial for them and that they will face no environmental or social impacts due to proposed project rather Social and economic benefits were perceived as a result of this project implementation.

6.4.4 Public Concerns Regarding Project Execution

Respondent's opinion was sought about the project through interviews, focused group discussion and community meetings. People supported the project as beneficial for them at the local level and at the national level. They are very positive and excited about the project benefits; the only concern was whether this project shall be providing additional employment opportunities for the locals or not.



6.4.5 Environmental and Social Team Composition

A well-balanced team comprising of senior and junior, experienced professionals was formed for this exercise, headed by Environmental and Social Specialist. The team constitution was as under:

- One Environmental & Social specialist
- Two environment scientists

After actually collecting all the data and formulating it into some relevant information and review of study, the team visited the selected site of the proposed project for collection of data on various aspects of the study as required for the EA. They also conducted meetings with all stakeholders.

6.4.6 Participation Framework of Stakeholders

Stakeholder analysis was carried out to identify relevant stakeholders on the basis of their ability to influence the project or their vulnerability towards the perceived negatively impacts linked with this project. This approach ensured that no relevant groups are excluded from the consultation, and appropriate engagement strategies are developed for each stakeholder.

6.4.7 Data Collection/Compilation

During this phase, data was collected and compiled to develop a baseline of the project area's Physical, Biological and Social Environment related aspects. For this purpose, both review of secondary sources and field data collection were carried out.

The secondary resources that were consulted included reports of the studies carried out earlier, published books and data, and relevant websites. With the help of these resources a generic profile of the entire feasibility/project area was developed.

6.4.8 Consultative Meetings with Stakeholders

A series of consultation was carried out with stakeholders and general public in the project area. In this regard, the rounds of public consultation and social assessment survey



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were held during month of December, 2024. with selected persons including Government/ Non-Government Officials, notables and local community of Project area.

The purpose of this survey was to achieve the objectives of the consultation, highlight the main issues in the implementation of the proposed Project and finally propose mitigation measures. Open and close ended questionnaire was used to collect the views concerning the assessment survey. Scoping sessions and informal group discussions were also carried out with local residents and local government representatives regarding the proposed Project. The outcome of whole consultation process was very encouraging.

The following issues were discussed during Informal Meetings with local representatives:

- i. Brief Description of the Project
- ii. Perceptions about the proposed Project
- iii. Perceived impacts of the proposed Project

The community took a keen interest in the objectives and interventions of the Project and gave their comments accordingly. Generally, people were found to be aware of the need to improve the economy of the project area. Residents of the area were very supportive to implement the proposed Project and perceived the proposed Project to be helpful in enhancing the economic value of the area. The local representatives also showed the positive attitude about the proposed Project and emphasized that the proposed Project should add value to the development of this area in general.

The local poor people predominantly requested for unskilled and semi-skilled jobs during construction of the Project. On the basis of the consultations so far, it appears that the Project will have no insurmountable environmental and social impact. The community generally supported the proposed project. They have opinion that the Project will not only provide livelihood during construction stage, but also will help in getting jobs during operation phase of the project.

Public Concerns Regarding Project Execution

Respondents' opinion was sought about the project through interviews, focused group discussion and community meetings. People supported the project as beneficial for



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them at the local level and at the national level. They are very positive and excited about the project benefits and had only the fears about the job opportunities during construction and operation phase of the project. The major concerns shown by the locals was road blockage at the gate of plant due to parking of heavy traffic (Cranes, loader trucks etc.) and management of raw materials.

Table 0.1: Major Concerns of the Respondent

Sr. No.	Project Impact/ Perception of Community about the Project	No. of Respondents	Percentage %
1	Beneficial	33	100
2	a. Job opportunities for the locals	30	91
	b. Improvement of local and national economy	03	09
3	Benefits to labors and Wages	8	24

6.5 Apprehensions of the people of the area

- Low employment offers to local people during operation phase.
- Social work in the area.
- Infrastructure development
- Wastewater treatment

6.6 Mitigation of the People's Apprehensions

- Wastewater is will be treated for reuse in the process. Treated waste water if disposed will be well within the PEQS limits. Regular testing from the EPA approved laboratory will be conducted to ensure the compliance of effluents within prescribed PEQS limits.
- It will create employment opportunities especially during construction and operation phase.
- Project management team has already started hiring of workers for unskilled jobs and same practice will be followed for the proposed project.
- Management of TCCECP has special focus on the Social compliance and will continue in the area of this plant. TCCEC not only spends money in the project



area but its activity is at national and provincial level. The Coca Cola Export Corporation has a strong CSR program and served one million meals for the needy to support the poor specially to support the economically affected people during the Covid.

- The infrastructure is to be developed by the Government of Pakistan as the SEZ has been announced by the federal government. The best infrastructure is expected to be developed in this area.

Chapter 7:

Screening of Potential Environmental Impacts and Mitigation Measures

This chapter identifies the significant potential environmental, socio-economic, health and safety impacts which may occur during the project life. The appropriate mitigation measures are also identified in this and the subsequent chapter of this report.

7.1 Characteristics of Impacts

The term “Environmental Impact” or simply “Impact” covers the negative, adverse or harmful as well as positive, desirable or beneficial impacts of the project on environmental canvas. Prediction of impacts of the proposed activity is based on factual data; however, the significance of these impacts involves a value judgment technique. The nature of the impacts may be categorized in terms of:

Direction	-	Positive or Negative
Duration	-	Long or Short Term
Effect	-	Direct or Indirect
Extent	-	Wide or Local

Impact significance depends on both the nature of the impact and on the sensitivity of the receptor. The more sensitive the receptor the greater will be the significance of impact of that change. For this EIA report, nature of change is combined with the sensitivity of the receptor to evaluate the significance of the impact. The significance of impact is characterized as very low, low, moderate, high and very high. Environmental issues of “moderate”, “high” and “very high” significance would be provided with mitigation measures.

For identification of potential impacts of the project, screening of activities causing impacts had been carried out in different phases of the project life. In the impact assessment exercise, major project activities with their associated environmental issues



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were identified and then their impacts on the relevant physical, biological, and socio-economic elements of the area were evaluated.

In broader spectrum, the project activities could be categorized in the following three components:

- 1) Planning & Design Stage
- 2) Physical Implementation Stage
- 3) Operations Stage

Environmental issues and the assessment of their impacts have been presented in tabular form in the matrix form for ease of referencing and understanding under table

7.2 Environmental Impacts Identification

Before identification of specific impacts and their mitigations, the EIA team conducted the preliminary environmental evaluation of the proposed project, keeping in view all the foreseeable activities based on the project description as given in Chapter 3 of this report.

7.2.1 Impact Assessment Methodology

Identification and evaluation of impacts has been undertaken through a process comprising:

- Punjab Environmental quality standards (PEQS) act as the basic yardstick to evaluate the impacts of the project on existing ecological setup. The compliance of PEQS shows the no or little impact and severity of impact as intensity of PEQS violation increases.
- The long term or short term impacts were analyzed.
- The reversible and irreversible impacts were identified.
- Literature review including the EIA reports of other similar projects and research articles particularly secondary and primary international standards have been utilized to assess the long term impacts which may happen over the long term operation of the plant here.



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- Consultation with local communities and relevant government departments; and complaints of the people of the area are also used to assess the impacts.
- On site observations by environmental and social experts.
- Matrix method is used to identify the impacts and their intensity on environmental as well as on socio-economical values of the area.

Table 7.1: Matrix of Environmental Impact Assessment and Mitigation Plan

Subject	Environmental and Social impacts during various Project Phases			Proposed Mitigation Measures
	Planning	Construction	Operation	
Social Impacts				
Resettlement	No resettlement required as site is already under use of Coke international, open, vacant and in custody of proponent	Establishment of containers and small tents for site management and labor shelter.	Nil	Not required as land has been already been acquired by the federal government at market rate and no relocation is involved.
Change in Land use	The existing land use was agriculture.	Agriculture area was converted to the industrial one. It is irreversible impact of the project which has minor to moderate impact.	Nil	Mitigated through provision of employment for hundreds of the people. Revenue generation to federal and provincial government in form of taxes. Moreover all vacant land in the project site will be planted with trees and grasses.
Employment	About 25 people are employed in planning stage of the project who are	About 300 persons unskilled, semiskilled and	The technical and labour workers will be hired during	Open merit employment recruitment.

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	accommodated in the different outsource offices of consultants.	skilled workforce will be employed during construction phase.	operation phase. The specialized jobs will also be created.	
Permissions from controlling authorities	Not Significant	Permission (NOC) for construction will be obtained from EPD under section 12 of PEPA, 1997. While approval of building plan will be obtained from SEZ	Permission (NOC) for operation will be obtained from EPD.	<ul style="list-style-type: none"> • A reliable and seasoned consultant (Sustainable Environmental Solutions) has been hired for preparation of EIA. The team work of consultant and project management will succeed in procuring the NOC under section 12. • After environmental approval the approval from LDA will be sought. • Coke International will get approval from WASA or concerned department for waste water disposal, if required.
Air Pollution (noise and dust)	Air quality measured during planning stage is good except PM2.5.	Smoke and emissions of fugitive dust due to movement of heavy vehicles on site may add up to the dust level during construction phase. Noise due to operation of heavy project construction	Not significant during operation phase.	<p><u>Planning Stage</u></p> <p><u>Construction Phase</u></p> <ul style="list-style-type: none"> • Mitigated by using appropriate dust control measures, such as minimizing the amount of ground disturbance, safe construction material handling, and water use for dust suppression and providing the project construction personnel with dust protection equipment. The construction site will be cordoned by the sheets to discourage the dust dispersion.

		<p>machinery and movement of heavy transport vehicles</p>		<ul style="list-style-type: none"> • Water sprinkling on muddy and katcha routes during construction phase. • Prefabricated structure will discourage the dust emission. • Fencing of excavated site or covering of excavated soil • Speed control of moving vehicles. <ul style="list-style-type: none"> • Mitigated noise pollution by monitoring changes in noise levels, • providing the project construction personnel with personal hearing protection devices, and • Conducting weekly training on use of protective devices. • Follow SOP for construction work issued by EPA. <p><u>Operation Phase</u></p> <ul style="list-style-type: none"> • Implementation of environment policy of the TCCEC. • Plantation of sufficient trees and land cover. • Selection of low noise and low NOx generators and diesel trucks.
Water Pollution	Not significant	Significant due to provision of	Moderately Significant as	<ul style="list-style-type: none"> • Mitigated through construction of septic tanks for sewerage during construction phase.



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		lavatories at site for workers and during construction phase.	industry will have staff and waste generation from the process.	<ul style="list-style-type: none"> • Disposal of sewerage after treatment into SEZ draining system. • Adoption of water conservation practices in the factory for reduced water consumption and reduced waste water produced. • Construction of waste water treatment system to treat water for reuse.
Groundwater Quality	Not significant	Not significant due to absence of any such activity which may affect ground water contamination.	Not significant	<ul style="list-style-type: none"> • No mitigation measures required.
Domestic Solid Waste	Not significant As all work on planning stage is being done in head quarter or outsource consultants.	Significant due to debris during and after construction phase of proposed building.	Site rehabilitation may produce solid waste.	<ul style="list-style-type: none"> • Private contractor will collect all the construction soil or debris. • Small quantity Office waste will be handed over to contractor who will carry it to municipal/local government's waste collection point for final disposal. • The hazardous material if any will be treated as medical risk waste and handed over to EPA approved facility. • As per EPA orders 5 color bins will be placed for different type of waste and get registration certificate from EPA..

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<p>Site pollution Impact</p>	<p>Not significant</p>	<ul style="list-style-type: none"> • Site pollution is likely to occur due to accumulation of solid waste that will mainly be composed of debris. • The waste could also contain hazardous lead-based paint residues, paints and solvents, heavy metals, and other products. • Spillages of fuel and oil. 	<p>Not significant</p>	<ul style="list-style-type: none"> • Ensure project personnel training on specified site pollution safeguards. Provide equipment for storage of waste oil and other lubricants. Incorporate full field cleanup costs into cost of the project. • Ensure that the field crew is well trained in safe handling and disposal of hazardous waste. • Ensure that the hazardous waste is properly removed stored and regularly disposed off in a safe manner. Ensure that training on safe handling of hazardous waste is regularly provided, including equipment for safe handling of waste. • The hazardous waste if any will be sold out to the waste management company certified by EPA.
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Noise	Not significant	Moderately significant as site is away from residential areas.	Not Significant as no source of noise exists in the site except generator.	<ul style="list-style-type: none"> • The noise level of machines used during construction will be controlled as far as possible and workers will be provided with ear muffs wherever the noise level exceeds 85 dB(A). • The speed of vehicles used for transportation of construction machinery and material would be limited. • Procurement of less noise producing machinery like generators and compressors. • Installation of noise producing machinery in thick walled structures to control escape of noise during operational phase. <ul style="list-style-type: none"> • Regular monitoring of the ambient noise for compliance of NEQS for noise.
Environmental Impacts				
Waste water disposal	Not significant	Significant Labors will add to the municipal waste during construction phase.	Not Significant	Mitigation measures are recommended: <ul style="list-style-type: none"> • Reuse and recycling of the waste water • Treatment of the waste water to make it reusable. • Disposal of waste water into the drain of SEZ.

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Flora and Fauna	Not significant as site is industrial and have no plantation.	Not significant	Not significant.	The project activity no loss to the flora and fauna is foreseen project does not have any air pollution source and hence no loss to flora and fauna is expected. However, vast plantation will be done on empty land.
Soil erosion	Not significant	Not Significant as fabricated material will be used.	Not significant	<p>No mitigation measure is required. However, design and construction stages incorporation of the following in the project design and implementation.</p> <ul style="list-style-type: none"> • The soil on site will be investigated prior to site preparation for building construction and implementation of international safety procedures developed to reduce the occurrence of increased soil erosion. • Measures taken to control erosion will include clearing and grading the ground surface within approved work limits. • stripping the top soil layer from the subsoil, • Stockpiling the removed soil in approved areas to be retrieved during landscaping and site restoration, • Clearing the nearby drainage systems during construction stage.

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Fire Protection	Not significant	Not significant	Not significant	<p>Firefighting system designed on international standards will be placed at the Coke Concentrate plant building which will include the following:</p> <ul style="list-style-type: none"> • Underground fire service main with valve pits. • Hydrants and fire hoses in cabinets • Fire extinguishers (CO₂, dry gas, foam) • Training to the staff of factory for fire fighting
Occupational Health and Safety	Not significant	Not significant	Slightly Significant	<ul style="list-style-type: none"> • Use of safety gadgets during construction phase • Handling of risk waste in accordance with HWM rules 2005 which include. • Training of staff. • Mandatory use of protective clothing
Emergency Procedure and Contingency Plans	Not significant	Significant	Significant	<ul style="list-style-type: none"> • Emergency procedures will be developed • Observance of Emergency Response Manual. • An ambulance will be present on site to handle any accident during construction phase. • Training on health and safety issues by hired professionals and senior officers of the factory.

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<p>Socio-economic impact</p>	<p>Employment of man power and safe concentrate at local and regional level.</p>	<p>Positive impact seen due to skilled and non-skilled workers employment during construction phase.</p>	<p>Positive impact for general public, by improving access to improved beverages.</p>	<p>No mitigation required</p>
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7.4 Anticipated Environmental Impacts and Mitigation during Operations Phase

This will be the stage where major impacts, both positive and negative, can surface, and the earlier predictions could be validated. This stage will comprise of commissioning the rehabilitated and new interventions. While the operations stage entails mostly engineering activities, it has an equally important requirement of inter-departmental coordination, for harvesting the full potential of positive impacts of the project.

7.5 Potential Enhancement measures

Overall the proposed project will have a very positive impact on the economic activity in Pakistan. Along with that other steps are also proposed by the proponent for the betterment of the workers and socio-economic betterment of the local people. As given below:

1. Trees will be planted within the premises to beauty the surrounding area.
2. A special budget of 50 million PKR will be designated for the environmental improvement of the environment on annual basis. The administration is responsible for spending of this budget. The team leader prepares the inventory of environmental improvement activities and communicates it with the rest of the team for implementation.
3. Medical facilities will be available for workers without any cost.
4. Clean treated water will be available for all the workers of the plant

Chapter 8

Environmental Management and Monitoring Plan

The objective of the Environmental Management Plan (EMP) is to address all the major environmental issues and provide framework for the implementation of the proposed mitigation measures during the construction and operational phases of the proposed project. The proper implementation of the EMP will ensure that all the adverse environmental impacts identified in the EIA are adequately mitigated, either totally prevented or minimized to an acceptable level and required actions to achieve those objectives are successfully adopted by the concerned institutions or regulatory agencies. The implementation of EMP should be carefully coordinated with the design and construction program of the project to ensure that relevant mitigation measures are implemented at the appropriate stage and that adequate resources are properly allocated to achieve the desired results. This EMP has been prepared to satisfy the requirement of the Pakistan Initial Environmental Examination and Environmental Impact Assessment Review Procedures, 2000 revised in 2016 for proposed project of TCCEC green field in SEZ, Lahore.

For effective environmental management, the Client should assign the necessary responsibilities to Environmental personnel, which should be responsible for Environmental Monitoring of the proposed Project.

8.1 Objectives of EMP

The EMP provides a delivery mechanism to address potential impacts of the project activities, to enhance project benefits and to introduce standards of good practice to be adopted for all project works. The EMP has been prepared with the objectives of:

- Defining roles and responsibilities of the project proponent for the implementation of EMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the project;



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- Outlining mitigation measures required for avoiding or minimizing potential impacts assessed by the EIA;
- Developing a monitoring mechanism and identifying requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the EIA; and satisfy the regulatory frame work of PEPA 1997 and its allied rules and regulation.
- Defining the requirements for communication within EPA and the proponent, documentation, training and monitoring, management and implementation of the mitigation measures.

8.2 Institutional Responsibilities

Following functionaries will be involved in the implementation of EMP:

- TCCEC as the project proponent and owners of the EMP
- Project construction contractor(s) as executors of the EMP during construction phase of the project.
- Operational & Maintenance (O&M) team of proposed project as an executor of the EMP during the operational phase of the project.
- EPA as watch dog of the environmental rules and regulations in the form of inspections during construction and operation phase.

8.2.1 Responsibilities of Functionaries

8.2.1.1 Responsibilities of TCCEC

TCCEC will be responsible for the environmental management and supervisory affairs during the construction phase of the proposed Project. Environment personnel designated by the management of TCCEC will look after the environment related issues during the construction phase. The responsibilities of Environmental personnel are as follows:

- Monitoring progress of the project as per planned schedule of activities;



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- Exercising oversight over the implementation of environmental mitigation measures by the contractor;
- Documenting the experience in the implementation of the environmental process;
- Preparing training materials and implementing programs;
- Maintaining interfaces with the other lined departments/ stakeholders; and
- Reporting to the TCCEC Management on status of EMP implementation.
- Communication between EPA and proponent for implementation of conditions of NOC for construction phase.
- Implementation of conditions of NOC for construction phase.

8.2.1.2 Responsibilities of Project Construction Contractor

Construction Contractor appointed for the construction and commissioning of the proposed project including the auxiliary facilities is responsible for:

- Implementation of, or adherence to, all provisions of the EMP and with any environmental and other codes of conduct required by TCCEC.
- Provision of proper Personal Protective Equipment (PPE) to the workers and train them for their proper use.

8.3 Environmental Monitoring

Monitoring of all the parameters is done on regular basis as described in previous chapters. The proposed project does not involve any new operation therefore it will be operated under the same system.

Environmental monitoring can be categorized into two types;

- Compliance Monitoring
- Effects Monitoring,

The project does fall under reporting defined by SMART EPA Rules 2001 where monitoring of waste water, drinking water/sub soil water, noise, ambient air, generators emissions, motor vehicles emissions, trucks emissions, solid waste disposal, and hazardous waste and substances disposal will be monitored and reported. EPA may



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specify its monthly or quarterly monitoring during the project implementation phase. Plant management will conduct quarterly/monthly monitoring of all the parameters as EPA specifies in the conditions of NOC.

8.4.1 Compliance Monitoring

Compliance Monitoring will be carried out to ensure compliance with the requirements of the PEQS, EIA and EMP. Project staff and contractors will carry out the inspections on a routine basis.

8.4.2 Effects Monitoring

To monitor actual impacts of the project on selected sensitive receptors so that impacts not anticipated in the EIA or impacts which exceed the levels anticipated in the EIA can be identified and appropriate mitigation measures can be adopted in time. This objective will be achieved through Effects Monitoring to check the long time impacts of the ecosystem.

8.5 Institutional capacity

The proposed project will need to hire the professional team to look after the matters related to the EPM. These human resource may be not limited to Environment and safety officer and Manager Environment. The environment team will be administratively looked after by the plant manager.

8.6 Summary of Impacts and their mitigation measures

8.6.1 Construction Phase

Industrialization has been widely regarded as a sustainable construction method in terms of its environmental friendliness. And Coca-Cola company consider it as a fundamental responsibility to uphold its role in ensuring a healthy and sustainable environment. This belief is part of their policy applies across the Coca-Cola system therefore PEB is chosen for solving new warehouse requirement.

Sustainable construction



From the sustainability point of view, the advantages from the use of PEB (prefabricated building) is in fact related to a greater control of quality in the production phase, less waste of material in factory and on site, higher speed in the construction phase. The consequences include the improvement of profitability and productivity for contractors, the increase of guarantees on product final quality for buyers and consumers, the reduction of resources employment and of general investments finalized to the building construction, less impact on the environment during on site works.

According to the scheme of environmental evaluation by the European Program Euro House (Long 1999) the consequential benefits from the employment of prefabricated system are:

- From 30 to 60% in the reduction of times on site through a more efficient coordination of the different construction packages;
- The reduction of 50% of water quantity consumption in comparison to a traditional construction;
- 50 reduction% of the quantity of material utilized and produced by excavations;
- Wider use of recycled materials (like timber, steel, aluminum, etc.);
- Up to 80% in the reduction of waste materials during on site works;
- Up to 60% in the reduction of greenhouse gases like CO₂ emissions and of annual energy consumes during building life cycle;
- Possible reutilization and reuse of prefabricated elements.

Characteristics of Prefabricated Building (FEB)

Compared with traditional methods of site-based construction, industrialized building has brought out many changes, including the construction process and output performance. The characteristics of industrialized buildings is a key precondition step to identify impact factors, which can be summarized as follows:

- (iv) Transportation from an off-site factory to the construction site; Prefabricated logistics requiring heavy transport to be used in shipping. Generally, the construction stage was divided into three sub-processes, including material manufacturing, transportation, and on-site construction work. However, in

this type of buildings construction stage is divided into transportation of components, stacking, assembling and the cast-in-place.

- (v) Stacking Stage involves stacking up all the components to be used on site during assembly stage
- (vi) Assembling Stage is a complex and systematic activity impacting directly on the construction environment in such areas as power consumption, solid waste generation, machine wear, noise pollution, and the safety of workers. All these impacts will be addressed on site as a complete EMP and KORE are in place to handle all management, environmental and safety issues. Details are provided in EMP chapter of this report.

8.6.2 Operation phase

Concentrate plant is a high degree of automation and mechanized handling. Materials are handled by fork-lifts, and full containers are placed on pallets by automatic palletizers. Although, employees generally do not have to use excessive force to get the job done, lifting related injuries remain a concern in non-automated plants.

Major hazards include engines and equipment in motion, objects falling from overhead containers, energy hazards in repair and maintenance, confined space hazards in cleaning mixing tanks, noise, fork-lift accidents. New Concentrate plant will be of higher capacity and fully automatic to avoid injuries or accidents related to cleaning processes. Warehousing of the final product i.e. concentrate will also become easier.

All these operations will enhance worker's safety, environmental and management conditions of the plant by allowing to keep all sorts of utilities at bay from the production hall as well as being on their right and safe place with more automation.

8.7 Environmental Management system

With KORE, objective is to establish a management system that supports vital relationships and sustainable strategies. KORE offers assurance in quality, food safety, environment and occupational safety & health through four top-level policies that provide direction in these strategic areas. These policies support the six mission and vision areas



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of our 2020 Vision. To strengthen this assurance, TCCEC align with external, internationally-recognized standards. From the policies and standards, TCCEC establish requirements, specifications and methods to afford Corporate, Group and Business Unit organizations a basis of compliance. The subsequent sections of the EMS manual are laid out according to the required clauses of ISO14001:2015

KORE represents a change in the philosophy of the whole organization that is designed on the basis of good governance at the higher level, and that provides more flexibility, encourages innovation and learning, supports development and empowers the operations. Quality and operational control no longer comes from the top down, but, instead, is the responsibility of the people in the operations at all levels of the supply chain.

KORE also requires that manufacturing and distribution facilities implement BS OHSAS 18001 (British Standard Occupational Health and Safety Assessment Series 18001, a framework for an effective occupational health and safety management system) or an equivalent internationally recognized safety management system.

Additionally, KORE includes requirements that guide in manufacturing products, assist in day-to-day operations and extend beyond the international standards.

These requirements include:

- Management Systems
- Incident Management and Crisis Resolution
- Control and Destruction of Non-Conforming Trademarked Materials and products
- Corrective Action
- Risk Management
- Record-Keeping and Retention Samples
- Customer and Consumer Response
- Traceability and Date Coding
- Process Monitoring and Control



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- Calibration and Maintenance of Equipment
- Food Safety
- Security, Asset Protection and Product Integrity
- Environment, Safety & Health
- Ingredients and Materials
- Cleaning and Sanitizing
- Processing
- Validation
- Immediate Consumption
- Warehousing and Distribution
- Marketplace

8.7.1 Emergency Preparedness and Response (ISO 14001:2015 – 8.2)

- Emergency preparedness covers the management of incidents that are likely to cause damages to Manufacturing and Supply of Concentrate or have a negative impact on the reputation of our Trademark. Incident covers a wide range of disruption to our business such as product issue, ingredient issue, environmental impact, breach of security etc...
- Emergency response Plan has been developed to provide guidance on first steps to be taken in the event of an emergency on site. It details the steps to be taken in the event of personal injuries, fires or spillages of hazardous substances on site.
- Storm water Pollution Prevention & Spill Response has been prepared to highlight the potential source of contamination and the control measures, which are in place to mitigate those risks. It also details the steps to be taken if a spills or potential contamination is identified.

8.7.2 Audit

Internal Auditing (Internal Audit - ISO 14001:2015 – 9.2, 9.2.1, 9.2.2)



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The audits are conducted at planned interval to assess if activities meet requirements of The Coca-Cola Company & various National and International Standards and to demonstrate the effectiveness of the environment Management Systems.

Measures of Effectiveness:

- Audit by the Global Environmental Assurance Department to indicate noncompliance of current applicable Environmental Laws and Company's GEPs
- Record of environmental training
- Timely addressing non-conformities.
- Periodic reviews of CAPs.
- Verify the effectiveness of the followed corrective actions.

Verification of Effectiveness

- The effectiveness of the program is reviewed as part of the Management Review and includes the number of CA, PA, Continuous Improvements created, closed and overdue. Trends are looked at to identify systemic issues.

8.7.3 Documentation (ISO 14001:2015 – 7.5, 7.5.1, 7.5.2, 7.5.3)

EMS Documentation

Various types of documentation are produced to support the implementation of the EMS. These include procedures (SOP's), work instructions, Checklists and other documents used as a basis for implementation of the EMS.

Documentation Structure - The document management system covers documents generated at Lahore Concentrate Plant or received from Corporate Headquarters.



8.7.4 Training, Competency, and awareness (ISO 14001:2015 – 7.2, 7.3)

- A training needs analysis is established by associates themselves agreed with their line manager and this applies also to those with specific environmental responsibilities at the plant.
- An overall Skill Gap Analysis for Environmental training is retained by HR Team and progress against the Skill Gap Analysis is tracked. An annual training plan is developed based on the Skill Gap Analysis and Performance Development Plan and this includes Environmental courses also.
- Specific training is carried out for associates with particular Environmental responsibilities – e.g. Emergency Response Team, Environmental Auditors, etc.
- Records of training are maintained by the HR for all courses, who also retain Training Specification Sheets for all training courses conducted. Training evaluation is carried out after delivery of training and records of evaluation are retained by the HR.
- For details refer Skill/Competency requirement and Training needs for Associates, in Training Program, DOC-17087
- Personnel using this program are trained to understand the contents and then perform the tasks required, the record keeping and the systematic flow of work as per procedures above.
- Standard Operating Procedures are thoroughly explained to Plant technician and operators.
- Training from external organization are arranged according to need
- Training, Awareness and Competence (ISO 14001:2004 – 4.2 (f). 4.4.2-) Competence, Training, and Awareness.
- Orientation training is carried out for all associates on joining the company, by department & function heads. This covers awareness of EMS policy, objectives and importance of EMS compliance, potential environmental impacts, roles and responsibilities, emergency procedures and potential impact of non-compliance with SOP's.

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- Contractors are made aware of the environmental policy and any other relevant procedures at the time of induction training. Specific environmental requirements are included in contracts for major projects and site requirements.

8.7.5 Continual Improvement (Non-Conformity, corrective action and preventive action (ISO 14001:2015 – 10, 10.1, 10.2, 10.3)

The process used by Lahore Concentrate Plant to capture deviations or potential deviations are as follows:

1. Internal Audits
2. Monthly Inspection Check lists
3. Monthly GMP audit
4. Periodic Monitoring of parameters

The type of defects is ranked as follows, based on their severity and potential impact on our business:

8.7.5.1 Critical Risk, High Risk, Potential Risk & Improvement Opportunity

These issues are discussed in the Monthly review meetings for proper classification of defects and route cause analysis. Corrective Action Review Team will perform trends analysis, and highlights defects, which are systemic and report these findings to the Management

- If the program effectiveness is poor, noncompliance is indicated in the audit reports, both internal and Global Environmental Assurance then an investigation is necessary and corrective action program needs to be activated.
- The request of a corrective action notifies concerned area by the case of nonconformance to arrange the necessary corrective action to remove the nonconformance or decrease of its impact, the person responsible will follow up the execution of the corrective action.
- The group of managers/Function heads meets and reviews the trends Based on these reports, the CAR may decide to elevate the issue therefore requiring a formal root cause analysis and not only an apparent cause resolution.



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- The corrective action coordinator will monitor the resolution and progress of CAP (Corrective action plan)

8.7.6 Preventive Action

The management of Preventive Actions is covered within the Corrective and Preventive Action Program and the Continual Improvement procedure. Sources of Preventive Actions include audit findings and learning from other plants, or early detection of “near misses” and hazards in the plant.

8.7.7 Continual Improvement

To enhance improvement and productivity culture we have continual improvement program in place the main elements of this program includes:

- Strategic Planning: Like site master planning, CAPEX plan, and performance targets.
- Improvement project are part of annual business planning cycle and these projects are provided to management team members.
- Kaizen program include capturing improvement suggestion on routine basis and planning and execution of those improvement opportunities.
- The effectiveness of continual improvement projects monitored through actual achievement of result that are actualized in control phase of these projects.

8.7.8 Records (ISO 14001:2015 – 7.5, 7.5.1, 7.5.2, 7.5.3)

EMS Records;

- Minutes of Management Review Meetings
- Audit reports- in Internal Audit
- Corrective action plans- in Internal Audit
- Accident and incident investigation records
- Training records



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- Skill & Competencies in Training Program
- Calibration Records in Process and test equipment calibration
- Performance measurement records (KBI)
- Environment Aspect & OHS Hazards register
- Emergency contact list
- Air Emissions/noise level/light intensity

The related management systems and requirements are given in Annexure VII along with this report.

8.8 Solid waste Management.

The proposed plant will have a well-established waste management plan to avoid any environmental deterioration or incompliance to EPA requirements especially the executive order of Director General EPA vide order No.409/PA to DG/EPA/2025 dated 25-11-2025 under section 6(1)(n) of PEPA, 1997.

It aims to provide a system which ensures that all wastes generated are identified and managed in a manner this renders them harmless to the surrounding environment and to ensure that Concentrate plant management has implemented solid waste management programs to minimize the solid waste materials generated in the facility and its impact on the environment and associate's safety.

8.8.1 Responsibility

Production Manager/ Environment Manager:

- Production manager or his designee is responsible for Segregation of wastes, and transfer segregated wastes to waste disposal area.
- Weather proper colored bins are present and waste is stored in the proper bin.



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- Prepares the list of materials to be disposed during loading of scrap materials
- Prepares shipping memo based on materials list and their weight / quantity and hands over this shipping memo to FM.
- Ensures that waste collection containers (Trash bins) are available at relevant locations according to the type of waste.

Assistant Manager Environment:

- Is responsible for managing scrap vendor. Ensure compliance to requirements related to scrap disposal (whether vendor is EPA approved?) Does he dispose the waste in environment friendly way?
- Ties up with waste disposal vendor for lifting the scrap and wastes.
- Coordinate with vendor for rates, and amount of each item, and total amount. Keeps record accordingly. Also responsible to provide scrap data to ESLP (Environment Safety and Loss Prevention) lead for ESLP metrics reporting.
- Receives the bill paid by vendor and keeps in his record. Receives the shipping memo from PM / or his designee, reconciles this shipping memo with bill paid. He sends this shipping memo to security office for vehicle physical verification.
- After physical verification from security office receives the copies of shipping memo and keeps one in his record.

Sends the bank payment slip and other copy of shipping memo to Country Finance.

- Exploring vendors for its safe disposal, identification. Audit or physical survey of waste vendor to ensure that recyclable wastes are properly recycled. Evaluate and appoint authorized scrap vendor and make sure that the scrap is given to qualified contractor.

Security Supervisor and Security Staff:

Upon receiving the shipping memo, one of security person physically check the vehicle against shipping memo. After physical verification by security person the security



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supervisor signs the shipping memo for verification. The security supervisor hands over original copy to vendor and two remaining copies to Finance.

ESLP Specialist:

ESLP Specialist Identify the solid waste sources & types of wastes and Responsible for calculation of total solid waste on monthly basis. Responsible to train the relevant associates according to requirements of this procedure. Ensure spill response equipment is available at relevant locations and hazardous materials are handled as per requirements of this document.

Plant Associates:

- Responsible for minimization of waste generation and use designated waste bins.

8.8.2 Waste vendors

TCCEC will engaged two different vendors to handle hazardous waste and non-hazardous waste. Both of vendors should have all required legal certificates/NOCs from Environment Protection department (EPD) Punjab.

Hazardous Wastes

Any waste that imposes or has potential to impose adverse effect on the public health, welfare and environment if improperly managed and released to the environment. Typically, these wastes contain harmful constituents like toxic metals, or physical properties such as corrosives or flammability etc. Examples are obsolete toxic lab reagents, medical waste, hydrocarbons or material contaminated with hydrocarbons/fuels, expired raw material or products, lab waste. Asbestos is not allowed to use.

Non-Hazardous Wastes

Organic and inorganic wastes which do not exhibit hazardous characteristics. These include, but are not limited to scrap metal, food wastes; ingredient and product packaging wastes (glass cullet, cans, plastic films, bottles, drums and straps, cardboard, Pallets), yard wastes, office trash, clean packaging wastes, boiler ash, canteen wastes



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bio solids, inorganic sludge etc. CPS use to ensure appropriate handling, transportation and recycling of non-hazardous waste to support environment.

Bio solids

Biomass produced in the normal operation of the plant will handover it to the hazardous waste contractor for incineration Microbiology Waste: Waste which is generated from microbiological analysis activity.

Bio Hazard Waste: Waste generated from first aid activity that may contain blood borne pathogens. It is sealed in bio hazard bag and handover to hazardous waste contractor for incineration.

Other Wastes: Organic or inorganic wastes like Scrap Metal, Cafeteria Food wastes, Ingredient packaging waste, Office trash glass cullet.

Further details are provided in Annexure VII of the report.

8.9 Management Review (ISO 14001:2015 – 9.3)

Management review is an important part of the monitoring of the continued suitability, adequacy, efficiency, and effectiveness of the various programs developed by Concentrate Plant. The reviews are performed by the Plant Head and the representatives from the wider management team.

8.9.1 Plant General Manager

- Plant Manager has overall responsibility to ensures that the program is implemented and adhered to.
- He ensures that the plant is operated in environmentally responsible manner and ensures full compliance with the Company's Environmental Management program & applicable local laws.
- Lead the business planning process at CPS Pakistan level and works with leadership team to ensure that adequate environmental objectives are set, and reviewed and updated on quarterly basis



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- Arrange all necessary support in terms of external training, machines / equipment etc. to associates as & when required.
- An Integrated Environmental Policy is developed and implemented for Concentrate Plant, Lahore.
- Adequate resources (financial & personnel) are provided to ensure the ongoing effective implementation of the EMS
- Environmental objectives, targets and plans are set and met
- Ensure that EPA certified bodies are engaged in testing, solid waste collection and disposal and hazardous waste management.

8.9.2 Environment, Safety and Loss Prevention Specialist:

- Works in coordination with other functions to ensure that environmental requirements are adhered, and environmental aspects are addressed as planned.
- Leads water and energy saving projects in liaison with engineering department.
- Reports ESLP metrics in company reporting system, and coordinates with relevant functions for required actions.
- Ensures required training related to environmental requirements and performance is provided to relevant associates.
- Ensures smooth and compliant operation of wastewater treatment plant.

8.9.3 Quality, Safety and Environment (QSE) Manager

- Overall responsible for managing Management system requirements including EMS.
- Ensure through testing of wastewater that process or system is working well, and according to Company or local standards, whichever is more stringent.
- Provide support in the proper operation of Wastewater Treatment plant, by testing the quality of water at various steps.
- The QSE Manager has the responsibility to ensure that disposition of waste materials from Lab is controlled.



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- Maintains a file of all applicable local environmental laws and Company's policies, requirement and obligations
- Maintains records showing compliance of applicable local environmental laws and Company's requirement.

8.9.4 Finance Executive:

Responsible to allocate appropriate funds, handle the safe disposal of the waste and maintain the required records for these tasks.

Chapter 9: Impact Assessment

This section provides the analysis of the potential impacts during construction and operational phases of the proposed project on the physical, biological and socio-economic Environment of the project area. Environmental sensitivity of the project area is described through the evaluation of significance of impacts is carried out through Environmental Matrices. In addition, it also narrates the measures that will mitigate the project's potential environmental impacts. Environmental impacts have been considered not only as they pertain to Industrial city or project site, but also to the site associated with the road project.

9.1 Impact Assessment and Characterization

Potential impacts from the proposed project activities were identified by thorough review of the project activities, study of surrounding environment, review of literature, from previous similar studies and expert judgment.

Once potential impacts have been identified, the assessment of each potential impact follows these steps:

9.1.1 Characterization of Environmental Impact

Primarily, anticipated impacts have been categorized as direct, indirect and induced impacts. These groups of impacts can be further broken down according to their nature into:

- Positive and negative impact;
- Minor, major and moderate impact;
- Local and widespread impact;
- Temporary and permanent impact;
- Short and long term impact; and
- Reversible and Irreversible impact



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Characterization of potential impacts during construction and operation stage of the project has been classified based on the above characteristics.

The following scale has been used for the evaluation of potential impacts on different environmental settings:

9.1.2 Prediction of the magnitude of the potential impacts

This step refers to the description, quantitatively (where possible) or qualitatively, of the anticipated impacts of the proposed project. This may be achieved through the use of models or comparison with other similar activities. The predicted level of impact magnitude may be due to uncertainties in the baseline conditions, the proposed activities, external developments, or the prediction model.

9.1.3 Identification of the mitigation measures:

If it is determined that the predicted impact is significant when compared with the Criteria for Determining Significance, suitable mitigation measures are identified. There is a range of mitigation measures that can be applied to reduce impacts.

9.1.4 Evaluation of the residual impact

Incorporation of the suggested mitigation measures reduces the adverse impact of the project and brings it within the acceptable limit. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied the residual impacts.

9.2 Impact Identification and Evaluation

Identification and evaluation of impacts has been undertaken through a process comprising:

- ❖ Literature review including the EIA reports of other similar projects and research articles;
- ❖ Consultation with local communities and relevant government departments;
- and,



- ❖ On site observations by environmental and social experts.

9.3 Impact Assessment methodologies

Listed below are the important methodologies for assessing the impacts of any developmental activity on the environment:

1. Adhoc method
2. Checklist method
3. Matrix method
4. Network method
5. Overlay method
6. Environmental index using factor analysis
7. Cost/Benefit analysis
8. Predictive or Simulation methods

These methods might vary from:

1. Simple to Complex
2. Static piece-meal approach to Dynamic nature of the environment

The change in EIA is moving away from a simple listing of potential impacts to complex modes involving identification of feedback paths leading to higher order impacts as compared to the easily visible first order impacts involving uncertainties.

This approach can be considered as an overall management technique requiring different kinds of data in different formats along with varying levels of expertise and technological inputs to accurately forecast the results of any planned development.

9.3.1 Ad hoc methods

Ad hoc methods indicate broad areas of possible impacts by listing composite environmental parameters (Ex: flora and fauna) likely to be affected by the proposed activity.

These methods involve assembling a team of specialists who identify impacts in their area of expertise. Here, each parameter is considered separately and the nature of impacts (long term or short term, reversible or irreversible) are considered.

These methods give a rough assessment of total impact while giving the broad areas and the general nature of possible impacts. In this method, the assessor relies on an intuitive approach and makes a broad-based qualitative assessment. This method serves as a preliminary assessment and helps in identification of important areas like:

1. Wildlife
2. Endangered species
3. Natural vegetation
4. Exotic vegetation
5. Grazing
6. Social characteristics
7. Natural drainage
8. Groundwater
9. Noise
10. Air quality
11. Visual description and services
12. Open space
13. Recreation
14. Health and safety
15. Economic values and
16. Public facilities

Types of Ad hoc method are:

- Opinion poll
- Expert opinion and
- Delphi methods

This method is very simple and can be performed without any training. It does not involve any relative weighting or any cause-effect relationship.

It provides minimal guidance for impact analysis while suggesting broad areas for possible impacts. Moreover, it does not even state the actual impacts on specific parameters that will be affected.

The drawbacks of this method are listed below:

- It gives no assurance that a comprehensive set of all relevant impacts have been studied
- Analysis using this method lacks consistency as it different criteria are selectively evaluated by different groups
- It is blatantly inefficient as it requires a considerable effort to identify and assemble a panel for each assessment.

9.3.2. Checklist method

In this method, environmental factors are listed in a structured format by giving importance weightings for factors and application of scaling techniques for impacts of each alternative.

Checklists are strong indicators of impact identification. They effectively garner the attention and awareness of their audience. Impact identification is a fundamental function of an EIA.

Checklists may be:

- Simple
- Descriptive
- Scaling or

- weighting type

Simple checklists are a list of parameters without guidelines regarding either interpretation or measurement of environmental parameters or specific data needs or impact prediction and assessment.

Descriptive checklists include list of environmental factors along with information on measurement, impact prediction and assessment.

Scaling and weighting checklists facilitate decision making. Such checklists are strong in impact identification. While including the function of impact identification, they include a certain degree of interpretation and evaluation. The aforementioned factors make these methods attractive to decision-making analysis.

However, the scaling and weighting methods are subjective and hence pose the danger of imparting equal importance to every impact. Another defect observed by critics is that numerical values assigned to impacts can be derived on the basis of expert knowledge and judgement alone.

Scaling and weighting checklist techniques quantify impacts reasonably well although they use subjective estimates. However, they make no provision for assessing dynamic probabilistic trends or mitigation, enhancement and monitoring programs. These methods cannot identify higher order effects, impacts and interactions.

Simple and descriptive checklists simply identify the possible potential impacts without any rating regarding their relative magnitudes.

Scaling and weighting checklists remove decision making from the hands of decision makers while they impart a single number to various inherently different impacts and this aspect prevents the decision maker to consider the possibility of trade-offs.

The advantages of this method are:

- It is simple to understand and use
- It is good for site selection and priority setting

Disadvantages of this method are:

- It does not distinguish between direct and indirect impacts



- It does not link action and impact
- It is cumbersome at times

9.3.3. Matrix Method

This methodology provides a framework of interaction of different activities of a project with potential environmental impacts caused by them. A simple interaction matrix is formed when project actions are listed on one axis (usually vertical) and environmental impacts are listed along the other axis. This technique was pioneered by Leopold et al in 1971.

It lists about 100 project actions and about 88 environmental characteristics and conditions.

- The advantage of the matrix method is that it links action to impact
- This is a very good method for displaying EIA results
- The disadvantages of this method are listed below:
- It is difficult to distinguish between direct and indirect impacts using this method
- There is potential for double-counting of impacts
- It is qualitative in nature and does not refer to quantity of impact

9.3.4. Network method:

This method uses the matrix approach and extends it to include both the primary as well as the secondary impacts. Identification of direct, indirect along with short, long term impact is a crucial and basic step of making an impact tree.

- The impact tree is used to identify cause-effect linkages
- The impact tree is a visual description of linkages

The advantages of the network method are:

- It links action to impact
- It is useful to check second order impacts in a simplified form



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- It handles direct and indirect impacts

The disadvantages of this method are:

- It becomes overly complex if used beyond simplified version
- It is completely qualitative in nature

9.3.5. Overlays

This method depends on a set of maps of a project area's environmental characteristics covering physical, social, ecological and aesthetic aspects

It enables separate mapping of critical environmental features at the same scale as project's site plan (Ex: wetlands, steep slopes, soils, floodplains, bedrock outcrops, wildlife habitats, vegetative communities, cultural resources, etc.)

In the old technique, environmental features were mapped on transparent plastic in different colors. Modern technique of the same activity is done using computer software, hardware, data and skilled people. It is called GIS (Geographic Information Systems)

The advantages of this method are:

- It is easy to understand and use
- It has a good display and
- It is good for setting site selection

The disadvantages of this method are:

- It addresses only direct impacts
- It does not address impact duration or probability

9.4 Environmental Impact Matrix

The methodology adopted for the proposed project is the matrix method.



Table 9.1: Environmental Impact Matrix for Pre-construction and Construction Phase

Name	Impact			Magnitude	
	Positive	Negative	No	Minor	Moderate
Land Acquisition			√		
Earth-fill Material		√		√	
Scenic Quality	√			√	
Topography and Geology			√	√	
Dust		√		√	
Noise		√		√	
Soil Erosion		√		√	
Solid Waste		√		√	
Waste Water		√		√	
Flora			√	√	
Fauna				√	
Agricultural Land			√		
Employment Opportunities	√				√

9.5 CONCLUSION

Based on the environmental and social impacts assessment of the proposed TCCEC green field project it is concluded that Project will have short term and reversible impacts with moderate to minor magnitude. Implementation of this Project will definitely lower the outbreak of water borne diseases and improve the health and hygiene conditions in the area. The major aspects of the Project are summarized as under:

- All the construction phase impacts like soil erosion, soil contamination, solid waste generation, water contamination, air pollution, high noise level, etc. are of temporary nature and can be controlled and mitigated.
- No protected forest area or wildlife sanctuary or any other environmentally sensitive site exists within the Project Area of impact, which may be affected by the Project.
- No indigenous people have been identified in the Project.
- The other social issues like safety of general public and workers, security problems, risk of communicable diseases, vector borne diseases etc. are of temporary nature.
- A comprehensive EMMP has been developed identifying the impacts, mitigation measures, agencies responsible for implementation and monitoring of the proposed measures. EMMP also describes the environmental and social monitoring responsibilities

List of Annexures

Annexure I: Ambient air analysis report

Annexure II: Noise analysis report

Annexure III: Water analysis report