

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY REPORT (SR) FOR THE

PROPOSED GLASS BOTTLES MANUFACTURING PLANT ON PLOT NO. MOMBASA/MUNICIPALITY BLOCK LX/1483 AT DONGO KUNDU SPECIAL ECONOMIC ZONE IN MOMBASA COUNTY

06/03/2026

GPS COORDINATES

Latitude: (-4.098814) 4°05'55.73076"S and Longitude: (39.599120) 39°35'56.83164"E



PROPONENT

**MILLY GLASS SEZ LIMITED
P.O BOX 80180-80100
MOMBASA**

DECLARATION

ENVIRONMENTAL CONSULTANTS

This Environmental and Social Impact Assessment (ESIA) study report for the Proposed Glass Bottles Manufacturing Plant on Plot No. Mombasa/Municipality Block LX/1483 at Dongo Kundu Special Economic Zone in Mombasa County has been prepared by a team of EIA/EA practicing experts with reasonable skills, care and due diligence in accordance with the Environmental Management and Coordination Act, 1999 (*Revised 2015*) and the Environmental Impact Assessment and Audit Regulations, 2003.

We hereby certify that the contents as contained in this document are correct to the best of our knowledge.

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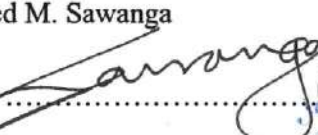
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Proponent

I Michael S Rasmi being a representative of MILLY GLASS SEZ LTD, do hereby confirm that I was consulted during the preparation of the ESIA study report for the Proposed Glass Bottles Manufacturing Plant on Plot No. Mombasa/Municipality Block LX/1483 Dongo Kundu Special Economic Zone in Mombasa County, and that the study report has been submitted to NEMA with my approval.

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LIST OF ACRONYMS

Acronym / Abbreviation	Definition
BOD	Biological Oxygen Demand
CIDP	County Integrated Development Plan
COD	Chemical Oxygen Demand
CPR	Comprehensive Project Report
EA	Environmental Audit
ECDE	Early Childhood Development Education
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act
EMP	Environmental Management Plan
EMMP	Environmental Management and Monitoring Plan
EPZ	Export Processing Zone
EPZA	Export Processing Zone
ESIA	Environmental and Social Impact Assessment
ETP	Effluent Treatment Plant
EMF	Environmental Management Framework
ESA	Ecological Support Areas
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GN	Government Notice
HFO	Heavy Fuel Oil
I&AP	Interested and Affected Party
IDP	Integrated Development Plan

IFC	International Finance Corporation
KPA	Kenya Ports Authority
KPLC	Kenya Power and Lightening Company
LC	Least Concern
LPG	Liquefied Petroleum Gas
LOS	Level-of-Service
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
M&E	Monitoring and Evaluation
NAAQS	National Ambient Air Quality Standard
NDP	National Development Plan
NEMA	National Environment Management Authority
QC	Quality Control
TOR	Terms Of Reference
TPD	Tones Per Day
SEZ	Special Economic Zone
SEZA	Special Economic Zone Authority

DEFINITION OF TERMS

Analysis means the testing or examination of any matter, substance or process for the purpose of determining its composition or qualities or its effect (whether physical, chemical or biological) on any segment of the environment or examination of emissions or recording of noise or sub-sonic vibrations to determine the level or other characteristics of the noise or sub-sonic vibration or its effect on any segments of the environment;

Effluent means gaseous waste, water or liquid or other fluid of domestic, agricultural, trade or industrial origin treated or untreated and discharged directly or indirectly into the aquatic environment;

Environment includes the physical factors of the surroundings of human beings including land, water, atmosphere, climate, sound, odour, taste, the biological factors of animals and plants and the social factor of aesthetics and includes both the natural and the built environment;

Environmental Impact Assessment means a systematic examination conducted to determine whether or not a programme, activity or project will have any adverse impacts on the environment;

Environmentally Friendly includes any phenomenon or activity that does not cause harm or degradation to the environment;

Hazardous substance means any chemical, waste, gas, medicine, drug, plant, animal or micro-organism which is likely to be injurious to human health or the environment;

Noise means any undesirable sound that is intrinsically objectionable or that may cause adverse effect on human health or the environment;

Oil includes –

- (a) Crude oil, refined oil, diesel oil, fuel oil and lubricating oil; and
- (b) Any other description of oil which may be prescribed;

Pollutant includes any substance whether liquid, solid or gaseous which –

- a) May directly or indirectly alter the quality of any element of the receiving environment;
- b) is hazardous or potentially hazardous to human health or the environment; and includes objectionable odours, radio-activity, noise, temperature change or physical, chemical or biological change to any segment or element of the environment;

Pollution means any direct or indirect alteration of the physical, thermal, chemical, biological, or radio-active properties of any part of the environment by discharging, emitting, or depositing wastes so as to affect any beneficial use adversely, to cause a condition which is hazardous or potentially hazardous to public health, safety or welfare, or to animals, birds, wildlife, fish or aquatic life, or to plants or to cause contravention of any condition, limitation, or restriction which is subject to a license under this the Environmental Management and Coordination Act (1999)

Project includes any project, programme or policy that leads to projects which may have an impact on the environment;

Proponent means a person proposing or executing a project, programme or an undertaking

Soil includes earth, sand, rock, shale, minerals, vegetation, and the flora and fauna in the soil and derivatives thereof such as dust;

Waste includes any matter prescribed to be waste and any matter, whether liquid, solid, gaseous, or radioactive, which is discharged, emitted, or deposited in the environment in such volume composition or manner likely to cause an alteration of the environment; and,

Water includes drinking water, river, stream, water-course, reservoir, well, dam, canal, channel, lake, swamp, open drain, or underground water.

EXECUTIVE SUMMARY

1.0 Introduction

This Executive Summary provides a synopsis of the Environmental and Social Impact Assessment (ESIA) Study Report (SR) prepared for the proposal by Milly Glass SEZ Limited to develop and operate a glass bottle manufacturing plant on plot number Mombasa/Municipality Block LX/1483 at Dongo Kundu Special Economic Zone in Likoni Sub-County, Mombasa County.

1.1 Background

Milly Glass SEZ Ltd hereby referred to as the proponent is an extension of Milly Glass Works Limited which is a leading manufacturer of glass bottles, mainly for soft drinks and spirits popularly known as container glass. Currently, Milly Glass Works Ltd only produces flint bottles (clear bottles as opposed to green or amber) at their factory based on Mombasa Island. The company intend to venture in manufacturing pharmaceutical bottles (Type 3 glass amber bottles). The project proponent proposed the development facility based on market analysis of demand growth of pharmaceutical glass bottles and the opportunity to construct a new facility that will strengthen their existing glass bottle manufacturing facility in Mombasa. At present, there is no glass factory in East and Central Africa producing pharmaceutical bottles and this will be the first of its kind. Having a local pharmaceutical glass manufacturing plant will also make Kenya attractive to pharmaceutical manufacturing entities in setting up their plants in the country. This will have a ripple effect in spurring manufacturing within the country and a positive step towards retaining foreign currency from repatriation.

The proposed glass bottle manufacturing plant would produce type 3 glass amber colored pharmaceutical glass bottles. These are chemically inert, and durable containers used for storing, protecting, and transporting medicine. They are used for liquids, tablets, capsules, vaccines, and parenteral (injectable) preparations, acting as a, crucial barrier against moisture, light, and contaminants.

1.2 Location

The proposed site is approximately 1km off the Dongo Kundu Bypass road on plot L.R number Mombasa/Municipality Block LX/1483 within the Dongo Kundu Special Economic Zone in Mombasa County. The site is in Mrongondoni Village, Bububu Sub-Location, Nguta Location within Likoni Sub-County in Mombasa County. The exact site location can be accessed through GPS Co-ordinates: **Latitude (-4.098814) 4°05'55.73076" S and Longitude (39.599120) 39°35'56.83164" E.**

2 Project description

This ESIA Report includes a general description of the proposed project and a comparative assessment of project alternatives.

Table 1: Summary of Property/Site Information

Plot Number:	Plot L.R number Mombasa/Municipality Block LX/1483 within the Dongo Kundu Special Economic Zone in Mombasa County.
Physical address:	Off the Dongo Kundu Bypass road at Mrongondoni Village in Dongo Kundu Special Economic Zone
Property size:	6 ha
Development footprint size:	Approximately 60 000 m ² (6 ha)
Administrative Location	At Mrongondoni Village in Bububu Sub-Location, Nguta Location within Likoni Sub-County in Mombasa County
Centre coordinates of site:	Latitude (-4.098814) 4°05'55.73076" S and Longitude (39.599120) 39°35'56.83164" E.

2.1 Description of the Proposed Glass Bottle Manufacturing Project

The proposed development project consists of construction of a Glass Bottle Manufacturing Plant and supporting facilities. The proposed glass bottle manufacturing plant would mainly produce type 3 glass amber colored pharmaceutical glass bottles. These are chemically inert, and durable containers used for storing, protecting, and transporting medicine. They are used for liquids, tablets, capsules, vaccines, and parenteral (injectable) preparations, acting as a crucial barrier against moisture, light, and contaminants.

The facility would comprise a batch plant, main manufacturing building with LPG/HFO fired 75 TPD furnace and a warehouse. The annual glass bottle production target would be approximately 290 000 tons.

Glass is a non-crystalline amorphous solid made of the fusion of a diverse range of non-organic oxides found in sand, soda ash, limestone and other raw materials.

The conceptual process flow of the proposed project is illustrated in the diagram below and the main components are described in the text.

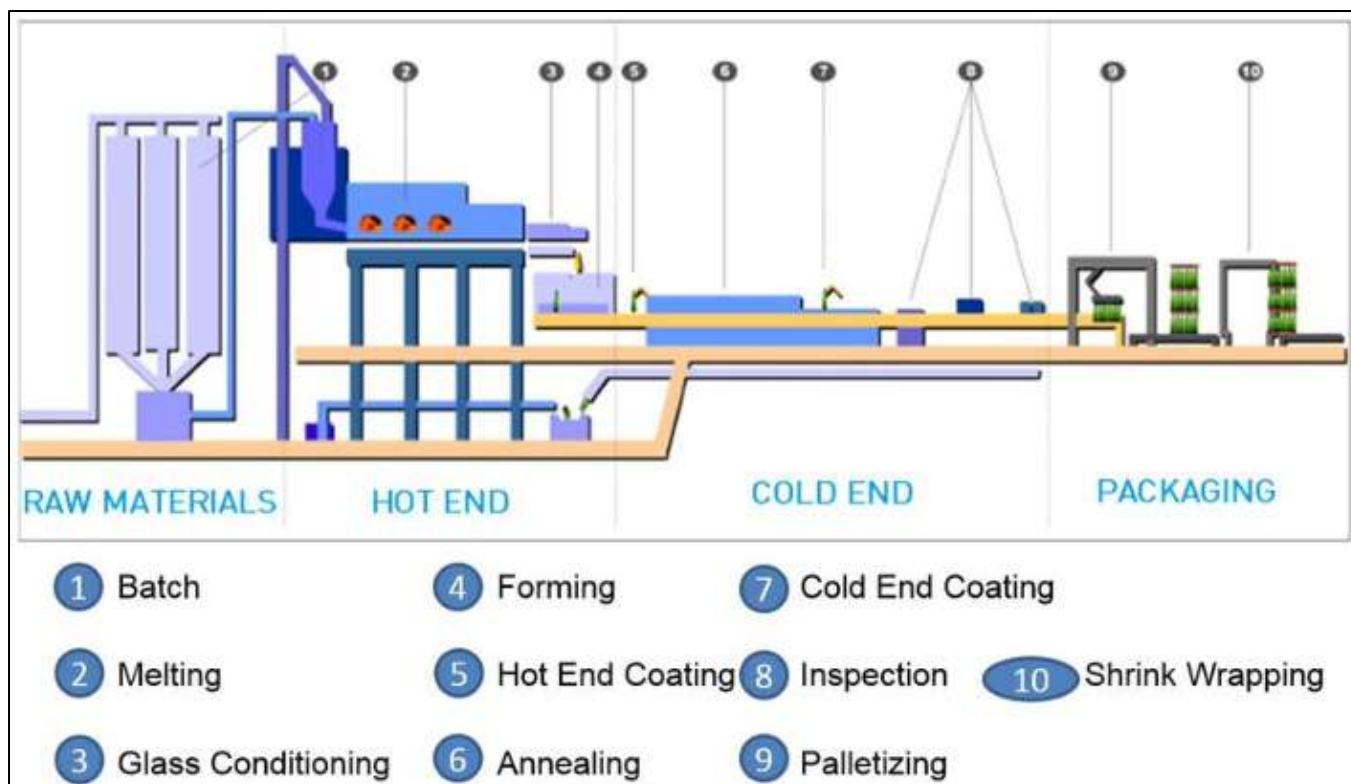


Figure 1: Conceptual flow chat of the proposed project

2.2 Batch Plant

The batch plant would be used to mix the raw materials required in glass bottle manufacture. The key raw materials and their source are listed below: -

1. Silica sand – Being mined in Kwale.
2. Soda ash – Being mined in Magadi by Tata Group.
3. Limestone – Being mined in Kajiado.
4. Dolomite – Being mined in Voi.
5. HFO, Diesel and LPG – Bought from the local oil marketers.
6. Electricity – Provided by KPLC.
7. Cullet (Recycled Glass) – Collected and sold by the informal sector.
8. Feldspar - Imported from India (However, it can be mined and processed locally if Athi River mining revive their Feldspar mining and processing)

The raw materials are stored in a variety of silos, hoppers and bunds, before being mixed according to specific recipes for the glass product. Once mixed, the raw material batches would be conveyed across to the main manufacturing warehouse.

2.2.1 Main Manufacturing Warehouse 01

The main manufacturing warehouse would comprise a single large covered hall, approximately 5,760 m² in extent. The warehouse consists of three areas (named the Furnace, Hot End and Cold End areas) in which, the glass is melted, formed into bottles and inspected for quality and defects.

2.2.2 Furnace

The furnace would utilize Liquid Petroleum Gas (LPG) or HFO oil as a heat source. It would have capacity to melt 750 tons per day (TPD). This furnace would feed to the bottle manufacturing line. In the furnace the raw materials would be melted into glass at temperatures of up to 1 560°C and degassed. Emissions from the furnace would be cleaned in order to comply with the minimum emissions standards and released via a stack.

2.2.3 Hot End

In the Hot End the molten glass would be channeled to a series of glass forming machines that cool and meter the glass before using mechanical and pneumatic means to create the specific glass containers. The bottles would be hot end coated to enhance surface resistance and cooled in an annealing oven in a controlled manner, so as to avoid internal stresses.

2.2.4 Cold End

At the Cold End the bottles would be further coated and then subject to inspection for defects by high precision equipment that measure capacity, dimensions, impact, pressure resistance and other tests. Bottles that do not meet specifications would be crushed and conveyed back to the furnaces where the cullet is re-used in the raw material mix. Completed bottles would be packaged and moved to the warehouse for storage and distribution.

2.2.5 Main Warehouses 02

The main warehouse 02 would have an area of approximately 5,760 m². This warehouse shall be reserved for future expansion of the factory. Meanwhile, would be used for storage.

2.2.6 Main Warehouse 03

The main warehouse 03 would be used for storage of finished goods. This warehouse would also house the sand plant and cullet plant. It would also be used to store rejected sand.

2.2.7 Supportive Facilities

The glass production process requires several utility systems (gas and liquids) for operation. Support services associated with the proposed project would include:

- i. Ancillary buildings (Plant rooms: - Compressor, RO Plant, Cooling tower, all utility lines, high-impact facilities and fuel park)
- ii. Administration office block (Factory/plant office: - Technical office, QC labs)
- iii. Parking
- iv. Recreational

- v. Changing rooms
- vi. Emergency room,
- vii. Staff accommodation

The facility would also have a gas station to regulate gas supply, an HFO fuel oil storage facility as a back-up furnace fuel, diesel generators for emergency electricity supply and emergency water storage.

2.2.8 Utility System

Utilities required consist of water, electricity and back-up power system as well as life and fire safety system (described separately below). The utilities are necessary components to ensure smooth operation of the facility

Access and Transport: Access to the facility would be via an access road connecting the site to the Dongo Kundu Bypass Road. Transport of goods to, and products from, the facility would be by truck.

Water supply System: Water will be sourced from a groundwater pumping borewell, which will be constructed as part of this project. The borewell would be the main portable and process water source. Water shall be treated onsite using an RO plant. A water tower fire utility that store water for every-day use and fire event will be constructed between the compressor room and RO plant utility.

Power Supply: Power supply for the project will be sourced from the national power grid to be supplied to the project site. The power will be utilized for pumping water, general office need, and other electricity needs. The power requirement of the facility would be high during operation stage.

LPG/HFO/Diesel: The proposal is to source LPG/HFO and diesel from local oil marketers

Wastewater and solid waste treatment: Two types of waste will be produced from the facility, the wastewater and solid waste. Wastewater will be mainly coming from domestic sanitation activities which include black water (resulting from toilet flush) and grey water (resulting from kitchen sink, other washing facility) and runoff during rainy events. Black and grey water will be treated using an onsite effluent treatment plant (ETP) before being used for landscaping. Process water would be recycled through a cooling tower and filters to significantly reduce the need for fresh water, allowing reuse for multiple processes.

Solid wastes generated by the plant and associated operations will be separated at source, as much as is feasible, and then directed to appropriate recycling, re-use or disposal facilities.

Fire Protection System: Fire management system is an important part of the project development, as fuel is susceptible to fire. Project proponent shall construct a system that meet the international life and fire safety standards to ensure integrity of its own facility, safety of workers and surrounding community. Fire protection system shall consist of the following element:

- Fire hose
- Fire hydrant system
- Moveable fire extinguisher
- Fire water system

2.2.9 Efficiency and Sustainability

It is Milly Glass SEZ Ltd.'s intention that they give consideration to all reasonable and feasible sustainability measures for incorporation within the facility. Such measures should be considered in the plant technology and operations as well as in ancillary services such as offices, ablutions, workshops, warehouses and parking. It must be noted that the actual sustainability measures and equipment specifications for the facility that would be constructed will be subject to confirmation during the detailed design phase.

2.2.10 Employment

It is anticipated that construction would result in the generation of up to 800 direct and indirect job opportunities. Operation of the facility would create approximately 280 permanent employment opportunities. Employees would be sourced, as much as is possible, from local communities and the greater Mombasa County.

2.3 Summary of project alternatives

Dongo Kundu Special Economic Zone was selected as the target area as it has good regional transport linkages, the required services and infrastructure (Notably Port of Mombasa, SGR, Moi International Airport and roads) and requires economic stimulation. Dongo Kundu Special Economic Zone in Mombasa is basically a strategically planned area designed to attract both Foreign and Domestic Direct Investments. It features world-class infrastructure and operates under liberal economic laws, offering tax and duty incentives. SEZs have been engineered to promote industrialization, increase exports and generate employment.

In selecting the site, consideration was given during pre-feasibility investigations to commercial, logistical, environmental, social and technical factors. In proposing the plant layout consideration was given to a number of local features, adjacent users and access, operational efficiency, geotechnical and hydrological parameters. Only the preferred site and layout were investigated in the EIA phase.

Design alternatives that were considered during pre-feasibility investigations included the furnace fuel and furnace type, production line configuration and emissions control mechanisms. The alternatives selected for consideration in the EIA phase included two regenerative-type, LPG fired furnace producing amber colored glass bottles. Emissions controls would ensure compliance with NEMA emissions standards as a minimum, moving toward best-in-class where possible. Only the preferred designs were investigated in the EIA phase. The No-Go alternative will also be investigated in the EIA phase.

2.4 Project cost

Setting up the proposed glass bottle manufacturing plant is estimated to cost **Kenya Shillings. Three Hundred and Thirty Million, Three Hundred and Sixty-Six Thousand, Five Hundred and Three Shillings Only. (Kshs. 330,366,503.00)**. The proponent will be required to pay 0.1% of the total project cost as official fee payable to NEMA which is equivalent to **Kenya Shillings Three Hundred and Thirty Thousand, Three Hundred and Sixty-Six Shillings Only (Kshs. 330,366/=)**.

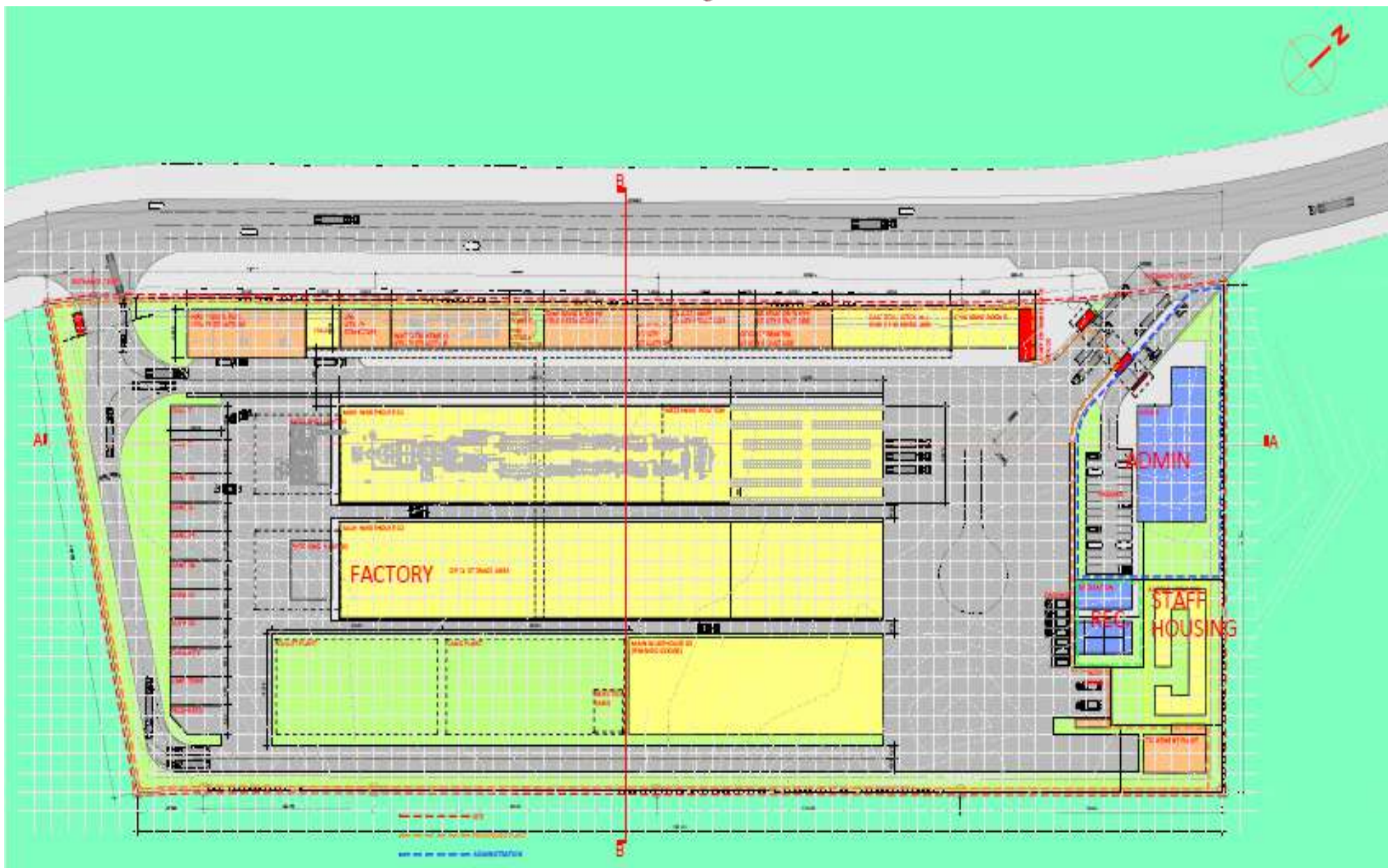


Figure 2: The conceptual project layout

3 Description of the Affected Environment

This report includes a description of relevant environmental (geographical, physical, biological, social, economic, heritage and cultural) aspects associated with the project site.

3.1 Climate

The project area falls within Mombasa County in the coastal region which features a hot, humid tropical climate year-round, with temperatures typically ranging from 26°C to 33°C (79°F – 91°F). Located on the coast, it experiences high humidity, with the warmest, most humid conditions usually from January to March and cooler, drier, yet still warm, conditions from June to August. Significant rainfall occurs during the "long rains" (April to May) and "short rains" (October to November). Tropical, maritime winds influence the coastal weather, with winds often ranging from 10–15 mph.

Baseline Ambient air quality in the project area was conducted through Zonal Laboratory Ltd between 24th – 26th February 2026 at selected locations within and around the project site. The monitoring aimed to establish background concentrations of key air pollutants including particulate matter (PM2.5 and PM10), sulfur dioxide, (SO₂), carbon monoxide (CO₂), nitrogen oxides (NO_x), and ozone (O₃), as well as local meteorological conditions (temperature, humidity, wind direction, and wind speed).

Measured PM_{2.5} concentrations ranged between 7.9–14.5 µg/m³, while PM₁₀ concentrations were between 15.7–28.7 µg/m³ across all monitoring locations. These values are well below the limits prescribed under the Environmental Management and Coordination (Air Quality) Regulations, 2014 (PM_{2.5} – 75 µg/m³; PM₁₀ – 100 µg/m³), indicating that the area is currently subject to low levels of particulate pollution.

Sulfur Dioxide (SO₂): Background concentrations ranged from 10.2–23.2 mg/m³, well below the regulatory limit of 80 µg/m³. This indicates negligible industrial SO₂ emissions in the vicinity.

Carbon Monoxide (CO): Observed concentrations ranged from 0.05–0.09 mg/m³, significantly lower than the EMCA threshold of 2.0 ppm (~2.26 mg/m³). This low CO concentration reflects the limited combustion sources in the area, consistent with the rural setting.

Nitrogen Oxides (NO_x): Levels ranged between 11.9–18.1 µg/m³, below the 80 µg/m³ regulatory limit, indicating minimal vehicular or industrial NO_x emissions.

Ozone (O₃): Measured concentrations ranged between 17–28 µg/m³, which are typical of rural background conditions and well within ambient limits.

Meteorological conditions: Temperature ranged between 28.2–33.6°C, while relative humidity varied between 55.7–63.8% during the monitoring period. Wind speeds were moderate, ranging from 0.2–4.3 m/s, with predominant directions from the northwest and northeast. These conditions suggest that pollutant dispersion is generally favorable, with sufficient natural ventilation reducing the likelihood of pollutant accumulation at the ground level.

Baseline ground vibration monitoring was also conducted over three consecutive days (24th–26th February 2026) at strategic locations within and around the proposed Glass Manufacturing Plant site in Dongo Kundu. The purpose of this monitoring was to establish reference vibration levels prior to the commencement of construction works and future operations.

Ground vibration was measured in terms of acceleration (mm/s²), velocity (mm/s), and displacement (mm) at the proposed site entrance, exit, boundary walls, and nearby residential areas. The observed results are summarized as follows:

- Acceleration: 0.03–0.09 mm/s²
- Velocity: 0.4–0.7 mm/s
- Displacement: 0.007–0.009 mm

All measured velocity values are well below the maximum limit of 5 mm/s specified under the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

3.2 Biophysical Characteristics

The project site is largely flat, with a slight fall to the south, and is located at elevations of between 50 and 60 m above mean sea level. The area is characterized by a mix of coastal soil types, with a significant presence of clay, sandy soils, and sedimentary rock structures. The soils have a low agricultural potential and are highly susceptible to erosion. No evidence of contamination was noted in test pit samples and concentrations are considered to represent baseline conditions. The geology of the project area, located in the coastal region of Mombasa, Kenya, is dominated by coastal sedimentary deposits ranging from Permo-Carboniferous to Recent ages, representing continental, lacustrine, and marine depositional environments. The area is heavily influenced by its location along the coast, featuring a mix of mangroves, swamps, and marine soils.

On-site noise levels are comparable to what is typically expected within rural/suburban areas. Daytime noise levels ranged between 57.3 dB(A) – 67.1 dB(A) while night time noise levels ranged between 47.5 dB(A) – 52.8 dB(A).

The vegetation in the project area is characterized by a mix of coastal ecosystems heavily influenced by tropical climate conditions and, more recently, human development. The area was historically part of the East African coastal forests, which are ecologically important centers of plant endemism.

Key vegetation types in the area include:

Mangrove Forests: Located along the coastline and in muddy, tidal creek areas.

Coastal Savanna and Shrubland: The dominant vegetation, consisting of scattered trees and bushes.

Fruit Trees and Agroforestry: In cultivated areas, common trees include mango, cashew, and coconut palms.

Disturbed/Secondary Vegetation: Due to the construction activities in the area, parts of the area have experienced land degradation and deforestation.

The overall habitat integrity of the site is considered to be moderately low and the only faunal species noted were those adapted to high levels of anthropogenic activity. The site is not protected in terms of the Conservation Areas Act nor is it mapped as sensitive or important by any of the relevant conservation planning tools.

Kaya Mrongondoni is located approximately 600m to the north of the site while Kaya Tembo is located approximately 500m south-eastern side of the project site. Immediate land use is mainly residential and small-scale agricultural activities are being undertaken by the area residents. The Dongo Kundu Bypass Road is approximately 1.2km north of the project site. The only observed utilization of the site is the informal grazing of livestock.

3.3 Socio-economic Characteristics

The project site is in the Likoni Sub-County. The Likoni Sub-County is one of the six Sub-Counties in Mombasa County. The site falls within Mtongwe Ward. The project site is located within the Industrial Estate Zone of the Dongo Kundu Special Economic Zone in Mombasa which one of the most important industrial and commercial centers created by the government in Kenya. The local economy is heavily dependent on the small and medium enterprises most of which are found near Likoni Ferry. The region faces many economic challenges including a poorly performing economic growth rate, high poverty levels, inequalities in terms of incomes, limited employment opportunities as well as youth unemployment.

The area is rural in character. Overall the scenic quality rating is low to moderate because of the general sense of deterioration / degradation to the landscape.

The site is accessed from the Dongo Kundu Bypass Road through an earth road which is set to be upgraded to bitumen standard under the SEZ infrastructure plan.

The current land-use of the site, or lack thereof, means that the site has almost no direct, indirect or induced effects on the local, regional and national economy. No formal employment results from the site and there is no contribution towards socio-economic development. The informal grazing of livestock is the only current beneficial use of the site.

4 Key Project Issues

The following key project issues have been identified by the ESIA project team, with input from I&APs:

Table 2: Key project issues

Issue	Phase	Response
Air Quality		
Dust generated from vegetation clearing, soil grubbing, material handling and the movement of vehicles on unsurfaced area. Wind erosion from exposed materials. Resulting in increased	C	Air quality is a concern as the site is near residential establishments. Ambient concentrations for PM _{2.5} and

dust fall on a local scale and higher particulate matter loads.		PM ₁₀ might exceed limits. Nearby third-party receptors may be sensitive to health risks from air quality. It is important that the plant complies with the prescribed minimum emission standards and does not substantially increase ambient concentrations (notably particulates) beyond its boundaries. Baseline air quality issues were carried out through Zonal Laboratory Ltd (An accredited laboratory).
Fuel combustion in the furnaces and ovens could result in sulfur dioxide (SO ₂) and nitrogen oxides (NO _x) emissions. Entrainment from vehicles on paved roads and materials handling at batch plant could result in increased dust fall on a local scale and higher particulate matter loads (PM _{2.5} and PM ₁₀).	O	
Greenhouse gas (CO _{2e}) emissions from the operations are likely to arise primarily from fuel combustion in the furnaces/vehicles and the decarbonization of raw materials (direct) and consumption of imported electricity (indirect).	O	Energy efficient, gas fired furnaces were selected to reduce greenhouse gas emissions. Regular air quality monitoring shall be undertaken throughout operation phase of the facility.
Soil and land capability		
Soil could be lost under infrastructure as well as compacted or contaminated during construction activities.	C	Soil is vital for plant growth and overall ecological function. Disturbance and loss should be prevented. Local duplex soil types are susceptible to erosion. Agricultural potential of the site is low. Avoidance of soil loss, compaction or contamination during construction requires planning and management.
Noise		
Primary noise sources are likely to be traffic, earth moving machinery, warning hooters on reversing vehicles	C	Ambient noise levels are typical for the local rural matrix.
Vehicle traffic, facility warning and information signals, rotating machinery (motors, fans, pumps), turbulent fluid flow, electrical equipment, furnaces and production lines, material handling and maintenance works may result in noise	O	It is important that the plant complies with the prescribed noise guidelines and does not substantially increase ambient noise levels beyond its boundaries. Baseline noise levels were undertaken.

Vegetation		
Vegetation would be lost under infrastructure as well as disturbed by construction activities.	C	The site has evidence of historical and current disturbance which is likely to reduce the ecological importance of the vegetation type. It is considered unlikely that the site hosts significant flora.
Aquatic Habitat		
Aquatic resources present on the site would be altered and surface water flows would be redirected. Changes to the quality and volume of run-off water arising from the site could influence downstream aquatic habitats.	C	The site has no natural water features.
Fauna		
Habitat loss from vegetation and soil clearance, as well as disturbing activities, would chase locally occurring fauna away.	C	The disturbed nature of the site has long limited the habitat and food availability at the site to only common faunal species. It is considered unlikely that the site hosts significant fauna.
Surface Water		
Disturbance of vegetation and the soil profile could result in increased sedimentation of storm water. Spillages of chemicals and hydrocarbons from construction activities could contaminate storm water.	C	There are no natural water resources on or immediately adjacent to the site. The application of regular construction management measures are anticipated to be appropriate to limit risks to storm water quality during construction.
Handling of particulates (e.g. sand, limestone) could result in increased sediments. Spillages of dangerous goods (e.g. diesel, HFO) could contaminate storm water. The impermeable surfaces (e.g. roofs, roads, paving) would increase the volume of runoff and reduce the time of concentration. The increased peak flow	O	The facility design will give consideration to safe handling and storage of dangerous goods. Operational run-off rates will not exceed pre-development levels. A storm water management plant will be developed to detail controls on water quality and run-off.

generated by the site could cause floods during a storm event.		
Ground Water		
Spillages of chemicals and hydrocarbons from construction activities could contaminate storm water and soils. If the spillage volume was significant, it could potentially impact the quality of groundwater.	C	Storage and handling of chemicals and hydrocarbons would need to be undertaken in a manner to ensure containment appropriate to the risk posed by the material.
Spillages of chemicals and hydrocarbons from activities could contaminate groundwater. Similarly, the runoff from material storage and handling areas may contain contaminants that could seep to groundwater. These could result in a lowering of the quality of groundwater on the site.	O	Groundwater in the region is unlikely to be highly sensitive, nor is significant local use anticipated. Storage and handling of chemicals and hydrocarbons would need to be undertaken in a manner to ensure containment appropriate to the risk posed by the material. A baseline ground water analysis was undertaken by Zonal Laboratory Ltd
Heritage		
Development of infrastructure could disturb cultural heritage material, graves and other archaeological material.	C	The site is not sensitive in terms of archaeology. The site may be sensitive from a paleontological point of view In the event that an archeological material is found during project implementation, work will be stopped and the National Museums of Kenya is notified.
Land Use and Users		
Land use in the area is generally residential to agricultural but rapidly changing to industrial and commercial. A number of cattle owners in the area graze their livestock periodically. At development the property would be fenced and this area would no longer be available for livestock grazing.	C	The area was zoned for Industrial and commercial use under the special economic zone; thus, the proposed development is appropriate in terms of the planning. The reduction in grazing land would likely mean that less livestock could be sustained in the area, or more feed would have to be obtained. A Social Impact Assessment and an Economic Impact Assessment assessed the potential impact on users of the site and adjacent land.

Traffic		
The proposed project would result in an increase in traffic volumes, which may affect the level-of-service (LOS) on the existing road network (i.e. increased vehicle trips). Construction traffic is not anticipated as a concern due to its relatively short duration.	O	Operations would result in many vehicles, including light and heavy vehicles, accessing the site on a 24-hr basis. Functionality of the local intersections during peak traffic periods requires investigation.
Visual		
The proposed project could change the fabric and character of the landscape due to its physical presence. The project would be visible (day and night), particularly from view points on the Dongo Kundu Bypass road.	C	The removal of vegetation, earthworks, construction camps, building of structures, etc. would be visible from surrounding areas
	O	The visibility of the project would be influenced by its physical presence and the movement of trucks to and from the site. The most significant contribution to visibility and the impact on visual quality would be the scale and bulk of the structures.
Social		
Construction could result in various social impacts with both positive and negative effects: • nuisance type impacts (noise and dust) which could impact sensitive receptors; • public safety may also be influenced as a result of increased traffic and presence of construction workers; • employment opportunities and flow of revenue to local construction companies and service providers, supporting the local economy; and • loss of grazing land	C	Nuisance and safety issues to nearby receptors will be identified across all environmental aspects and measures implemented to prevent or manage such impacts. The loss of grazing is unavoidable, but potentially offset by the other economic benefits. Employment and economic opportunities, both direct and indirect, are likely and commitments will be made to enhance the local influence of these benefits. Mechanisms to ensure appropriate corporate social investment in local communities will be investigated.

Operations could result in various social impacts with both positive and negative effects:	O	
• Reduced air quality could have nuisance and health impacts on local receptors; • The sense of place will be altered by the large structures; • employment opportunities and flow of revenue to local companies and service providers, supporting the local economy; and • opportunities for skills transfer and other corporate social initiatives to improve the economic status of local communities.		
Economic		
Construction could result in direct employment, the flow of revenue to local companies and service providers, as well as the trickle down of these economic benefits to the local community.	C	The substantial capital investment is likely to increase land values, unless other negative environmental and social impacts affect adjacent land use. The project would generate significantly more employment and economic value than the site currently does.
Operations could result in various beneficial economic impacts:	O	These factors will contribute to economic growth and socioeconomic development in the area. Mechanisms to enhance the local influence of these benefits and ensure appropriate corporate social investment in local communities will be investigated.
• the land value of the site and adjacent properties is likely to increase following the investment; • net positive employment; • a cash injection to the local and regional economy; and • facilitation of local socio-economic development through mechanisms such as training skills transfers, entrepreneurship and learnership programmes, local investment and corporate-social investment etc.		

5 Impact Assessment Conclusions

The mitigated assessment assumes that technical design controls, as included in the project scope, together with mitigation measures included in the environmental management plan (EMP) would be implemented when the plant is constructed and operated.

Table 3: Summary of the significance of potential impacts associated with proposed project

Potential impact	Significance of impacts	
	Without mitigation	With mitigation
Increase in ambient air concentrations	H	L to M
Loss of agricultural soil resources through physical disturbance	M	VL to L
Loss of agricultural soil resources through contamination	L to M	VL
Increase in disturbing noise levels affecting potential human receptors	M	L
Loss of terrestrial habitat and biodiversity through physical disturbance	M	L
Loss of wetland habitat and biodiversity through physical disturbance	L	VL
Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality	L to M	L to VL
Alteration of drainage patterns affecting the flow of water in downstream systems	M	L
Discharges from project affecting the quality of downstream freshwater resources	M	L to VL
Contamination of groundwater quality affecting the aquifer	L to M	VL
Alteration of the visual environment	M	L
Economic impact (positive and negative)	H+	H to VH+
Social benefits associated with employment and economic development	L+	M+
Changes in land value	M	L+
Reduction in grazing land affecting livelihoods of local farmers	L	VL+
Disturbance to third party road users by project-related traffic	H	L+
Increase in safety risks to third parties and communities	H	L

Change in land use affecting sense of place	L	VL
Disturbance of ground resulting in damage to heritage resources	No impact	

VH – Very High; H – High; M- Medium; L – Low; VL – Very Low; + denotes a positive impact;

The majority of potential biophysical impacts associated with the proposed glass bottle manufacturing plant would be short-term and limited either to the site or neighboring land. These include impacts on soils, terrestrial habitats and biodiversity, wetlands, drainage patterns, groundwater aquifers and the visual environment. The ecology of the site and surrounds has been subject to historical and current disturbances. The potential impacts on biophysical aspects are considered to be of **LOW** or **VERY LOW** significance with mitigation.

Operational activities present the most potential for negative air quality impacts as these activities would be conducted over a long period and in an area with already elevated ambient concentrations. More significant impacts are predicted to occur due to PM_{2.5} and PM₁₀ emissions from material handling at the batch plant. Design controls and additional mitigation measures would reduce potential impacts. The impact on air quality and the related inhalation health impacts is considered to be of **HIGH** significance without mitigation and **LOW to MEDIUM** significance with design controls and additional mitigation. Maintenance of a high efficiency for emissions controls during operations will be important.

The nearest residential area to the project site is the Dongo Kundu informal settlement. Potential noise impacts on these receptors could be significant during all project phases, more especially at night. Noise controls that focus on mitigating noise emissions at source should be put in place. With design controls and mitigation measures, potential noise impacts could be reduced to **LOW** significance.

Potential discharge of treated effluent from the on-site sewage package plant could impact on the aquatic ecosystem in the downstream. However, the treatment plant would be operated to treat effluent to standards for discharge into the environment. Therefore, any impacts on downstream aquatic habitats are considered to be of **VERY LOW to LOW** significance with mitigation.

Economic impacts associated with employment and economic development is considered to be of **HIGH** significance even without mitigation. With mitigation this is considered to be of **HIGH to VERY HIGH** significance. The substantial capital investment is likely to increase land values, unless other negative environmental and social impacts affect adjacent land use. The project would generate significantly more employment and economic value than the site currently does. These factors would contribute to economic growth and socio-economic development in the area. The related social benefits are also considered to be positive in nature. Key to realizing the **MEDIUM** positive mitigated significance of social benefits associated with increased employment and economic development is to recruit employees and procure services locally as far as possible and implement corporate social responsibility initiatives in the local area.

A reduction in grazing land used by the local community could affect the livelihoods of local farmers. Even without mitigation this is predicted to be of **LOW** significance. Where the local community is given preference in Corporate Social Responsibility initiatives, the significance of potential impacts is considered to be **VERY LOW positive**.

The project has the potential to present safety risks to third parties through project-related traffic on public roads and uncontrolled access to the site. However, with mitigation, potential safety impacts are considered to be of **VERY LOW** significance. In the case of project-related traffic, proposed road and pedestrian accommodation upgrades would result in a **LOW positive** improvement of the road network.

No impacts on heritage and cultural resources are expected as no heritage resources occur on the project site and paleontological resources, if they do exist, would be located well below the foundations of the plant.

Proceeding with the project attracts potentially significant economic benefits and potential negative environmental and social impacts of moderate or lower significance. Not proceeding with the project retains the status quo, but with a loss in employment opportunities, revenue generation and related social benefits, which could potentially be generated by the development. The project is located within an area earmarked for commercial and industrial development in the Mombasa County's spatial development framework.

6 Opinion of Environmental Assessment Practitioner

It is the opinion of environmental consultants that in terms of the sustainability criteria described in this report, there is no reason why the proposed project, with implementation of the proposed mitigation measures, should not receive a favorable decision. The management and mitigation measures recommended for the proposed project are detailed in the Environmental Management Plan for construction and operation.

CHAPTER ONE

1.0 INTRODUCTION AND BACKGROUND TO THE ASSESSMENT

1.1 Background

Milly Glass Works Limited, previously operating as Bawazir Glass Limited, is a leading manufacturer of glass containers and tableware situated in Mombasa, Kenya, serving the East African region. The company, established on February 1, 2000, possesses a significant history in the glass container industry, with roots extending back to 1954. Currently, Milly Glass Works Ltd only produces flint bottles (clear bottles as opposed to green or amber) at their factory based on Mombasa Island.

To support the expansion plan of Milly Glass Works Limited, Milly Glass SEZ Limited intends to establish another glass bottle manufacturing plant within the Special Economic Zone Dongo Kundu Likoni Constituency which will supply pharmaceutical glass bottles to pharmaceutical industries in Kenya and the East African region.

Milly Glass SEZ Limited values the favorable action taken by the Special Economic Zones Authority (SEZA) regarding the issuance of a section of the Special Economic Zone (SEZ) Dongo Kundu as a public zone for its investment. The project advocate is committed to maximizing the use of the designated space and the infrastructure planned by the Government of Kenya, thus ensuring that broader economic advantages are shared with the regional countries linked to this project.

Upon operationalization of this project the company will export pharmaceutical glass bottles to pharmaceutical companies in East and Central Africa thereby increasing Kenya Government revenue and foreign exchange earnings. The project will also attract investments in pharmaceutical manufacturing industries setting up their plants in Kenya thereby increasing local employment opportunities.

A proposal was made to the Special Economic Zones Authority (SEZA) of Kenya for the purpose of obtaining land and a License to set up the new glass bottles manufacturing plant within the Special Economic Zone at Dongo Kundu, Mombasa, for Milly Glass SEZ Limited in alignment with the Government Industrialization Agenda in vision 2030, for the construction of the glass bottles manufacturing plant at Dongo Kundu that will be fully funded by Milly Glass SEZ Limited.

Milly Glass SEZ Limited proposes to construct a glass bottle manufacturing plant and related facilities at Dongo Kundu Special Economic Zone. The proposed plant is designed produce type 3 glass amber colored pharmaceutical glass bottles. These are chemically inert, and durable containers used for storing, protecting, and transporting medicine. They are used for liquids, tablets, capsules, vaccines, and parenteral (injectable) preparations, acting as a crucial barrier against moisture, light, and contaminants

The glass bottle manufacturing plant would comprise a batch plant, main manufacturing building with LPG/HFO fired 75 TPD furnace and a warehouse. The annual glass bottle production target would be approximately 290 000 tons.

Other support services associated with the proposed project would include: Ancillary buildings (Plant rooms: - Compressor, RO Plant, Cooling tower, all utility lines, high-impact facilities and fuel park; Administration office block (Factory/plant office: - Technical office, QC labs); Parking; Recreational; Changing rooms; Emergency room; Staff accommodation, security installations and others amenities.

The project will be located within Dongo Kundu Special Economic Zone on portion LR No. Mombasa/Municipality Block LX/1483. Dongo Kundu SEZ covers an area of 3,000 acres, demarcated (zoned) to support various economic activities to facilitate the integrated needs of manufacturing and processing industries. It includes areas set aside for industrial parks; a free port zone; a free trade zone; a Meeting, Intensive, Conference, and Exhibitions (MICE) zone to facilitate business and tourist related meetings, conventions, events and exhibitions; and various residential zones. Out of the 3,000 acres Milly Glass SEZ Limited will occupy 6 Ha within the zone (GPS Co-ordinates: **Latitude (-4.098814) 4°05'55.73076" S and Longitude (39.599120) 39°35'56.83164" E**).

The Kenya Government policy on all new projects, programmes or activities requires that a project of this nature undergoes the process an Environmental and Social Impact Assessment during its planning stages to ensure that significant impacts on the environment and social aspects are taken into consideration during the design, construction, operation and decommissioning of the facility. The scope of this Environmental and Social Impact Assessment, therefore, covered:

- i. The baseline environmental conditions of the area,
- ii. Description of the proposed project,
- iii. Description of the relevant environmental laws,
- iv. Identification and discussion of any adverse impacts to the environment anticipated from the proposed project,
- v. Description of appropriate mitigation measures,
- vi. Preparation of an environmental management plan outline for all the phases of the project

1.2 Rationale for Proposed Project

Kenya's glass manufacturing sector is a mature, growing industry (established in the 1950s) driven by rising demand in construction, beverage packaging, and specialized architectural applications. Dominated by major players like Milly Glass Works Ltd, Ardagh Glass Packaging Kenya Limited and Impala Glass, the sector is expanding due to urbanization, sustainable packaging trends (EPR rules), and demand for safety glass. While container glass uses 98% local raw materials, float glass (sheet glass) is primarily imported.

Demand for container glass is projected to reach 147 thousand tonnes by 2030. This is driven by the brewery and packaging industries. Construction remains the largest consumer of glass products.

Production Hubs: Production clusters around Nairobi, Mombasa, and Nakuru, which handle the majority of beverage production.

Key Products: The industry specializes in container glass (bottles), tempered/safety glass, laminated glass, architectural glass, and bullet-resistant glass.

Sustainability & Recycling: The industry is moving towards sustainability, with 100% recyclability of glass. New Extended Producer Responsibility (EPR) regulations are obliging manufacturers to manage post-consumer waste.

Challenges: Key challenges include high electricity costs (comprising 30–40% of production costs), frequent power outages, and tax structures affecting the importation of raw float glass

1.3 Aim/Purpose of the ESIA Study

The purpose of the ESIA study is to identify and address possible direct, indirect and cumulative significant adverse environmental and social impacts to arise from the proposed project for acceptability and sustainability. The study aims at satisfying both legal and institutional obligations specified under the Environmental Management and Coordination Act 1999 (amended 2015). This ESIA has also been developed as part of Milly Glass SEZ Limited's commitment to address the requirements of the setting up of such projects in Kenya as set by NEMA a parastatal under the Ministry of Environment and Forestry in Kenya; to support the identification of project environmental and social impacts in comparison with potential benefits and the requirements for mitigation.

1.4 Scope of Work for the ESIA Study

The scope of work for the ESIA study is to:

- a) Provide technical description of the proposed project and identify all activities of environmental/social concern;
- b) Establish the existing environmental and socio-economic baseline conditions of the project area of influence;
- c) Predict and examine all the significant environmental impacts on the surrounding communities and the general environment during implementation of the proposed project and advise on appropriate mitigation and abatement measures against potential adverse impacts;
- d) Provide a monitoring program for predicted impacts;
- e) Provide an Environmental and Social Management Plan (E&SMP);
- f) Document the socio-economic and cultural advantages and disadvantages associated with the proposed project for stakeholders and interested groups to make an informed decision on the level of environmental compromise and permitting.
- g) Provide framework to guide the development of an emergency response plan for the project;
- h) Provide guidelines to be followed in the event of decommissioning; and
- i) Carry out public consultations and include the outcome in the ESIA report with arrangements to address stakeholders' concerns.

1.5 Approach/Methodology for the ESIA Study

The approach and methodology adopted for the study include but not limited to:

- i. Field inspections and trekking;
- ii. Review of available literature;
- iii. Specialists studies for baseline information;
- iv. Stakeholders' Consultations; and
- v. Data analysis and reporting.

1.5.1 Field Inspections

Surveys of the proposed project site were carried out for two months from 24th January 2026 to 24th March 2026 to confirm the project's area of influence as well as the environmental and social issues and conditions to be affected or are likely to develop from the implementation of the proposed project. The field studies identified the potential project affected persons, as well as confirm the project's area of influence, key stakeholders, as well as environmental and social issues and conditions to be affected or are likely to develop from the implementation of the proposed project.

1.5.2 Review of Available Literature

The major documents reviewed include:

- i. Documents from the project implementers on scope of the project;
 - a. Project's site plan
 - b. Architectural drawings of the proposed project
- ii. SEZA 's Dongo Kunde Site's Master Plan
- iii. Mombasa County Integrated Development Plan (2018-2022)
- iv. Kenya National Bureau of Statistics. (2019). 2019 Kenya Population and Housing Census: Volume II, Distribution of Population by Administrative Units. Nairobi.
- v. Ministry of Environment and Natural Resources. 1999. Environmental Management Coordination Act. Nairobi: Government Press.
- vi. Ministry of Environment Kenya. 2004. Legal Notice 31: The Factories and Other Places of Work (Safety and Health Committee) Rules. Nairobi: Government Printers.
- vii. Ministry of Environment Kenya. 2024. Legal Notice 177: Environment Management and Coordination (Water Quality) Regulations. Nairobi: Government Printers.
- viii. Ministry of Environment Kenya. 2024. Legal Notice 178: Environmental Management and Coordination (Waste Management) Regulations. Nairobi: Government Printers

- ix. Ministry of Environment Kenya. 2006. Legal Notice 160: Environment Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations. Nairobi: Government Printers.
- x. Ministry of Environment Kenya. 2009. Legal Notice 61: Environmental Management and Coordination (Noise and excessive vibration Pollution) (Control) Regulation. Nairobi: Government Printers.
- xi. Ministry of Environment Kenya. 2024. Legal Notice 179: Environment Management Coordination (Air Quality) Regulations. Nairobi: Government Printers.
- xii. United Nations (UN) Convention on Biological Diversity 1994
- xiii. United Nations Framework Convention on Climate Change (UNFCCC)
- xiv. Stockholm Convention on Persistent Organic Pollutants
- xv. Basel Convention on the control of transboundary movements of hazardous wastes and their disposal

1.5.3 Specialist Studies for Baseline Information

Specialist Studies conducted to provide additional information on the current environmental and socio-economic baseline to identify key issues and help assess potential impacts of the project. The scope of these specialist studies is presented in **Table 1-1** below.

Table 4: Overview of Scope of Baseline environmental assessments

Resource	Description
Noise	Baseline noise levels were measured at the identified locations. A detailed report on the noise survey is attached in the annex
Surface water analysis	Baseline surface water analysis was undertaken through Zonal Laboratory Ltd. Samples of water from Kaya Mrongondoni and Kaya Tenbo were sampled through the laboratory. Water analysis details are attached in the annex
Ground water analysis	Baseline ground water analysis was undertaken through Zonal Laboratory Ltd. Sample from a borehole located next to the project site was sampled through the laboratory.
Soil analysis	Baseline soil analysis was also conducted through Zonal Laboratory Ltd. Baseline soil analysis was carried out to be used as a pollution control indicator during the various stages of phases of the project. Soil analysis results are attached at the annex

Socio Economic Baseline	Desktop studies reviewed available data from the National Population and Housing Census reports, existing EIA reports and other socioeconomic research/reports for the Project Area. - Land ownership, land tenure and land use in the project area - Key informant interviews and focus groups with local leaders (government, traditional leaders), - key workers. These was inclusive of men, women, and youth, land users, and land owners. - Socio-economic analysis for socioeconomic baseline. The methodology used for the studies included: - Observational studies; - Interviews with traditional leaders and members of Dongo Kundu communities; - Interviews with the Mombasa County representative; - Review of Likoni Profiles; and - Review of district information from the 2019 Population and Housing Census report.
Land use studies	Methods employed included: - Field observations of existing properties at the project area; and - Use of the 1:50,000 topographical maps and satellite images of the project area to demarcate the project area of influence.

1.5.4 Stakeholder Identification and Consultations

The project proponents have been engaged to understand the project scope, design and implementation and to obtain relevant project documents. Extensive consultations have been held with key stakeholders and interested groups as part of information gathering process on environmental and socio-economic issues by means of one-on one interviews and stakeholder consultation meetings. These include relevant Government Institutions and regulatory bodies, the project beneficiaries and engineers, local political authorities and project affected persons/interest groups.

The stakeholder engagements also assisted in appreciating the role of the identified stakeholders in the successful implementation of the proposed project. Details of the stakeholders' consultations are provided under **Chapter 5**.

1.5.5 Data Analysis and Reporting

The data obtained from the desk and field studies were analyzed and have been presented in this Environmental and Social Impact Assessment Report for the purposes of applying for an ESIA license.

CHAPTER TWO

2.0 POLICY, LEGAL AND LEGISLATIVE FRAMEWORK

This section provides the policy, legislative and regulatory framework to which the proposed project should comply. National regulations are discussed along with IFC performance standards and international conventions to which Kenya is a party. Kenya champions sustainable development and recognizes the need for sustainable environment. This is in line with the Millennium Development Goals and Vision 2030. The Environmental Management and Coordination Act (EMCA) was enacted in 1999 as the core law in environmental management and guidelines.

Kenya's environmental policy and legislation are scattered in a multiplicity of resource and sector-specific laws and policy papers. The institutions and departments that deal with environmental issues are equally numerous. Sector-specific laws are deficient in that they are characterized by fragmented and uncoordinated sectorial legal regimes that are developed to facilitate resource allocation and to deal with environmentally adverse effects of resource exploitation.

2.1 The Constitution of Kenya, 2010

The Constitution of Kenya is the supreme law of the land. Article 26 lists the right to life as one of the fundamental rights an individual is entitled to. The right to life guaranteed by the Constitution is interpreted to include the right to a clean and healthy environment. Article 42 provides that every person has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures.

Article 69 of the Constitution requires the Government of Kenya to, among other things: ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits; encourage public participation in the management, protection and conservation of the environment; establish systems of environmental impact assessment, environmental audit and monitoring of the environment; eliminate processes and activities that are likely to endanger the environment; and utilize the environment and natural resources for the benefit of the people of Kenya.

Industrialization in Kenya is anchored in the Constitution of Kenya 2010 through broad provisions that create a conducive environment for manufacturing, trade, and economic development. The Constitution provides the supreme legal framework guiding the nation's industrial agenda.

Property Rights (Article 40): Protects private property rights, encouraging both local and foreign investors to establish manufacturing firms.

Labor Relations (Article 41): Guarantees fair labor practices, which are essential for a stable industrial workforce.

Consumer Rights (Article 46): Promotes fair competition and consumer protection, supporting standards in industrial products.

Environmental Protection (Article 42 & 69): Ensures sustainable industrial development by requiring environmental impact assessments for industries.

Role of Counties (Fourth Schedule): Empowers county governments to create local industries and enhance trade development.

Public Participation (Article 10(2) (a)): Mandates consultation with industry stakeholders when developing industries

The passing of The Constitution of Kenya in 2010 also altered the governance structure of the country thereby necessitating the review of the Industrial sector framework. This led to the review of the National Industrial Policy Framework (Sessional Paper No. 9 of 2012), Industrial sector laws, by-laws and regulations, other policies, administrative procedures, government guidelines and circulars relating to Industrial Development in Kenya.

2.2 Kenya Vision 2030

This is the current national development blueprint for the period 2008 to 2030. The objective of Vision 2030 is to transform Kenya into a middle-income country with a consistent annual growth of “10 % by the year 2030”. One of the aims of the vision is to make Kenya a nation that has a clean, secure, and sustainable environment by 2030. This will be achieved through promoting environmental conservation to better support the economic pillar. Improving pollution and waste management through the application of the right economic incentives in development initiatives has also been raised as being critical to Vision 2030.

The blueprint aims to transform the nation into a newly industrializing, middle-income country by fostering a robust, diversified manufacturing sector. Key goals include increasing manufacturing's contribution to GDP to over 20%, creating jobs, boosting exports, and establishing industrial parks to facilitate value addition in agriculture, textiles, and technology.

Key Industrialization Strategies under Vision 2030 include:

- **Manufacturing Expansion:** Increasing the sector's contribution to GDP from around 8–11% to over 20% to drive economic growth and reduce reliance on raw agricultural exports.
- **Priority Sectors:** Focusing on agro-processing, leather, textiles and apparel, pharmaceuticals, edible oil, and local assembly of electric vehicles/motorcycles.
- **Special Economic Zones (SEZs) & Parks:** Developing County Aggregation and Industrial Parks (CAIPs) and industrial clusters, including flagship projects in Mombasa and Kisumu for efficient logistics and processing.
- **Value Addition:** Shifting from exporting raw materials to enhancing the value of products like tea, coffee, and meat.
- **Policy Support & Infrastructure:** Developing "Buy Kenya Build Kenya" policies, improving energy infrastructure (geothermal/renewable), and upgrading technical training (TVET) to supply skilled labor

Application: The proposed construction of a Glass Bottle Manufacturing Plant is a private development project that is aimed at increasing industrialization in Kenya as stipulated in the vision 2030 of the Republic of Kenya.

2.3 Policy Framework

2.3.1 National Industrialization Policy 2012 - 2030

This framework was designed to promote and sustain a vibrant, globally competitive and diversified industrial sector for generation of wealth and employment through the creation of an enabling environment. The policy is focused on addressing the factors affecting the industrial sector, exploiting the strengths and opportunities arising from regional integration and globalization, and positioning the industrial sector to become the leading investment destination in Africa to take advantage of investment flows. Chapter four of this document comprises of the broad policy intervention areas and respective policy measures to be undertaken, and chapter five comprises of the policy implementation, monitoring and evaluation.

Application: Milly Glass SEZ Ltd intends to establish a pharmaceutical glass bottle manufacturing plant. Having a local pharmaceutical glass bottle manufacturing plant will also make Kenya attractive to pharmaceutical manufacturing entities in setting up their plants in the country thereby increasing industrialization.

2.3.2 National Environmental Policy, 2013

The National Environmental Policy proposes a broad range of measures and actions responding to key environmental issues and challenges. It seeks to provide the framework for an integrated approach to planning and sustainable management of natural resources in the country. It recognizes the various vulnerable ecosystems and proposes various policy measures not only to mainstream sound environmental management practices in all sectors of society throughout the country but also recommends strong institutional and governance measures to support the achievement of the desired objectives and goal.

One of the objectives of the policy is to promote and support research and capacity development as well as use of innovative environmental management tools such as incentives, disincentives, total economic valuation, indicators of sustainable development, Strategic Environmental Assessments (SEAs), Environmental and Social Impact Assessments (ESIAs), Environmental Audits (EA) and Payment for Environmental Services (PES).

2.3.3 National Gender Policy (2011)

The overall goal of this Policy is to mainstream gender concerns in the national development process in order to improve the social, legal/civic, economic and cultural conditions of women, men, girls and boys in Kenya.

The policy aims at ensuring gender equality and women's empowerment and mainstreaming of needs and concerns of women, men, girls and boys in all sectors of development in the country so that they can participate and benefit equally from development initiatives.

Application: This policy would especially apply to the recruitment of construction labor for the proposed project, where women should have equal opportunity as men for available jobs. This policy also requires provision of a work environment that is safe and conducive to women and men, considering gender-disaggregated differences and

vulnerabilities. This for example applies to onsite workers' sanitation facilities, where women should have separate facilities from men.

3.3.4 Occupational Safety and Health Policy (2012)

This policy and all related regulations aim at safeguarding the safety, health and welfare at work of all persons working in a given workplace. In addition to full compliance to all the stipulated legislation under this policy, the proponent shall:

- Integrate, into the Company's operations, systems and procedures that ensure a safe working environment that is without risks to health
- Develop and implement a comprehensive internal occupation safety and health policy
- Carry out appropriate risk assessments in relation to the safety and health of persons employed and, on the basis of these results, adopt preventive and protective measures
- Ensure insurance for and compensation of employees on work related injuries and diseases contracted in the course of employment and for connected purposes as stipulated under the Work Injury Compensation Benefit Act 2007.

2.3.5 Workplace Policy on HIV/AIDS (2007)

The main objective of this Policy is to provide a framework to address HIV and AIDS in the workplace. The principles that guide the Policy are in accordance with international conventions, national laws, policies, guidelines and regulations. They include recognition of HIV/AIDS as a workplace issue; Non-discrimination; Gender equality, Safety and Health work Environment, Workplace ethics and Confidentiality.

Application: The requirements of this policy are expected to be fulfilled by proponent, especially in regard to having an internal company HIV Policy and worker sensitization initiatives. This policy is of paramount relevance to the project as the implementation of the proposed camp site during the construction and operations is expected to spur substantial in-migration into the project area by people seeking employment opportunities. This, coupled with the expected economic growth, increased financial spending power and disruption of social / cultural norms may result in predisposing factors associated with the spread of HIV/AIDS such as prostitution and adultery.

2.3.6 National Environment Action Plan (NEAP) 2007

The NEAP provides a framework for the implementation of the Environment Policy and realization of the National Millennium Development Goals and Vision 2030. It outlines methods to combat climate change including mitigation and adaptation, improving intersectoral coordination, mainstreaming sustainable land management into national planning, policy and legal frameworks and undertaking research on the impact of climate change on environmental, social and economic sectors.

2.3.7 National Climate Change Action Plan (NCCAP) 2018-2022

The NCAAP presents detailed actions that Kenya will embark on to address climate change, during the 2018-2022 medium-term planning period. It envisions a low carbon climate resilient development pathway for Kenya.

Application: The Proponent must ensure that throughout the construction and operation of the Proposed Project, emission of greenhouse gases is avoided.

2.4 County Level Policy and Planning

2.4.1 Mombasa County Integrated Development Plans

In September 2015 UN member countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals. As part of implementing the SDGs, the Government of Kenya published and launched its Road Map to achieving SDGs. The Road Map envisages a partnership with all stakeholders as well as building capacity for devolved governments to implement the SDGs. The domestication and integration of the SDGs are embedded in Medium Term Plans and County Integrated Development Plans.

2.5 Legislative Framework

2.5.1 Environment Management and Coordination Act, 1999

The proposed expansion of the LPG depot is subject to the requirements of Legal Notice 101 of 2003: The Environmental (Impact Assessment and Audit) Regulations, 2003 (ESIA/EA Regulations) published in terms of Section 58 of the Environmental Management and Coordination Act, 1999 (EMCA) and amended in 2015. This section provides a brief overview of the EIA Regulations and their application to the project.

EMCA is the national Act that provides for the authorization of certain controlled activities listed in the Second Schedule of the Act. In terms of Section 58 of the EMCA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported to the NEMA. The NEMA is the competent authority that may issue an ESIA License for the proposed project in consultation with other lead agencies.

The need to comply with the requirements of the EIA/EA Regulations ensures that decision-makers are provided the opportunity to consider the potential environmental impacts of a project early in the project development process, and assess whether adverse environmental impacts can be avoided, minimized or mitigated to acceptable levels. Comprehensive independent environmental studies are required to be undertaken in accordance with the EMCA and the EIA/EA Regulations to provide NEMA and other lead agencies with sufficient information in order for an informed decision to be taken regarding the project.

An EIA is an effective planning and decision-making tool. It allows the potential environmental and social consequences resulting from a technical facility during its establishment and its operation to be identified and appropriately managed. It provides the opportunity for the developer to be forewarned of potential environmental and social issues and allows for resolution of the issue(s) reported in the EIA report as well as for dialogue with stakeholders.

2.4.2 Legal Notice 150 of 2016 Replacement of the Second Schedule of EMCA

In April 2019 the Cabinet Secretary for Environment and Forestry on the advice of National Environment Authority amended the second schedule of the Environmental Management Act, 1999. The amendment was through LN 31 of

2019 on classification of projects (low, medium and high risk). Additionally, LN 32 of 2019 effected an amendment to the EIA Regulations prescribing requirements on the EIA for low and medium risk projects. The proposed project is a medium-risk project.

Application: An environmental impact assessment study must be undertaken in respect of the Proposed Project, and the report must comply with the guidelines applicable to medium-risk projects.

2.4.3 Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009

These regulations prohibit any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

In determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered:

- Time of the day;
- Proximity to residential area;
- Whether the noise is recurrent, intermittent or constant;
- The level and intensity of the noise;
- Whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and,
- Whether the noise is subject to be controlled without unreasonable effort or expense to the person making the noise.

Application: The Proposed Project site neighbors residential area, hence control of environmental noise is crucial. The developers of the Proposed Project shall observe policy and regulatory requirements with respect to noise and shall take any necessary measures to comply with the provisions of the Regulations.

2.4.4 Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009

The Objectives of these Regulations include-

- to provide for the conservation and sustainable use of wetlands and their resources in Kenya;
- to promote the integration of sustainable use of resources in wetlands into the local and national management of natural resources for socio-economic development;
- to ensure the conservation of water catchments and the control of floods;
- to ensure the sustainable use of wetlands for ecological and aesthetic purposes for the common good of all citizens;
- to ensure the protection of wetlands as habitats for species of fauna and flora;
- provide a framework for public participation in the management of wetlands;
- to enhance education research and related activities; and
- to prevent and control pollution and siltation.

Application: The Proposed Project site is a seashore area in close proximity to the Indian Ocean. The Proponent shall comply with the provisions of the above regulations in-order to preserve the surrounding seashore ecosystem.

2.4.5 The Petroleum Act, 2019

The Petroleum Act, 2019 came into effect on 28 March 2019, repealing the Petroleum (Exploration and Production) Act, Chapter 308 Laws of Kenya which entered into force in 1984. The Petroleum Act was enacted to consolidate into one statute the laws relating to petroleum operations which includes revenue sharing, local content, transparency, accountability, licensing, setting the scene for growth of petroleum sector, permitting requirements and establishment of National Upstream Petroleum Advisory Committee and Energy and Petroleum Regulatory Authority (EPRA).

The following is a summary of the sections that are relevant to the proposed project

- Part IX, Section 74. (1) A person who wishes to— o undertake refining, importation, export, bulk storage or transportation of petroleum crude or products must have a valid license issued by the Authority;

Application: The proponent should obtain a license to store fuel at the site from EPRA

2.4.6 The Petroleum (Liquefied Petroleum Gas) Regulations, 2025

The Petroleum (Liquefied Petroleum Gas) Regulations, 2025 in Kenya primarily aim to enhance safety, standardize bulk storage vessels (above 500L), modernize infrastructure, and secure the supply chain for clean energy. They establish strict licensing for bulk storage, including mounded or underground tanks, to reduce safety risks and ensure compliance with environmental and technical standards.

Key Objectives of the regulations for Bulk Storage

- **Enhanced Safety Standards:** The regulations mandate strict design, construction, and operational safety standards for bulk storage vessels (above-ground, buried, or mounded) to prevent accidents.
- **Safety Monitoring:** Introduction of a central tracking system to monitor LPG transactions, ensuring legal, safe handling, and traceability of products.
- **Compliance and Licensing:** To regulate the bulk storage sector by ensuring only licensed operators manage storage facilities, reducing illegal operations.
- **Operational Risk Reduction:** The regulations define requirements for emergency response, mandatory reporting of accidents (within 48 hours), and strict management of flammable LPG.
- **Environmental Protection:** To minimize risks of environmental damage from accidental releases of bulk LPG.
- **Quality and Supply Security:** To encourage investment in infrastructure while ensuring a steady, reliable supply of LPG to meet clean cooking goals.

Application: The facility will use LPG as the main source of fuel for the furnace. They will have to comply with these regulations for the bulk storage of LPG.

2.4.7 The Occupational Safety and Health Act (OSHA), 2007

Before any premises are occupied, or used as a workplace, a certificate of registration must be obtained from the Director of Occupational Safety and Health Services. The Act provides for the health, safety, and welfare for employees at workplaces. This shall be considered at the construction, implementation, and decommissioning phases of the project. **Health:**

The premises must be kept clean. Premises must not be overcrowded. The circulation of fresh air must secure adequate ventilation of workrooms. There must be sufficient and suitable lighting in every part of the premise in which persons are working or passing. There should also be sufficient and suitable sanitary conveniences separate for each sex, must be provided subject to conformity with any standards prescribed by rules. Food and drinks should not be partaken in dangerous places or workrooms. Provision of suitable protective clothing and appliances including where necessary, suitable gloves, footwear, goggles, gas masks, and head covering, and maintained for the use of workers in any process involving expose to wet or to any injurious or offensive substances.

Safety:

During construction, fencing of premises and dangerous parts of other machinery is mandatory. Training and supervision of inexperienced workers, protection of eyes with goggles or effective screens must be provided in certain specified processes. Floors, passages, gangways, stairs, and ladders must be soundly constructed and properly maintained and handrails must be provided for stairs. Special precaution against gassing is laid down for work in confined spaces where persons are liable to overcome by dangerous fumes.

Adequate and suitable means for extinguishing fire must be provided in addition to adequate means of escape in case of fire must be provided. Employees must additionally be provided with Personal Protective Equipment (PPE) that shall be used at all times when working.

The act requires the occupier to carry out appropriate risk assessments in relation to the safety and health of persons employed and on the basis of these results adopt preventive and protective measures to ensure that under all conditions of their intended use all chemicals, machinery equipment, tools and processes under the control of the occupier are safe and without risk to health and comply with the requirement of the health provisions in the Act. The risk assessment report shall be sent to the Occupational safety and Health Officer in Mombasa.

Welfare:

An adequate supply of both quantity and quality of wholesome drinking water must be provided. Maintenance of suitable washing facilities, accommodation for clothing not worn during working hours must be provided. Sitting facilities for all female workers whose work is done while standing should be provided to enable them take advantage of any opportunity for resting. Every premise shall be provided with maintenance, readily accessible means for extinguishing fire and person trained in the correct use of such means shall be present during all working periods. Regular individual examination or surveys of health conditions of industrial medicine and hygiene must be performed and the cost will be met by the employer. This will ensure that the examination can take place without any loss of earnings for the employees and if possible, within normal working hours. The Act (OSH) provides for development and maintenance of an effective programme for collection, compilation and analysis of occupational safety. This will ensure that health statistics, which shall cover injuries and illness including disabling during working hours, are well kept.

In view of this, an environmental management plan (EMP) should be put in place and implemented by the developer of the Proposed Project in conformity to this Act.

2.4.8 Work Injury Benefits Act, 2007

This Act provides for compensation to employees for work-related injuries and diseases contracted in the course of their employment and for connected purposes.

The applicable sections of this Act are as follows:

- Section 8: All workplaces to be registered with the Director of Occupational Safety and Health Services.
- Section 10: An employee who is disabled as a result of an accident is entitled to compensation.
- Section 12: Accidents arising as a result of trainings or drills are deemed to have arisen from employee's employment.
- Section 21: Employer is to be notified of an accident by the employee or somebody else on behalf of the employee.
- Section 38: An employee who contracts a disease specified in the second schedule as a result of his service to the company shall be entitled to compensation.
- Section 41: Notification of occupational disease shall be done by an employee.
- Section 45: The Employer shall provide and maintain first aid equipment.
- Section 46: Responsibility of the employer to make conveyance arrangements of injured workers if situations require such.

The Contractors and the proponent will be required to adhere to the requirements of this Act during construction and operation, respectively.

2.4.9 The Water Act 2016

This Act intends to provide for the regulations, management and development of water resources, water, sewage services and for other purposes. According to the Act, a water resource means any lake, pond, swamp, marsh, stream, watercourse, estuary, aquifer, artesian basin or other body of flowing or standing water, whether above or below the ground, and includes sea water and trans boundary waters within the territorial jurisdiction of Kenya.

In summary the following sections of the Act are relevant to the Proposed Project

- Section 100. (1) A person shall not supply water in bulk to a water services provider without a license issued by the Regulatory Board. (2) A water service provider may enter into an agreement with any other licensee or water services provider on terms and conditions to be approved by the Regulatory Board (a) for the supply of water in bulk for a specific period; or (b) where the supply is to be given by a water services provider, either within or outside the area of service of that water services provider.
- Section 143. (1) A person shall not, without authority conferred under this Act (a) willfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or (b) throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.

Application: The acts restricts the contractor or the developer from engaging water supply service providers that are not registered by the County Council of Mombasa and the Water Services Regulatory Board. During construction, Milly Glass SEZ Ltd is required to ensure that there is no dumping of the construction waste in any water body.

2.4.10 County Governments Act, 2012

The Act provides an overall framework for county governments to perform their transferred powers, functions, and responsibilities to deliver services. This includes:

- Ensuring effective citizen participation in the development of policies, development plans, service deliveries, and performance management (including monitoring) within the county;
- Establishing mechanisms to facilitate public communications and access to information;
- Developing grievance redress mechanisms so that citizens' concerns and complaints are recorded and addressed; and
- Ensuring protection and promotion of the interests and rights of minorities, marginalized groups and their access to relevant information;

Functions and powers of County Governments according to Part 2 (Fourth Schedule) and

Articles 185 (2), 186 (1) and 187 (2) of the Constitution of Kenya, 2010 include Agriculture; County health services; Control of air pollution, noise pollution, other public nuisances;

Trade development and regulations; County planning and development, including Electricity and gas reticulation and energy regulation; Implementation of specific national government policies on natural resources and environmental conservation; Firefighting services and disaster management, among others.

Under the County Government Act, Mombasa County Government is responsible for planning and development of the County with regard to: facilitation of the development of a well-balanced system of settlements; ensuring productive use of land, water and other resources for economic and social development; ecological conservation and the achievement and maintenance of a tree cover of at least ten per cent of the land.

Application: Milly Glass SEZ Ltd will comply with Mombasa County legislations as well as complement the County's efforts with regard to the above functions.

Among other things, the County Governments Act requires each County in the country to develop a 5-year County Integrated Development Plan (CIDP).

2.4.11 Public Health Act (Cap. 242)

Part IX, section 115, of the Act states that no person/institution shall cause to exist on its premises any nuisance or other condition liable to be injurious or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary, and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 and include nuisances caused by accumulation of stones, timber or other materials or refuse which in the opinion of the medical officer of health is likely to harbor rats or other vermin.

Part IV-A: General provisions of the Act deal with the prevention and suppression of infectious diseases and certain sections of this part will be applicable to the project.

The proponent must observe guidelines set by this Act though the ESMP.

Application: This Act is applicable to on site management of construction waste, sewage and domestic waste during construction and operation of the glass manufacturing plant to prevent environmental contamination leading to public health issues. It has been estimated that two hundred or more employees will be working on site and as a result:

- Adequate sanitary facilities need to be put in place that shall be cleaned and maintained regularly.
- After consultation and identification with the County Public Health Department on the dominant diseases present in the area and the impact this facility may potentially have, a plan needs to be put in place addressing how to monitor and curb them.
- The plan shall additionally include procedures for the prevention and suppression of infectious diseases.
- Food that will be handled and cooked on the premises shall be done so in suitable conditions and locations, by employees that possess food handling certificates.

The proponent must ensure that they comply with the conditions set under this act to avoid the initiation and spread of various diseases and, to avoid putting a strain on local resources.

2.4.12 Physical and Land Use Planning Act, 2019

The Physical and Land Use Act of 2019 replaced the Physical Planning Act of 1996. The Act established the procedure required to develop, process and implement several physical and land use development plans. These include, the National, Inter-County, County and Local Physical and Land Use Development Plans. The Physical and Land Use Act of 2019, amongst other issues, addresses matters of development control with respect to development permission and their applications, decision making and communication, development fees, commencement and completion of constructions, prohibition of licenses, preservation of heritage sites and exemptions.

Application: The proponent is required to attain development permission from the County Planning Authority, prior to which they shall submit documents, plans and other particulars prescribed by the executive committee. In most cases, mechanical, civil and electrical plans, access routes, written consent of other property owners where development may take place and credentials of the individual/s preparing the required documents shall be submitted. Furthermore, the public must be informed of the proposed development and their questions and concerns be addressed by the proponent.

2.4.13 Occupiers Liability Act (Cap. 34)

Under Common Law, an occupier of premises owes to a duty to visitors in respect of danger and risk due to the state of the premises or to things omitted or attributes an affliction on his/her health to a toxic material in the premises.

Application: The Proponent shall endeavor to ensure that the management of health and safety issues is of high priority during the operational phase of the project and shall ensure that measures are put in place to avoid safety hazards at the project site.

2.4.14 The Employment Act, 2007

The Act provides for general terms and conditions of employment in Kenya and applies to both domestic and foreign contracts of employment. It is the relevant legislation that harmonizes relationships between employees and employers, protects workers' interests and welfare, and safeguards their occupational health and safety through:

- a) Prohibition against discrimination of any employee or prospective employees (on race, color, language, religion etc.);
- b) Prohibition of sexual harassment;
- c) Making a provision on contract of services; and
- d) Stipulating rights and duties in employment including weekly rest, working hours, annual leave, maternity and paternity leaves, sick pay, etc.

Application: From project construction and subsequent operation and maintenance, this Act will govern management of the labor force hired. The Act also applies in regard to occupational safety of project staff.

2.4.15 People Living with Disability Act, 2012

This Act of Parliament provides for the rights and rehabilitation of persons with disabilities; to achieve equalization of opportunities for persons with disabilities; to establish the National Council for Persons with Disabilities. Part III of the act outlines the rights and privileges of persons with disabilities. Section 12 on employment states that:

- i) No person shall deny a person with a disability access to opportunities for suitable employment.
- ii) A qualified employee with a disability shall be subject to the same terms and conditions of employment and the same compensation, privileges, benefits, fringe benefits, incentives, or allowances as qualified able-bodied employees.
- iii) An employee with a disability shall be entitled to exemption from tax on all income accruing from his employment.

Section 15 on discrimination of employment states that:

(1) Subject to subsection (2), no employer shall discriminate against a person with a disability in relation to

- (a) the advertisement of employment.
- (b) the recruitment for employment.
- (c) the creation, classification, or abolition of posts.
- (d) the determination or allocation of wages, salaries, pensions, accommodation, leave or other such benefits.
- (e) the choice of persons for posts, training, advancement, apprenticeships, transfer, promotion, or retrenchment the provision of facilities related to or connected with employment; or many other matters related to employment.

(2) Notwithstanding subsection (1), an employer shall be deemed not to have discriminated against a person with a disability if

- (a) the act or omission alleged to constitute the discrimination was not wholly or mainly attributable to the disability of the said person;
- (b) the disability in question was a relevant consideration in relation to the particular requirements of the type of employment concerned.

2.4.16 The Sexual Offences Act, 2014

This Act protects people and employees from any unwanted sexual attention or advances by staff members. This act ensures the safety of women, children and men from any sexual offences which include: rape, defilement, indecent acts.

Application: This law will govern the code of conduct of the Contractor's staff and provide repercussions of any wrongdoing.

2.4.17 The HIV And AIDS Prevention and Control Act, 2006

This Act provides measures for the prevention, management and control of HIV and AIDS, to provide for the protection and promotion of public health and for the appropriate treatment, counseling, support and care of persons infected or at risk of HIV and AIDS infection, and for connected purposes.

Application: This Act will ensure that the Contractor and Sub-contractors make provision for VCT services for employees and locals, as well as promotes public awareness. This will go a long way in ensuring stigmatization of HIV and AIDS is reduced as well as managed during the construction period.

2.4.18 Cities and Urban Areas Act 2012

This act identifies Mombasa as a city due to its integrated urban area. The city is under the jurisdiction of boards which carry out the duties of the County Government. The various boards within the city are charged with:

- a) exercise executive authority as delegated by the county executive;
- b) ensure provision of services to its residents;
- c) impose such fees, levies and charges as may be authorized by the county government for delivery of services by the municipality or the city;
- d) promote constitutional values and principles;
- e) ensure the implementation and compliance with policies formulated by both the national and county government;
- f) make by-laws or make recommendations for issues to be included in by-laws;
- g) ensure participation of the residents in decision making, its activities and programmes in accordance with the Schedule to the Act; and
- h) exercise such other powers as may be delegated by the county executive committee.

Application: This Act identifies the importance of consulting with the county council and its departments for the proposed project in order to get opinions and recommendations for the successful implementation of the project. In addition, the County Council will be part of the operation of the proposed project.

2.4.19 The Kenya Roads Act, 2007

The Act provides for the establishment of three independent Road Authorities, namely:

Kenya National Highways Authority (KeNHA), Kenya Rural Roads Authority (KeRRA), and Kenya Urban Roads Authority (KURA).

2.4.20 Children Act No. 8 of 2001

States that every child shall be protected from economic exploitation and any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development.

2.5 International Conventions, Treaties and Agreements

Kenya has ratified and domesticated several international conventions and treaties for the protection of the environment. The proposed project will comply with the requirements of the various conventions, treaties and agreements that Kenya has ratified. The table below gives the status of environmental treaties ratified by Kenya.

Table 5: Summary of the applicable International Conventions and treaties

Topic	Treaty	Date Treaty entered into force	Date of ratification/ accession in Kenya
Climate change and the ozone layer	United Nations Framework Convention on Climate Change (UNFCCC)	21/03/1994	30/08/1994
	Kyoto Protocol to the United Nations Framework Convention on Climate Change	16/02/2005	25/02/2005
	Vienna Convention for the Protection of the Ozone Layer	22/09/1988	09/11/1988
	Montreal Protocol on Substances that Deplete the Ozone Layer	01/01/1989	09/11/1988
Energy	Statute of the International Renewable Energy Agency (IRENA)	26/01/2009	08/07/2010
	Convention of the African Energy Commission	11/06/2001	13/12/2006
Waste management and pollution	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	05/05/1992	01/06/2000
	Convention on Persistent Organic Pollutants (POPs)	17/05/2005	24/09/2004

2.5.1 The African Charter on Human and Peoples Rights

The African Charter on Human and Peoples Rights (ACHPR) is the African continent human rights charter, which came into force on 21st October 1986 in Nairobi and was ratified by Kenya on 23rd January 1992.

The ACHPR recognizes and protects the collective rights of people, including “the unquestionable and inalienable rights to self- determination (article 20(1) and “social and cultural development (article 22(1))

Article 24 of the ACHPR provides that all peoples shall have the right to a general satisfactory environment favorable to their development. Additionally, Article 16 confers on each individual the right to the best attainable state of physical and mental health.

Application: The Proposed Project should be implemented in such a way that preserves the social and cultural life of the surrounding community, and avoids works that may negatively impact the environment or health of people within the vicinity of the Project site.

2.5.2 International Covenant on Economic, Social and Cultural rights, 1966 and International Covenant on Civil and Political Rights 1966.

These recognize the economic, social and cultural rights, including rights to self-determination, health and education, political and civil rights, including right to self-determination, to life freedom of religion speech and assembly. Kenya acceded to these laws on the 1st of May 1972.

Application: The Proposed Project should be implemented in such a way that preserves the social and cultural life of the surrounding community.

2.6 International safeguards and policies

In addition to the Kenyan regulatory framework, the project should be designed, constructed, operated and decommissioned in accordance with Good International Industry Practices (GIIP) on EHS. One set of standards that several multi-national corporations follow for sustainability are the International Finance Corporation (IFC) Environmental and Social (E&S) standards. While they are not mandatory in Kenya, it would be advisable for Milly Glass SEZ Ltd to incorporate them wherever practical. A description of the applicable IFC EHS Guidelines is given below.

2.6.1 International Finance Corporation (IFC) General Environment, Health and Safety (EHS) Guidelines

The EHS guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). The EHS guidelines contain the performance levels and measures that are generally considered achievable in new facilities by existing technology at reasonable costs.

The applicability of the EHS guidelines should be tailored to the hazards and risks established for each project based on the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account.

When host country regulations differ from the levels and measures presented in the EHS guidelines, projects are expected to achieve whichever is more stringent.

The General EHS Guidelines are organized under the following categories:

- Environmental
- Occupational Health and Safety
- Community Health and Safety
- Construction and Decommissioning

2.6.2 IFC Performance Standards

IFC's Sustainability Framework articulates the strategic commitment to sustainable development and is an integral part of IFC's approach to risk management. The Performance Standards provide standard guidance on how to identify risks and impacts and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the developer in relation to project-level activities.

In the case of its direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the Performance Standards to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation in order to achieve its overall development objectives. Other financial institutions may also apply the Performance Standards.

For the proposed project, the applicable IFC performance standards include:

2.6.2.1 Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts.

PS 1 highlights the importance of managing environmental and social performance throughout the life of a project by developing and implementing an effective Environmental and Social Management System (ESMS). It provides guidelines on the contents and process of developing an effective ESMS.

Requirement: Policy

The proponent will develop an EHS policy which will demonstrate the commitment to comply with the Kenyan laws and other international applicable standards like IFC's during all the phases of the project. All the contractors engaged by the proponent during construction, operation and decommissioning will be required, through contractual agreements to adhere to the proponent's EHS policy.

Requirement: Identification of Risks and Impacts

This study report is part of the environmental and social impacts assessment that will be used to identify, assess and propose mitigation measures for the environmental and social impacts in accordance with Kenyan requirements and IFC standards during construction, operation and decommissioning of the proposed project.

- The EHS policies, procedures and work instructions related to risk and disaster management and business continuity

Requirements: Management Programs

The proponent will develop specific Environmental and Social management programs and standards to ensure complete planning and implementation of all aspects related to EHS. Some of the management plans will include:

- Emergency Response plan
- Construction safety plan
- Electrical safety plan
- Fire safety plan
- Transport management plan
- Waste management plan
- Soil erosion control plan
- Stakeholders engagement plan

Requirements: Organizational Capacity and competency

The Proponent, in collaboration with appropriate and relevant third parties, will establish maintain, and strengthen as necessary an organizational structure that defines roles, responsibilities in association with the project. EHS and social manager(s) should be part of the line managers responsible for offering Environmental and social support. Subsequently the proponent will be required to engage competent supervisors.

Requirements: Emergency preparedness and response

The proponent will be required to develop an emergency preparedness and response plan and procedures for the proposed project construction and operation based on the identified risks and impacts. The plan will take into consideration all the applicable emergency scenarios i.e., medical, road transport accidents, landslides, Fire and explosion, community protest and security incidents. The Emergency Preparedness and response plan will have detailed emergency response and incident management plans to be implemented to mitigate, control and recover from credible emergency scenarios.

Requirements: Monitoring and review

The proponent will be required to develop and maintain a dynamic mechanism of monitoring the performance of the EHS monitoring system. The mechanisms will include,

- Statutory Environmental Audits
- Internal inspections
- Regular management review meetings;
- Review of the aspects and impacts register;
- Legal compliance audits and updating of the legal register;
- Incident and accident reporting;
- Addressing external complaints

Requirements: Stakeholder Analysis and Engagement Plan

The Proponent will develop and implement a Stakeholder Engagement Plan that is scaled to the project impacts and will be tailored to the characteristics and interests of the affected communities.

A Stakeholder Engagement Plan (SEP) will be prepared to illustrate how stakeholder identification and analysis was carried out, the engagement activities that were carried out during the scoping and EIA phases and those that are to be carried out throughout the construction and operations phase and communication mediums and strategy for those engagements.

The SEP will be an attachment to the Social Impact Assessment report.

Requirements: Consultation and Participation

For projects with potentially significant adverse impacts on affected communities, the client will conduct an Informed Consultation and Participation (ICP) process that will build upon the steps outlined below in Consultation with the Affected Communities to ensure their informed participation.

Effective consultation is a two-way process that should:

- begin early in the process of identification of environmental and social risks and impacts and continue on an ongoing basis as risks and impacts arise;
- be based on the prior disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information which is in a culturally appropriate local language(s) and format and is understandable to affected communities;
- focus inclusive engagement on those directly affected as opposed to those not directly affected;
- be free of external manipulation, interference, coercion, or intimidation;
- enable meaningful participation, where applicable; and be documented.

Application: Formal and informal consultations were carried out with the neighboring community through a structured public participation meetings and household questionnaires. The members of the community were provided with information on the proposed project and the EIA study and were given an opportunity to give their comments, concerns/issues.

Requirements: Disclosure of Information

The client will provide affected communities with access to relevant information on:

- (i) the purpose, nature, and scale of the project;
- (ii) the duration of proposed project activities;
- (iii) any risks to and potential impacts on such communities and relevant mitigation measures;
- (iv) the envisaged stakeholder engagement process; and
- (v) the grievance mechanism.

Application: Before commencing the stakeholder dialogue, pertinent project information was prepared for disclosure. The following information was disclosed to the stakeholders:

- Project Description (Details on the project site, project components, project activities and project duration)
- The EIA Process;
- Environmental and Social legislative framework;
- The Public Participation processes
- Potential environmental and social impacts for the different phases of the project

Requirements: Grievance Mechanism

Where there are affected communities, the Proponent will establish a grievance mechanism to receive and facilitate resolution of affected communities' concerns and grievances about the client's environmental and social performance.

Application: A Community Grievance Mechanism procedure will be prepared that will allow stakeholders to raise questions or concerns with the Company on project related issues and have them addressed in a prompt and respectful manner. The Grievance Mechanism will be independent of employee related grievances.

Requirements: On-Going Reporting to Affected Communities

The proponent will provide periodic reports to the affected communities that describe progress with implementation of the project action plans on issues that involve ongoing impacts on affected communities and on issues that the consultation process or grievance mechanism have identified as a concern to those communities.

Through the Stakeholder Engagement Plan (SEP) and the Grievance Mechanism (GM), the proponent will continuously engage the affected communities and disclose pertinent project information.

2.6.2.2 Performance Standard 2: Labor and Working Conditions.

PS 2 stresses on labor management as a key component in any project. It offers guidelines in relation to employment creation and income generation in a manner that protects the rights of the workers.

The following are the applicable requirements of PS 2:

Requirements: Working Conditions and Management of Worker Relationship

The EPC will develop and implement Human Resource Policies and Procedures that will be used to guide labor recruitment and management. These policies and procedures include but are not limited to:

- Employee Handbook
- Recruitment Procedures
- Job Procedures
- Worker Grievance Mechanism Procedure
- Termination and Retrenchment Policies
- Harassment Policy
- Disciplinary Policy
- Health and Safety Policy

The proponent will provide workers with documented information that is clear and understandable, regarding their rights under the Kenyan Employment Act, 2007.

The Proponent shall put in place measures to ensure:

- Prevention of child labor, forced labor, and discrimination.
- Freedom of association and collective bargaining are provided.
- Wages, work hours and other benefits shall be as per the National labor and employment laws.

The proponent will be required to provide reasonable working conditions and terms of employment for both direct and contracted workers through contractor agreements which are to be provided. Construction Contractor should ensure that Terms of employment include wages and benefits, wage deductions, hours of work, breaks, rest days, overtime arrangements, and overtime compensation, medical insurance, pension, and leave for illness, vacation, maternity, or holiday are to be communicated to workers clearly.

Requirements: Workers' Organizations

Milly Glass SEZ Ltd will not restrict workers from developing alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment.

The proponent will not discourage workers from forming or joining a workers' organization or discriminate or retaliate against workers who attempt to form or join workers' organizations.

Requirements: Non-Discrimination and Equal Opportunity

The proponent will not discriminate with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, and promotion, termination of employment or retirement, and disciplinary practices.

The proponent should take appropriate measures to prevent any discriminatory treatment of migrant workers. Measures to prevent and not endorse any harassment, including sexual harassment or psychological mistreatment within the workplace will also be undertaken.

Requirements: Retrenchment

The proponent should make certain that all workers receive notice of dismissal and severance payments mandated by law and collective agreements in a timely manner.

The proponent should conduct proper consultations with the workers before the retrenchment, if any. Selection criteria for those to be laid off should be objective, fair, and transparent. The retrenchment should not be based on personal characteristics unrelated to inherent job requirements.

Requirements: Grievance Mechanism

The proponent will provide a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns.

In providing a grievance mechanism through which workers may raise workplace concerns. The proponent should ensure that matters are brought to management's attention and addressed expeditiously. The Proponent needs to also document all grievances and follow up on any corrective actions.

Requirements: Protecting the Work Force

The Proponent/Contractor will not employ children in any manner that is economically exploitative or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

The proponent should ensure that the Contractor employs no child labor (as defined in IFC PS2) or forced labor during construction and operation phase of the project. The developers should also exercise diligence with regard to key contractors and subcontractors so that they do not knowingly benefit from practices that lead to bonded or indentured status of workers.

Requirements: Occupational Health and Safety

The proposed project will engage unskilled workers from the neighborhood and semi-skilled and skilled workers from within and outside the country. The developer will provide a safe and healthy work environment, taking into account inherent risks associated with working on steep areas, transportation of abnormal loads, hot works, installation of electrical equipment, and operation of the batching plant. The proponent will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, as far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice, as reflected in various internationally recognized sources including the World Bank Group Environmental, Health and Safety Guidelines, the developer will address areas that include the

- (i) identification of potential hazards to workers, particularly those that may be life-threatening;
- (ii) provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances;
- (iii) training of workers;
- (iv) documentation and reporting of occupational accidents, diseases, and incidents; and
- (v) emergency prevention, preparedness, and response arrangements.

Requirements: Workers Engaged by Third Parties

The Proponent will establish policies and procedures for managing and monitoring the performance of such third-party employers in relation to the requirements of this Performance Standard.

It is envisaged local, national and international contractors will be engaged by the proponent. These Contractors will be required to formally align their EHS systems with proponents. In regard to this, the Proponent should develop and implement procedures to manage and monitor performance of third parties.

2.6.2.3 Performance Standard 3: Resource Efficiency and Pollution Prevention

Performance Standard 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels.

It is envisaged that the construction of the proposed project will potentially lead to the following

- Significant use of water, energy and local construction materials
- Increased air pollution (from stationary and vehicular emissions and particulate matter generation),
- Generation of Green House Gases from construction equipment
- Generation of excavated spoil, sanitary waste, some hazardous waste and other general wastes
- Exposure to Hazardous cementing chemicals and used oil
- Increased environmental noise and ground vibration

The proponent will be required to develop and ensure implementation of the following project and site-specific plans in accordance to Kenyan laws and IFC requirements;

- Energy, water and natural resources (local construction materials) conservation
- Environmental and occupational air quality monitoring and pollution control
- GHG monitoring and control
- Waste management plans
- Hazardous materials management
- Excess noise and vibration control

2.6.2.4 Performance Standard 4: Community Health, Safety, and Security.

This performance standard stresses the protection of the affected people from the project activities. Any developer should identify the risks the project poses to the community and mitigate them.

Application: The Proposed Project will involve manufacturing of glass bottles. The potential occupational hazards arising from the project activities and the impacts on health & safety of the affected community has been identified and assessed in the EIA report.

Requirements: Community Health and Safety and Community Exposure to Disease

Community health and safety considerations should be addressed through a process of environmental and social risks and impacts identification resulting in an Action Plan for disclosure to project Affected Communities.

The proponent is required to address Community health and safety associated with the construction and operation phases of the project.

The Proponent should ensure that the surface water drainage system during operation phase is not poorly designed and there is no creation of construction pits and depressions that can have potentially adverse impacts on adjacent local communities.

Requirements: Infrastructure and Equipment Design and Safety

For all projects with risks to workers and the public, the client should also build its internal capacity to monitor engineering and fire safety of its operations, including periodic monitoring and internal audits.

The proponent will ensure that the recommended safety requirements for glass manufacturing plant are factored in the design.

Requirements: Hazardous Materials Management and Safety

The proposed project will involve handling and storage of LPG and HFO which is a highly flammable material. The Proponent will use approved engineering designs to ensure safe receiving and storage of LPG and HFO. Storage tanks will be constructed to minimize potential leaks, fire detectors and leak detectors will be installed and LPG approved pipe network will be put in place.

Requirements: Emergency Preparedness and Response

The Proponent will develop an Emergency Response Plan to respond effectively to emergency situations. This shall be in collaboration with the Kenya Ports Authority, and the County Government of Mombasa.

CHAPTER THREE

3.0 PROJECT DESCRIPTION

This chapter provides general project information; presents a description of the preferred project scope; and discusses the project alternatives that were considered in determining the preferred project scope.

3.1 General Project Information

3.1.1 Applicant Details

Milly Glass SEZ Limited is the applicant of the and the owner of the proposed project. As such, Milly Glass SEZ Ltd is herein referred to as the proponent.

Table 6: Applicant details

Name:	Milly Glass SEZ Limited
Address:	80180 -80100 Mombasa
Responsible person:	Nahason Kagwe
Position:	Project Manager
Tel:	+254 (0)725383240
E-mail:	Nahason.kagwe@macegroup.com

3.1.2 Summary of Property/Site Information

Table 7: Summary of Property/Site Information

Plot Number:	Plot L.R number Mombasa/Municipality Block LX/1483 within the Dongo Kundu Special Economic Zone in Mombasa County.
Physical address:	Off the Dongo Kundu Bypass road at Mrongondoni Village in Dongo Kundu Special Economic Zone
Property size:	6 ha
Development footprint size:	Approximately 60 000 m ² (6 ha)
Administrative Location	At Mrongondoni Village in Bububu Sub-Location, Nguta Location within Likoni Sub-County in Mombasa County
Centre coordinates of site:	Latitude (-4.098814) 4°05'55.73076" S and Longitude (39.599120) 39°35'56.83164" E.

3.2 Description of the Proposed Glass Bottle Manufacturing Plant

The proposal is for Milly Glass SEZ Limited, to develop and operate a glass bottle manufacturing plant on plot L.R number Mombasa/Municipality Block LX/1483 within the Dongo Kundu Special Economic Zone in Mombasa County.

The proposed glass bottle manufacturing plant would mainly produce type 3 glass amber colored pharmaceutical glass bottles. These are chemically inert, and durable containers used for storing, protecting, and transporting medicine. They are used for liquids, tablets, capsules, vaccines, and parenteral (injectable) preparations, acting as a crucial barrier against moisture, light, and contaminants.

The facility would comprise a batch plant, main manufacturing building with LPG/HFO fired 75 TPD furnace and a warehouse. The annual glass bottle production target would be approximately 290 000 tons. The description below presents the current, preferred project concept as informed by the technical and environmental inputs to date.

It must be noted that the actual plant layout and technical specifications for the facility that would be constructed will be subject to confirmation during the detailed design phase.

3.2.1 Project phases

The project will comprise two distinct phases, namely construction and operation.

3.2.1.1 Construction

The key construction activities associated with the proposed project include:

- Site establishment of construction phase facilities;
- Clearing of vegetation in accordance with the relevant vegetation management procedures;
- Stripping and stockpiling of soil resources and earthworks in accordance with the relevant soil conservation procedures;
- Transportation of construction phase materials and staff (via existing roads);
- Collection, storage and removal of construction related waste; and
- Construction of all buildings, services and infrastructure required for the operational phase.

The construction phase facilities would include:

- ✓ Parking area for cars and equipment;
- ✓ Mobile site offices;
- ✓ Portable ablution facilities;
- ✓ Change houses and clinic;
- ✓ Contractor's laydown areas;
- ✓ Workshops;

- ✓ Stores for the storing and handling of fuel, lubricants, solvents, paints and construction materials; □
Wash bay;
- ✓ Construction waste collection and storage facilities;
- ✓ Temporary electricity supply (diesel generators);
- ✓ Portable water supply (browsers);
- ✓ Portable diesel supply (browsers);
- ✓ Soil stockpiles;
- ✓ Water management infrastructure;
- ✓ Security and access control.

Construction facilities will be removed at the end of the construction phase (unless incorporated into the operational phase facilities). Final design and construction of the facility would take approximately 2 years from receipt of the required approvals.

3.2.1.2 Operations

The key operational activities associated with the proposed project include:

- Arrival and departure of personnel (in shifts);
- Delivery of raw materials, supplies and packaging by truck;
- Delivery of cullet from external sources by truck;
- Batching of raw materials;
- Melting to glass;
- Forming bottles from molten glass gobs;
- Treatment of bottles in the ovens (lehr);
- Annealing, cooling down and surface treatment of bottles;
- Inspection of bottles for defects.
- Palletizing and shrink-wrapping of bottles.
- Storage of product;
- Loading and distribution of product by truck; and
- Disposal of wastes.

The main operational phase facilities would include:

- ❖ Batch plant, including raw material and cullet storage;

- ❖ Furnace 1;
- ❖ Exhaust system /chimney;
- ❖ Production, annealing, cold end areas (including stores and workshops);
- ❖ Finished goods warehouse;
- ❖ Truck parking lots;
- ❖ LPG and diesel systems;
- ❖ Water supply system;
- ❖ Electrical substation emergency generators;
- ❖ Raw material and cullet handling area;
- ❖ Car parking lots and entrance;
- ❖ Trucks entrance gate;
- ❖ Staff accommodation;
- ❖ Recreation areas; and
- ❖ Offices, canteen and locker rooms.

These facilities and operations are described in the sections that follow. It is expected that the ramp up to full production, including optimization of all processes, will take two years. The plant is anticipated to be operational for a minimum of 25 years, but likely much longer.

3.2.1.3 Decommissioning and Closure

As indicated, the design life of the plant is 25+ years. However, with scheduled maintenance and ongoing equipment replacement/upgrades, it is likely the plant will operate for many decades longer than this. The duration of operations would ultimately be subject to industry and market economy drivers. Given that the plant is likely to operate for many decades, a specific decommissioning and closure plan has not yet been developed.

Decommissioning of the facility would require the dismantling of the equipment, the sale and final disposal of all components, the decontamination of any contaminated areas and the rehabilitation of the site to a condition suitable for an end land use. The details and requirements of decommissioning and closure are not considered in any further detail in this report as they are so far in the future that currently available information is unlikely to be relevant.

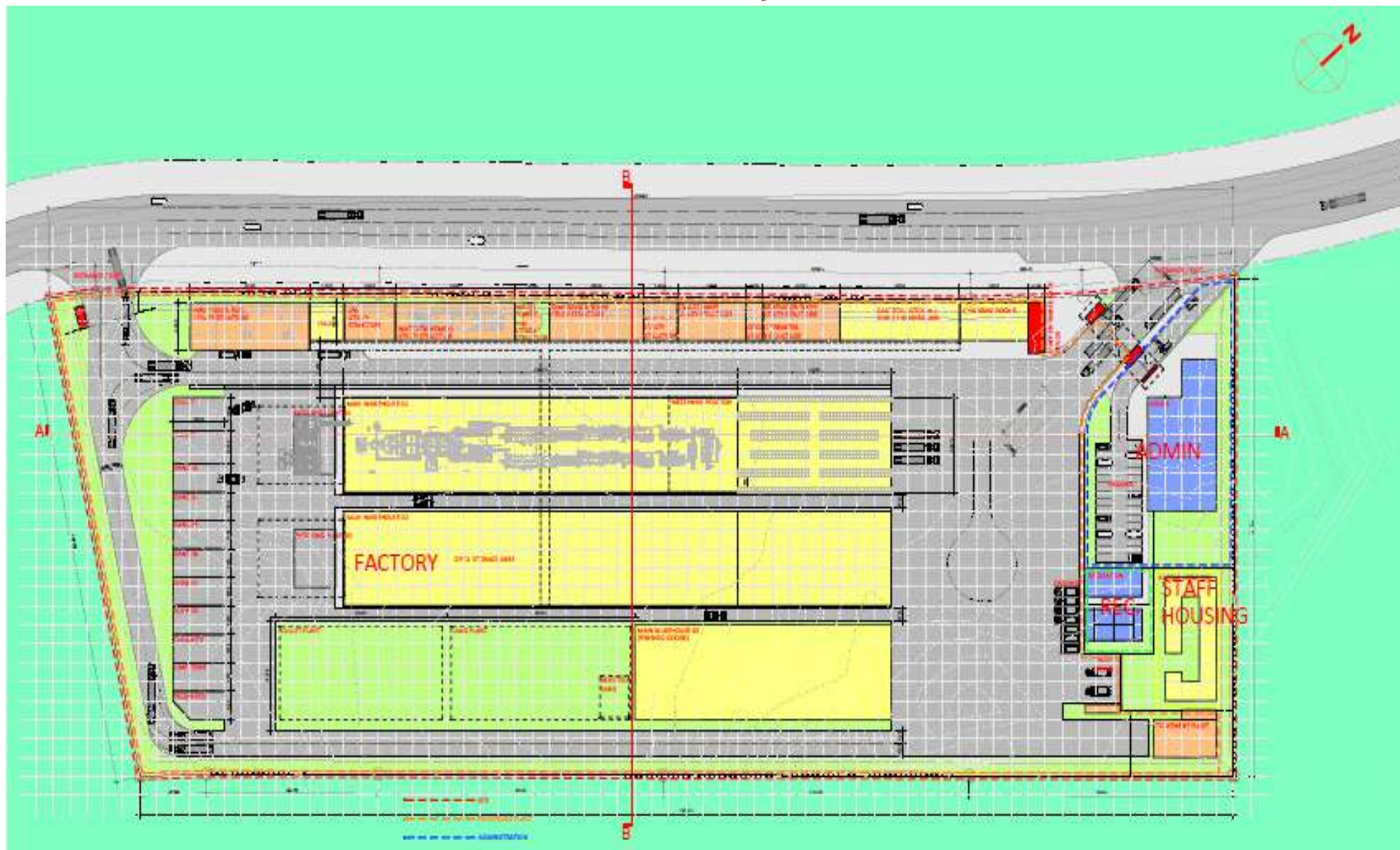


Figure 3: Conceptual layout of the project

3.2.2 General Overview

The proposed glass bottle manufacturing plant would produce type 3 amber colored pharmaceutical glass bottles using one gas fired furnace. The facility would comprise a batch plant, main manufacturing building and warehouses supported by a number of utility systems. The conceptual process flow diagram of the proposed project is illustrated in Figure below.

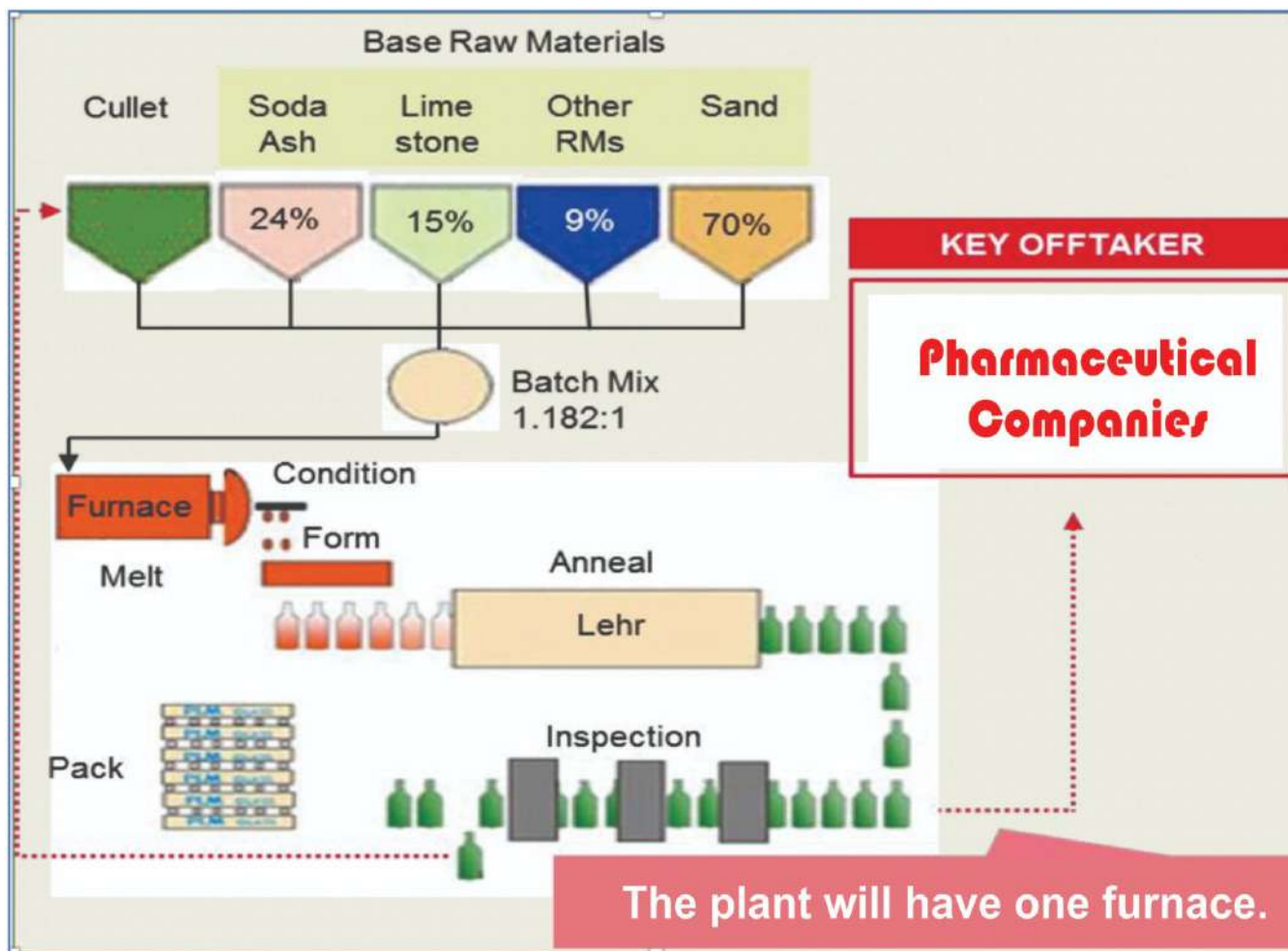


Figure 4: Conceptual flow diagram

3.2.2.1 Batch Plant

The batch plant building would be used to receive, store and mix the various raw materials required in glass bottle manufacture. The key raw materials are sand, soda ash and limestone, with a number of other raw materials also required. These would be delivered by trucks. The raw materials are stored in a variety of silos, hoppers and bunds. These materials would be mixed according to specific recipes for each glass product. Once mixed, the raw material batches would be conveyed across to the furnaces in the main manufacturing building by a complex system of conveyors, bucket elevators, dosing and weighing devices. The batch plant control system ensures that the raw materials are mixed together in a precise manner to assure good and stable glass quality. The batch plant would have control equipment to limit particulate emissions.

3.2.2.1.1 Cullet

The use of cullet in the manufacturing process would replace an equivalent volume of other raw materials required in the raw material batches and thus reduce the consumption of such materials. Cullet also requires less energy to melt than the equivalent raw materials, thereby making the manufacturing process more energy efficient.

The cullet (waste or broken glass) return system is a key part of the batch plant and which enables the use of internal and external cullet in the raw material batching and melting process.

Internal cullet would be derived from the plant, at various stages in the manufacturing process, where molten glass, broken glass and out of specification product is collected and returned to the batch plant. The re-use of the internal cullet will ensure that no waste glass is generated.

External cullet would be derived from the post-consumer collection and recycling of glass bottles which are then supplied to the batch plant. The volume of external cullet to be used will depend on the bottle specifications and the availability of cullet. The source of, collection and supply mechanisms for external cullet are not currently known. It is likely that an independent glass collection and recycling operation would have to be established by operators in the recycling market.

3.2.2.2 Main Manufacturing Building

The main manufacturing building would comprise a single large hall, approximately 5,760 m² in extent, covered in metal sheeting. The building consists of three areas (named the Furnace, Hot End and Cold End areas) in which, the glass is melted, formed into bottles and inspected for quality and defects. The facility would have amber glass furnace. The amber glass furnace, with a capacity to melt 750 tons per day (TPD).

3.2.2.2.1 Furnace and fore hearth

The furnace would utilize LPG as the heating medium. HFO would be available as a back-up heat source. At the furnace area the raw materials would be melted into glass at temperatures of up to 1560°C. The furnace is built of refractory material bricks inside a steel structure. Furnace operations are regulated by a control system comprising of thermocouples, flowmeters and pressure indicators, which assures stable furnace operations. The heating system includes gas burners with support from electrodes.

The glass is melted and refined in the main tank. A working tank with a fore hearth distributes the molten glass to the glass forming machines. The furnace has regenerative chambers for heat recovery to ensure maximum energy efficiency. Emissions from the furnaces would be cleaned, most probably via a ceramic candle filter, so as to comply with the minimum emissions standards prescribed by NEMA and released via a stack.

3.2.2.2.2 Hot end

In the Hot End the molten glass would be channeled to a series of glass forming machines that cool and meter the glass before using mechanical and pneumatic means to create the specific glass containers. The feeder mechanism cuts gobs from the molten glass beam drawn from the fore hearth. The gobs are formed into bottles by either a blow-blow process or a press-blow process. The formed bottles are taken from the machine, placed on a conveyor and directed to the annealing oven (lehr).

3.2.2.2.3 Annealing Lehr

After cooling down on the conveyor the bottles are heated up to around 550°C and then cooled in an annealing oven in a controlled manner. The cooling is so as to avoid internal stresses. Bottles are moved through the Lehr on a belt running at a controlled speed. A system of burners, ventilators, flaps and control equipment maintain a stable temperature curve and control cooling conditions.

3.2.2.2.4 Cold End

On leaving the Lehr the bottles start the Cold End process. This involves the bottles being further coated and then subject to inspection for defects by high precision equipment that measure capacity, dimensions, impact, pressure resistance and other tests. The bottles are also subject to further inspection by optical equipment. Bottles that do not meet specifications would be rejected, crushed and conveyed back to the batch plant where the cullet is re-used in the raw material mix.

3.2.2.2.5 Palletizing and Shrinking

Completed bottles would be packaged onto pallets by automated palletizers in multi-layer stacks. The pallets are moved on a system of rails to the shrink device. The pallet is wrapped in heated plastic foil, which shrinks to provide a rain and dust proof cover. The pallets are then railed to the warehouse for storage.

3.2.2.3 Warehouse

The warehouse building would be approximately 5,760 m² in extent. Bulk, wrapped pallets would be stacked up to three pallets high. Pallets would be mobilized using single or dual fork lifts and loaded onto trucks for distribution to customers. A second warehouse of approximately 4,000 m² will be developed adjacent to the warehouse. This would house the sand plant and cullet plant. It would also be used to store rejected sand.

3.2.2.3.1 Utility Systems

The glass production process requires several utility systems for operation. These include both gas and fluid-based systems such as:

Table 8: Utilities for operation

Gaseous	Fluids
Compressed Air	Cooling water
Vacuum	Scraper water
Furnace combustion air	Emergency cooling water
Fore hearth combustion air	Osmosis water
Furnace cooling air	Industrial and potable water
IS machine cooling air	Fire water
Servo motor cooling air	Effluent water
Natural gas	Lubricants

LPG	Diesel
-----	--------

The utilities such as water supply systems, cooling water, cullet water as well as combustibles such as LPG, HFO and diesel are placed outside of the main manufacturing building.

The LPG supply system provides gas primarily to the furnace and fore hearth, but also to the lehrs, shrink system and workshops.

Cooling water is required for the furnace electrodes and equipment cooling. The heat is dissipated from the water via a hybrid cooling tower.

The cullet water system is used to handle hot waste glass out of the furnace. This is collected in a flooded chute which delivers waste glass to the scrapper system. The cullet water, hot and contaminated with glass particles is cooled down and clarified in dedicated plant. A slant plate clarifier removes all particles while cooling towers cool the water. The treated water is returned to the cullet water system.

3.2.3 Associated services

3.2.3.1 Access

Access to the facility is via the Dongo Kundu Bypass Road. Transport of goods to, and products from, the facility would be by truck.

3.2.3.2 Storm Water Management

Storm water infrastructure will consist of surface flow, a piped storm water network, a concrete lined channel and a soakage pit.

3.2.3.3 Electricity supply

Power supply for the project will be sourced from the national power grid to be supplied to the project site. The power will be utilized for pumping water, general office need, and other electricity needs. The power requirement of the facility would be high during operation stage.



Figure 5: Conceptual image of the plant

3.2.3.4 Bulk water supply

Water will be sourced from a groundwater pumping borewell, which will be constructed as part of this project. The borewell would be the main portable and process water source. Water shall be treated onsite using an RO plant. A water tower fire utility that store water for every-day use and fire event will be constructed between the compressor room and RO plant utility.

3.2.3.5 Sewage and grey water

Wastewater will be mainly coming from domestic sanitation activities which include black water (resulting from toilet flush) and grey water (resulting from kitchen sink, other washing facility) and runoff during rainy events. Black and grey water will be treated using an onsite effluent treatment plant (ETP) before being used for landscaping. Process water would be recycled through a cooling tower and filters to significantly reduce the need for fresh water, allowing reuse for multiple processes.

3.2.3.6 LPG/HFO and Diesel supply

The proposal is to source LPG/HFO and diesel from local oil marketers.

3.2.3.7 Waste

Wastes generated by the plant and associated operations will be separated at source, as much as is feasible, and then directed to appropriate recycling, re-use or disposal facilities.

3.2.4 Efficiency and Sustainability

Milly Glass SEZ Ltd give consideration to all reasonable and feasible sustainability measures for incorporation within the facility. Such measures should be considered in the plant technology and operations as well as in ancillary services such as offices, ablutions, workshops, warehouses and parking.

Milly Glass SEZ Ltd is committed to Environmental Sustainability Goals in the areas of Renewable Energy, Waste Recycling, Climate Action, Circular Packaging and Entrepreneurship. These sustainability goals form part of the companies' Better World concept which aims to align the companies environmental, social and economic responsibilities to make the world a better place. Measures incorporated in the current plant design are described below:

The plant's furnace is LPG fired, which is a cleaner-burning and more efficient fuel source than any of coal, heavy fuel or diesel. The plant will be equipped with regenerative, end-port fired furnace which are the most efficient melting technology available.

The compressed air systems are significant consumers of energy within the plant. Highly efficient, centrifugal compressors and variable speed drive motors have been specified, which ensures high efficiencies and reduces the requirement for air blow-off.

The plant will include a heat recovery system to utilize waste heat from the compressors. This hot water will be used in the plant for heating.

The cooling water system that has been specified is a closed loop system that requires only very small amounts of make-up water. Additionally, the cullet water system is also a closed loop system in which the water is cooled, cleaned and reused. Hybrid cooling towers have been specified which minimize evaporative water losses. These systems save on water consumption.

The building concept has provided for the use of natural light and ventilation where possible. It is Milly Glass SEZ Ltd.'s intention to ensure that the facility's electricity requirements are derived from sustainable sources as much as this is feasible.

3.2.5 Employment

It is anticipated that construction would result in the generation of up to 800 direct and indirect job opportunities. Operation of the facility would create approximately 280 permanent employment opportunities. Employees would be sourced, as much as is possible, from local communities and the larger coast region.

3.3 Project Alternatives Considered in the ESIA Process

A summary of the project alternatives considered during the preliminary design and ESIA process are described in the Table below. The current, preferred project concept as informed by the technical and environmental inputs to date is as described in Section 3.2 of this report. It must be noted that the actual plant layout and technical specifications for the facility that would be constructed will be subject to confirmation before project implementation.

Table 9: Comparison of project alternatives considered

No.	Alternatives	Description
1. Property or Locality Alternatives		
1.1	Property and location on site	Dongo Kundu Special Economic Zone was selected as the target area for the proposed project as it is an area zoned by the government for industrial and commercial establishments together with planned regional transport linkages and services and infrastructure (Notably Port of Mombasa, SGR, Moi International Airport and roads) and requires economic stimulation. The pre-feasibility phase confirmed the availability of essential services to the facility. Dongo Kundu area require economic stimulation and would benefit from a project of this magnitude. Local and regional planning documents indicate that there are a number of areas identified for commercial and industrial development/expansion. Milly Glass SEZ Ltd owns a number of properties in Kenya. All of these were considered as site alternatives during a pre-feasibility phase. Consideration was given to commercial, logistical, environmental, social and technical factors during the pre-feasibility. Plot L.R number Mombasa/Municipality Block LX/1483 within the Dongo Kundu Special Economic Zone in Mombasa County was selected as the preferred site for the glass bottle manufacturing plant and no fatal flaws were noted. In proposing the plant layout consideration was given to a number of local features, adjacent users and access, operational efficiency, geotechnical and hydrological parameters. The preferred plant layout as presented in the ESIA was significantly influenced by potential geotechnical constraints. Only the preferred site and layout have been investigated in the ESIA phase.
2. Design Alternatives		
2.1	Furnace fuel and furnace type	Diesel, heavy fuel, coal and LPG were considered as furnace fuels. LPG was selected as the only viable alternative. It is a cleaner burning and more efficient fuel than the others. Use of LPG instead of the other fuels will result in significantly lower emissions of greenhouse gases and a lower carbon footprint per unit of glass produced. Regenerative, end port fired furnace was selected as this is the most efficient melting technology available to the industry. Only the LPG option has been investigated in the ESIA phase.
2.2	Production lines	The front-end engineering and design for the glass bottle manufacturing plant investigated the feasibility of a number of different furnace and production line scenarios in order to achieve the required target output. The preferred concept was for a one 750 tons per day (TPD) furnace plant. This configuration was

		Only the preferred one furnace concept option has been investigated in the EIA phase.
2.3	Emissions control	The glass bottle manufacturing plant will, as a minimum, comply with the minimum emissions standards set by NEMA. Milly Glass SEZ Ltd is investigating the use of additional control equipment to ensure the lowest emissions from the furnace as well as other processes. The selection of the emissions control equipment was guided by the Air Quality Regulations. Use of an electrostatic precipitator was considered but was estimated to not achieve compliance with all of the parameters in minimum emissions standards. The use of a Ceramic Candle Filter was selected as the preferred emissions control option in order to comply with the minimum emissions standards.
2.4	Sustainability Measures	Refer to section 3.2.4 for information on the sustainability measures considered in the current, preferred project concept. While other measures may be available, the affordability of these has not been tested.
3. “No-Go” Alternative		
3.1	No-go	The No-Go alternative represents the option not to proceed with the proposed glass bottle manufacturing project, which leaves the project areas of influence in their current state except for variation by natural causes and other human activities. It thus represents the current status quo and the baseline against which all potential project-related impacts are assessed.

3.4 Project Cost

Setting up the proposed glass bottle manufacturing plant is estimated to cost **Kenya Shillings. Three Hundred and Thirty Million, Three Hundred and Sixty-Six Thousand, Five Hundred and Three Shillings Only. (Kshs. 330,366,503.00)**. The proponent will be required to pay 0.1% of the total project cost as official fee payable to NEMA which is equivalent to **Kenya Shillings Three Hundred and Thirty Thousand, Three Hundred and Sixty-Six Shillings Only (Kshs. 330,366/=)**.

CHAPTER FOUR

4.0 BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

4.1 Projects location

The project is to be set up at SEZA in Dongo Kundu Mombasa County on LR.NO Mombasa/Municipality Block LX/1483 - Portion. Bubu Sub-location, Mbuta Location, Likoni Sub-county, Mombasa County.

4.2 Mombasa County

This section provides a brief overview of the socio-economic characteristics of the general Mombasa County as a whole while the subsequent sections will focus specifically on the project area of Dongo Kundu Likoni Sub-County of Mombasa County. Information was mainly obtained from the Mombasa County Integrated Development Plan 2023-2027).

4.3 Population size and composition

Population distribution and settlement patterns is mainly influenced by availability of essential social and physical amenities and infrastructure development such as roads, housing, water, and electricity. Other factors that influence settlement patterns include accessibility to employment opportunities and security. Mombasa city in Mombasa County has better developed infrastructure to influence settlement patterns of population. Notably it is important to note that it is the second largest city in Kenya hence attracts attention and focus from the national government as a key economic zone.

According to the 2019 population and housing census, Mombasa County has a population of 1,208,333 persons disaggregated as 610,257 males, 598,046 females and 30 intersex. The population growth rate in the county is estimated at 2.2 per cent against the national average of 2.6 per cent. Mombasa County has an average household size of 3.1 compared to the national household size of 3.9. Additionally, over 63 per cent of the population is below 30 years, indicating a youthful population which is more productive and thus the need to consider them in development activities.

4.4 Poverty Levels and Inequalities

According to the County poverty index, 23.6 per cent of the population is living in extreme poverty conditions. The majority live in low-cost housing and city slums e.g., Mishomoroni, Junda and Kisumu ndogo in Kisauni Sub-County; Shika-Adabu and Ngomeni in Likoni Sub-County and Bangladesh in Chagamwe Sub-County. Under employment and unemployment in Mombasa County coupled with underperforming national economy has forced the majority of the population to live in the slums which are mainly characterized by limited access to social amenities, dilapidated health care facilities and health seeking practices, inadequate supply of water and access to sanitation and poor consumption of technology.

4.5 Land Use and Agriculture (Crop, Livestock, Fish Production)

Land ownership is critical to socio-economic development and primary production. However, land ownership in the County remains contentious. Most of the residents do not legally own the land they use for cultivation and

livestock keeping. Mombasa County experiences high incidences of landlessness thus leading to many squatters. However, efforts are being made to correct the imbalance and boost economic activities on land by issuance of title deeds.

Notably, a sizeable number of people living in the peri-urban areas of the county practice subsistence small scale farming and rear different types of livestock. The main crops cultivated in the county include maize, millet, sorghum cassava, cucurbits family and vegetables. These are most preferred due to their resistance to diseases and pests. A transect walk across the project area showed diverse crops planted in the area: coconuts, beans, maize, and mangoes



Figure 6: Cassava and coconut crops in the project area

4.6 Climate

The Mombasa lies on 23m above sea level Mombasa has a tropical climate with warm and cool seasons. Mombasa has an average temperature of 26.7 °C | 80.0 °F and average precipitation of 1196 mm | 47.1 inch.

The warm season lasts for 4 months, from December to April, with an average daily temperature of 29°C. The hottest month is March, with an average temperature of 31 °C. The cool season lasts for 3 months from June to September with an average daily high temperature below 28°C. The coldest month of the year is August, with a monthly average temperature of 24°C.

Mombasa experiences seasonal variation in monthly rainfall. There are two rainfall seasons i.e., March to June with an average of 150 mm and October to December with a maximum of 70 mm of rainfall. The driest month is February, with 15 mm of rainfall. Most precipitation falls in May, with an average of 302 mm.

4.7 Wind partners

The windier part of the year lasts for 5 months, from April to October, with average wind speeds of more than 20 km per hour. The windiest month of the year is July, with an average hourly wind speed of 24 Km per hour. The calmer time of year lasts for 7 months, from October to April. The calmest month is November, with an average hourly wind speed of 14 km per hour.

4.8 Drainage and Hydrology

The major drainage of the coastal area of Kenya follows the general dip towards the east south-east with a secondary trend at right angles where the eastward flow is prevented by the height of the Coast Range. The Tana River rises on the north slopes of Mount Kenya and flows for 500 kilometers through the very arid Northern Frontier Province before entering the Indian Ocean near Kipini. Its flow is dependent on rains in the Highlands but it is a permanent water course and provides water transportation as well as irrigation water for a short distance on the east bank in the Coast Province. The Sabaki (or Galana) River drains the south slopes of Mount Kenya, the north of Kilimanjaro, and the Taita Hills. It is the Athi River of the Nairobi-Machakos area and is the only other major drainage of the eastern half of the Country. As with the Tana, the Sabaki gradient is very low in the coastal area and the yearly flooding supplies great quantities of alluvium along its meandering course.

4.9 Water situation at the proposed project site

In regard to waste water, majority of the waste water is directed into the ocean thus marine pollution. The Coast Water Works Development Agency is overseeing the construction of Changamwe Repooling Sewer Network designed to upgrade sanitation services in the West Mainland area, including Changamwe, Mikindani, Chaani, and Port Reitz. This project aims to address the sewage issues in the densely populated area by expanding the existing network, which dates back to the 1980s.

Currently, the government is expediting the construction of the Mwache Multi-purpose dam in Kwale County in order to ensure it's able to meet 100 per cent demand in Likoni and adjacent areas. It is projected to be achieved in 2026 when the demand to Likoni and its neighboring areas alone will increase to 10,500 liters a day. The Water supply to the Dongo Kundu Special Economic Zone is essentially the largest component for the successful implementation SEZ.

4.10 Water Infrastructure

4.10.1 Water Sourcing:

There are 3Nr drilled boreholes under Phase I of the implementation of water supply for Dongo Kundu Special Economic Zone area which is supplying 3000 cubic meters per day. The project largely involved construction and installation of the pipeline, air valves, section valves and washouts.

The 3Nr boreholes are:

- Intake One: -Chai, Intake Two- Pongwe;
- Intake Two and Three- Dzangazangani located in the Tiwi and Waa locations of Matuga Sub-County in Kwale. Yields from the three intakes are 50, 11 and 36 cubic meters per hour equivalent to combined yield of 97 M³hr-1 and 2,328 M³ per day respectively.

Table 10: The three boreholes supplying water to the Dongo Kundu SEZ

Boreholes	Location	Eastings	Northings
Intake 1	Tiwi	563464.5	9534781.9
Intake 2	Waa	563852.2	9535723.1
Intake 3	Waa	564459.1	9538147.5

There is a water distribution network implemented with the SEZ land heading up to the port through 2Nr free ports. The figure below illustrates the implemented network under Phase I of the water supply to the Dongo Kundu Special Economic Zone.

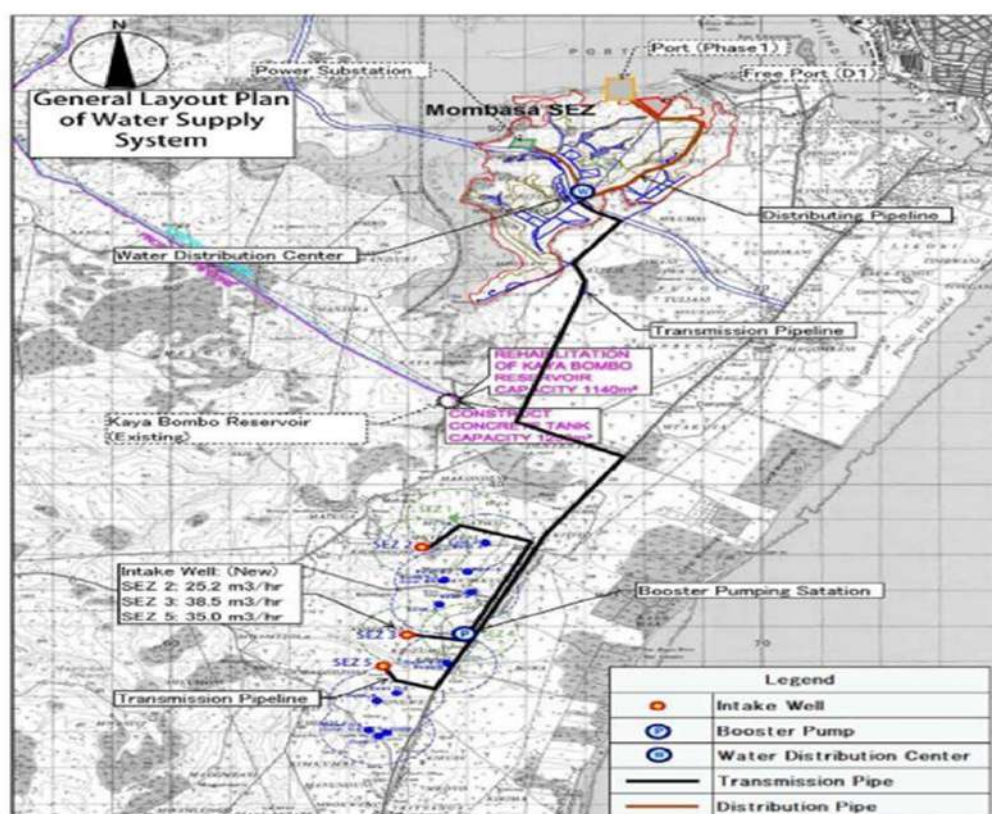


Figure 7: General layout Plan of the implemented Phase I of Water supply network for Dongo Kundu Special Economic Zone

Phase II of the water supply network is currently on-going which intends to increase the capacity up to 10,500 cubic meters per day. It involves equipping the boreholes piping of about 3km. Water from the three wells are to be transmitted by pipelines to the proposed Coast Water Works Development Agency pumping station at Tiwi Water offices (Hosting Boreholes Nr 6.1, 6.2 and 3) and then will be pumped through a main distribution line to a proposed new reservoir to be constructed in the Dongo Kundu Special Economic Zone area.

The proposed of the 25kilometer transmission and distribution network development linking the intakes in Tiwi to the Dongo Kundu through proposed Tiwi pumping station. It transverses through the A7 road linking Mombasa to

Tanzania, then runs through rural development roads and sections of Kwale County roads and sections of Coast Water works development agency land.

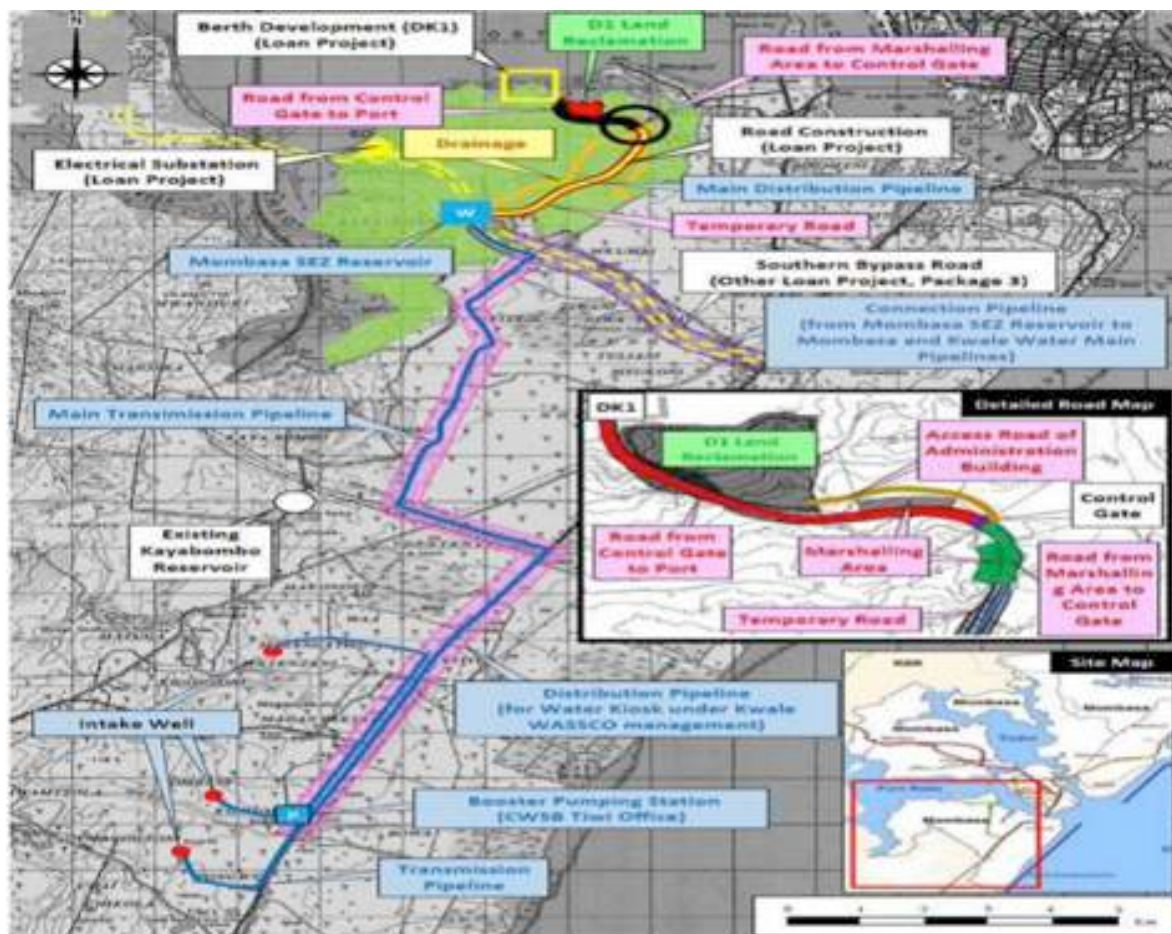


Figure 8: Entire water supply infrastructure for Dongo Kundu Special Economic Zone

In terms of storage, there is a proposed 1000m³ capacity reservoirs to be constructed within the Dongo Kundu area from where it will be reticulated by gravity flow through a 12kilometer pipeline. There is a proposed additional 10km pipeline to connect the reservoir to Mombasa water pipeline to channel water to Likoni areas which borders Dongo Kundu area which receives less than 50 per cent of its demand.

4.10.2 Current Conditions of Water Supply System

Mombasa County does not possess any big surface water sources. It heavily relies on it neighboring counties water sources to meet its potable needs. The main water sources for the Mombasa County is Baricho Well field, Marere Springs in Kwale, Tiwi well field and Mzima springs. Besides these sources are shallow wells and private owned boreholes (majority are salty just meeting the acceptable standards).

Major existing water sources serving Mombasa include:

- Marere Spring
- Tiwi Well field
- Baricho well field
- Mzima Springs



Figure 9: Overall Main water sources for Mombasa County

- Baricho Well field – Capacity 90,000 m³/d, serving Mombasa North Mainland and Island, as well as towns located in other counties (Malinda, Watamu, Kilifi, Mtwapa and enroute population); Baricho is nearly 100 km on the Sabaki River and requires pumping to a height of 150 m. In addition, the capacity of the pipeline Baricho severely limits the volumes sent to Mombasa.

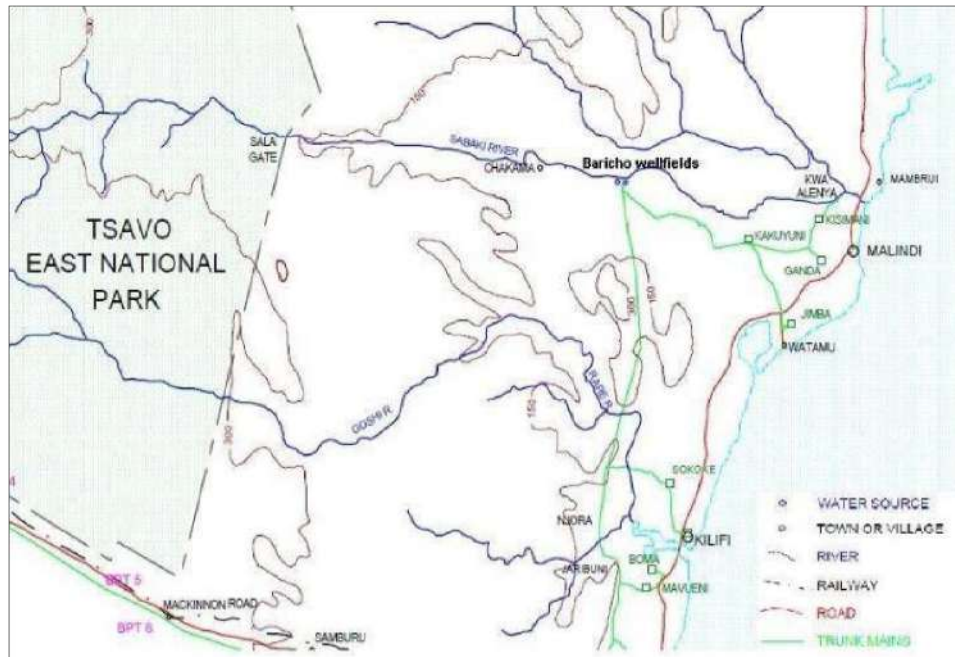


Figure 10: Baricho well field existing Water trunk

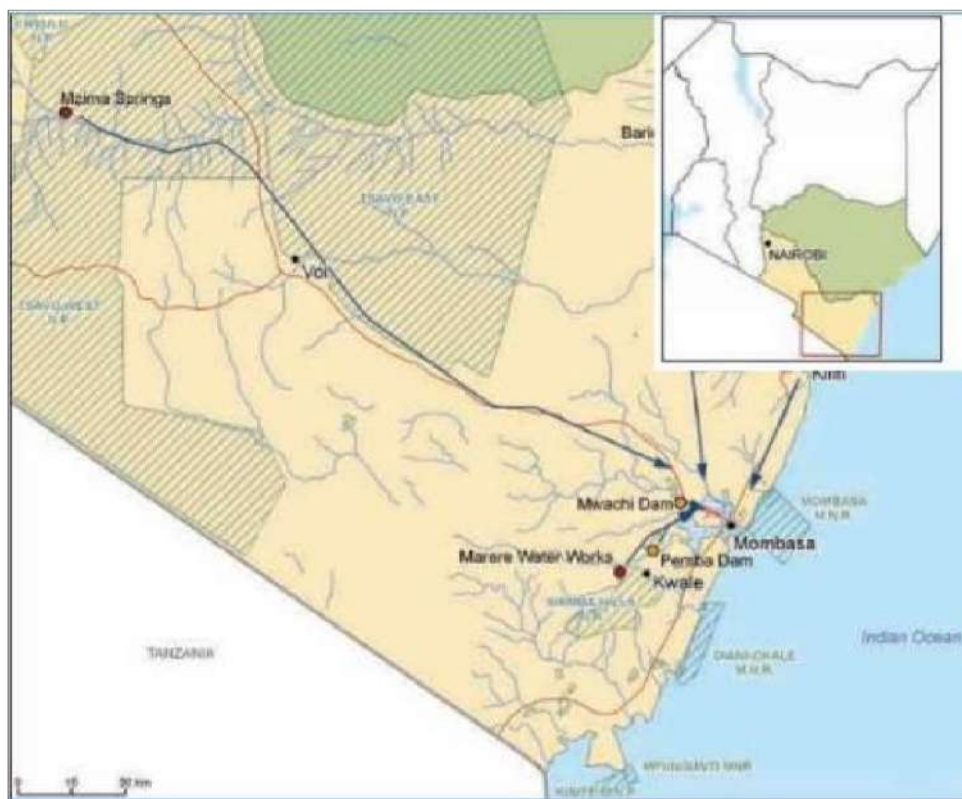


Figure 11: Mzima Spring mains transmission water supply line

- Marere Springs – Capacity 12,000 m³/d, serving Mombasa West Mainland, as well as towns located in other counties (Kwale, Kinango and enroute population);



Figure 12: Marere Spring Existing Networks

- Tiwi Boreholes – Capacity 15,000 m³/d, serving Mombasa South Mainland (Likoni Area), as well as towns located in other counties (Ukunda, Tiwi and Matuga).

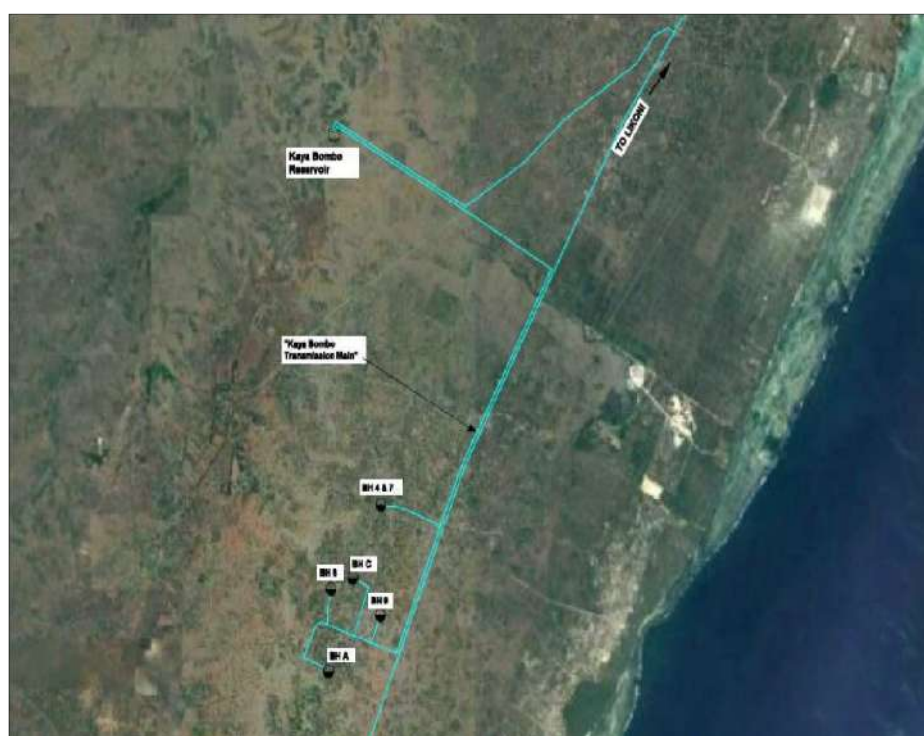


Figure 13: Tiwi Well field existing network including kaya bombo reservoir

The capacity of the existing sources is inadequate to meet the present water demand in the target service areas. The available volume of drinking water is currently under 50,000 m³. The figures below shows the existing water sources and storage reservoirs from the Tiwi well field used to supply water to Mombasa County.



Figure 14: Kaya bombo reservoirs which is 1250m³ tank and 2Nr which is 1,440m³ tank



Figure 15: Borehole A one of the main sources in Tiwi Well field to Kaya bombo reservoir

The Kaya bombo Reservoirs receives water from Marere Springs and Tiwi Well-field to supply to Likoni in the south of Mombasa. The current supply is not sufficient thus there is on-going works to increase the capacity by drilling new 2Nr boreholes and also to replace the worn out Marere pipeline to increase capacity and as well minimize losses. The reservoirs however are not in proper structural state however will be rehabilitated under the same works contracts.

The major challenges regarding water supply within the Dongo Kundu areas and its adjacent are: -

1. Inadequate water sources
2. Groundwater pollution
3. Encroachment of ground water recharges areas.
4. Salinity of groundwater

5. High levels of Non-revenue water
6. Low development of infrastructure development and generally old facilities

Currently, half of the population is connected to the network and the informal distribution is thriving. Neither the port, nor the airport now has the volumes required for normal activity. The situation can be considered critical, in particular in Likoni (South Mainland) area where the water availability is often below 2.5 l/d/inhabitant.

4.11 On-going Works Contract:

There is a major multi- donor funding for the Mwache Multi-purpose dam that is currently on-going. It is situated across the Mwache River at the Fulugani village in Kinango Sub-County in Kwale County. The Mwache multi-purpose dam has an 87.5-meter-tall concrete gravity dyke, impounding 118 million cubic meters of water with a daily supply of 186,000 cubic meters of water. These separate pipelines will transmit bulk water to main service reservoirs by gravity. The new Dongo Kundu service reservoir tank (supply volume 69,200 m³/d, tank capacity 23,000 m³) will be located near the Dongo Kundu Special Economic Zone. The water allocation to each service reservoir is based on the Water Supply Master Plan as shown in figure below: -

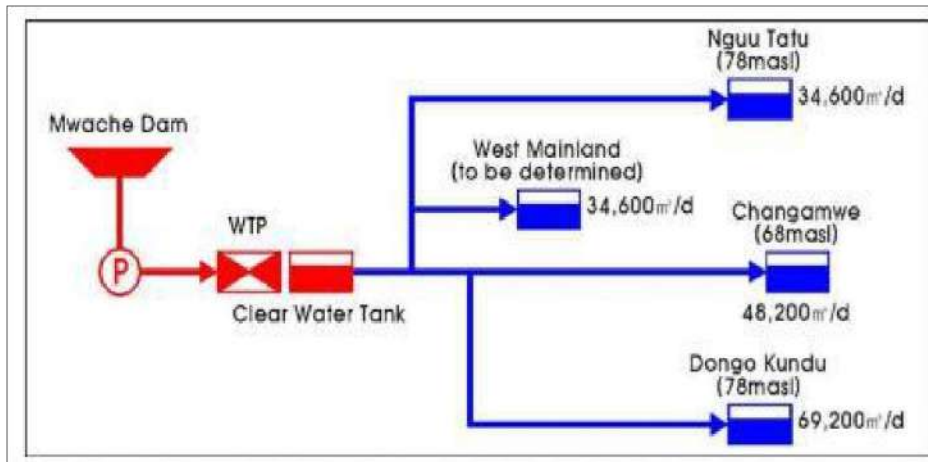


Figure 16: Proposed water supply allocation for Mwache multipurpose dam through Hydraulic Concept of Water Transmission Facilities

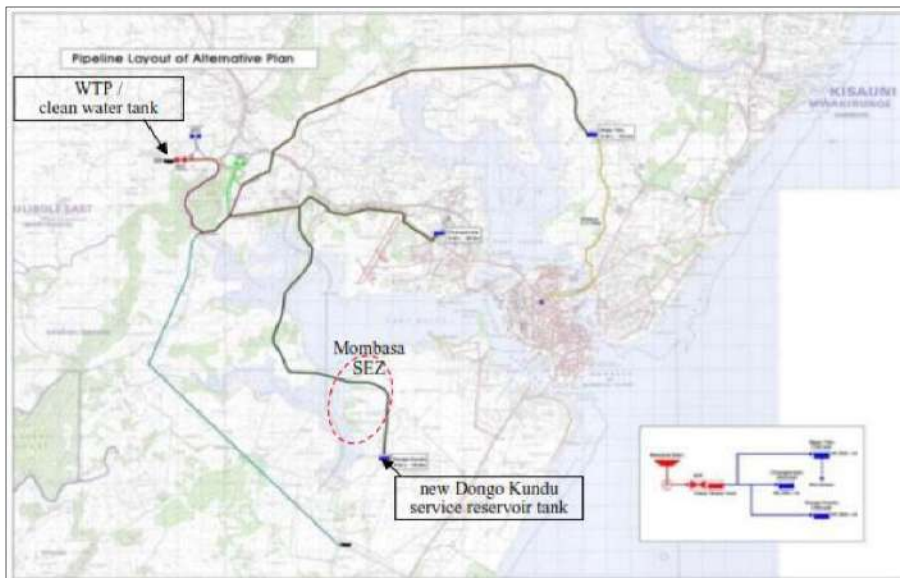


Figure 17: Pipeline Layout of Water Transmission Facilities



Figure 18: Transmission Line to Proposed Dongo Kundu Reservoir

4.12 Soils

The soil types in Mombasa are broadly associated with the geological formations along the physiographic zones. Along the coastal lowlands four soil types predominate.

- a. On the raised reefs along the shore well-drained, shallow (< 10 cm) to moderately deep, loamy to sandy soils predominate.
- b. On unconsolidated deposits in the quaternary sands zone (also referred to as Kilindini sands) are well drained moderately deep to deep, sandy clay loam to sandy clay, underlying 20 to 40 cm loamy medium sand.
- c. On the Kilindini sands are also found areas with very deep soils of varying drainage conditions and colour, variable consistency, texture, and salinity. iv. Also found on the Kilindini sands are well-drained very deep, dark red to strong brown, firm, sandy clay loam to sandy clay, underlying 30 to 60 cm medium sand to loamy sand soils.
- d. On the coastal uplands, composed of the raised areas in Changamwe and western parts of Kisauni, two soil types are dominant
- e. Soils developed on unconsolidated sandy deposits in the Magarini formation, composed of sandy to loamy soils. These are well drained, very deep, sandy clay loam to sandy clay, with a topsoil of fine sand to sandy loam.
- f. Soils developed on shales composed of heavy textured soils constitute the relatively high agricultural potential area in the district. The soils are dominated by well drained to imperfectly drained, shallow to moderately deep, firm to very firm clay, and imperfectly drained deep, very firm clay, with humic topsoil and a sodic deeper subsoil.
- g. Baseline Soil sampling was conducted on 21st February – 3rd March, 2026. The soil samples were collected from 2 predetermined locations. The samples were collected from the ground at a depth of 0.2 meters directly using a manual hand held trowel. The samples were placed in zip bags and then put in a cool box and transported to the laboratory for analysis using standard approved methodologies.
- h. Baseline Water sampling was done on 21st February – 3rd March, 2026; water samples were collected from from a nearby spring in the project area (Kaya Mrongondoni Spring) and from a borehole near the project site. The samples were collected by use of sampling bottles, preserved in cool boxes, transported to the laboratory for analysis using standard approved methodologies.
- i. The results of the water parameters tested were within the acceptable limits as stipulated in the EMCA (Water Quality Regulation), 2024 Legal Notice 177 of for Quality Standards for Sources of Domestic Water (First schedule). These results could have been influenced by seasonality i.e rainy and dry seasons.
- j. The analysis results have been annexed in this report.

4.13 Noise

The measurements were performed using Noise Meter complying with international standards for sound level meter specifications IEC 61672:1999, IEC 61260:1995 and IEC 60651, as well as ISO 19961:2003 and ISO 3095:2001 for the measurement and assessment of environmental noise.

Significant noise was emitted from various sections of the environment. The highest level was measured at the construction site. Most of site areas registered low values below the Kenyan Regulatory limits stipulated in the

Factories and other places of work (Noise Prevention and Control) Rules 2005, Environmental noise were also above the Environmental Management and Coordination (Noise and Excessive Vibrations) Regulations, 2009 for commercial zone of 60dB during day and 35dB at night which were influence with external sources especially at night.

A baseline noise survey was conducted during the field survey in 8 areas monitoring points as shown in the map below. The survey data was gathered to calculate an average daytime and nighttime noise level for each of the chosen locations.

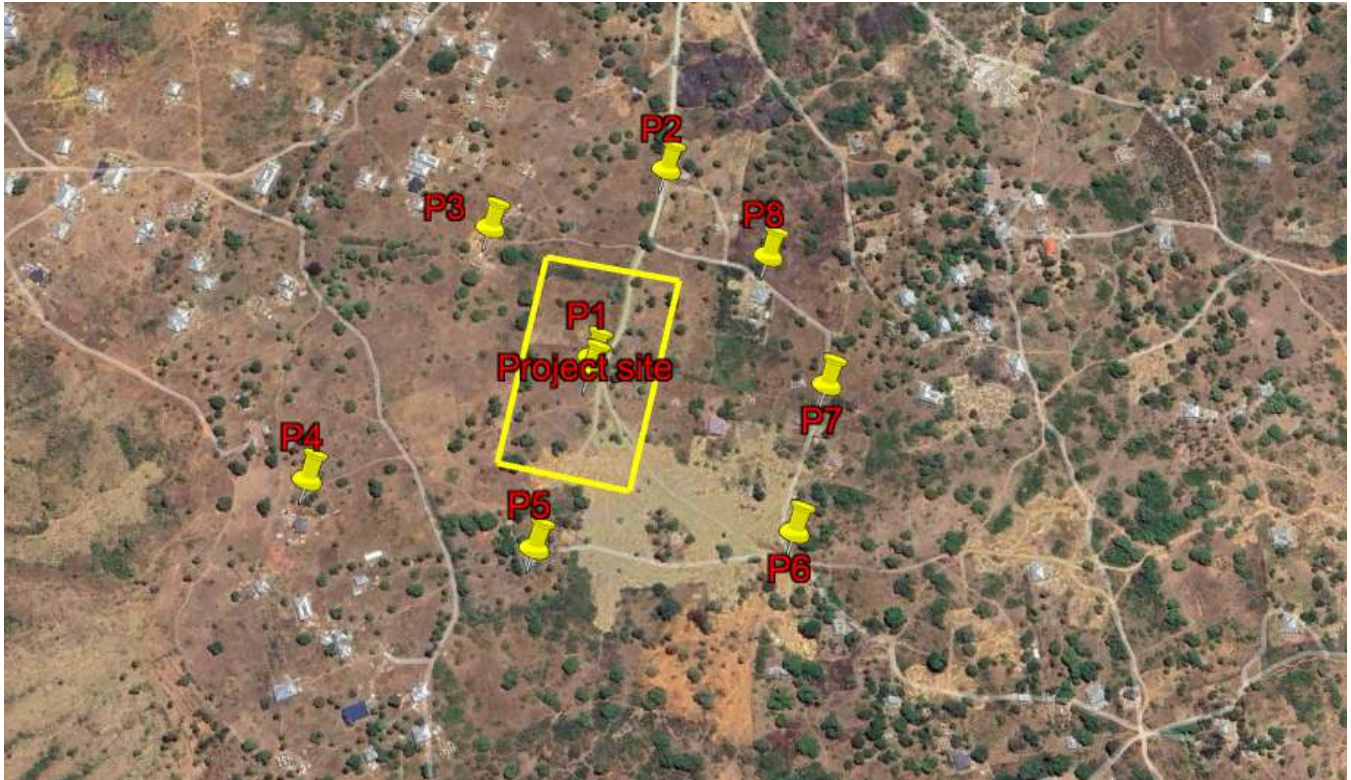


Figure 19: Noise survey monitoring points

4.14 Bio-physical Environment of the study area

The proposed project will be established in Dongo Kundu area and there is significant natural terrestrial or aquatic ecosystem existing within the area. Therefore, the biophysical environment will not be significantly impacted by the proposed project. Vegetation to be cleared will mainly be not endangered.

4.15 Social economic conditions, national and regional land use policies

The proposed project land use zoned as an industrial land within the Dongo Kundu Special Economic Zone in Mombasa County. The architectural plans must be approved by The Mombasa County Government. The national land planning policy in Kenya is to achieve sustainable development and is generally viewed in the context of resource exploitation, poverty eradication, conflict resolutions, public participations, equality and policies to achieve regional balance. Glass Manufacturing Factory is ideal for this proposed site.

4.16 Information, Communication and Technology (ICT)

ICT is important in all sectors of development: health management, natural resources management, partnership, education, rural women empowerment, youth empowerment and sustainable poverty reduction etc. The SEZA, the communication network in the entire project area is fairly developed with 3 networks (Safaricom, Airtel and Telkom.). According to Mombasa County Annual Development Plan 2020/2021, the mobile phone network coverage is 87%, with Safaricom network having the largest coverage. Other services available include radio and television waves.

4.17 Accessibility to the Project Area

The project area can be accessed through the Dongo Kundu Road (Southern Bypass) which is under the Kenya National Highways Authority (KeNHA).

4.18 Energy Availability

The project area is connected to the Kenya Power and Lighting Company (KPLC) and some of the households within the project area are connected to the grid. The Project Area has a huge potential for other energy sources that include: wind, solar and bio-fuels whose exploitation has been significant. Other sources of energy in the project area are fuel wood, charcoal and paraffin. The most commonly used among these is fire wood and charcoal and a few people are using Liquefied Petroleum Gas (LPG).

4.19 Health Facilities

The health sector is an important development segment for the empowerment and wellbeing of a society. Mbuta Model Health Center is 3.5km from the project area and serves the SEZA community.



Figure 20: A health Facility in the Project Area

4.20 Education Facilities

Mombasa County has insufficient educational facilities against a high population. The literacy rate of 57 per cent and literacy level is expected to increase as a result of the educational programs e.g., the Free Primary Education Programme, the Subsidized Secondary Education Programme, adult literacy programmes along with numerous initiatives like bursary schemes from the CDFs, LATF and Government.

Education sector is critical in providing the skills that will be required to steer the location to the economic and socio goals of vision 2030. Although the sector has faced serious challenges over the years relating to access, equity, quality, financing, and relevance, significant achievements have been made over the years. There are two institutions within the project area: Mwangala Primary School and Bububu Secondary school which are located approximately 2.1 km and 3.2km respectively from the project area. Tertiary institutions are located in Likoni.

4.21 Tenure System and Land Use

SEZA is public land owned by the government according to the article 62 of the Kenyan constitution. The main land use in the in the project area is residential and partly farming which changes to industrial with the development of the Zoning of the area as an industrial park.

4.22 Housing Structures

The type of housing that exists in the project area consists of semi-permanent and permanent houses. Most of the permanent structures are made of stones, bricks, tiles, iron sheets and mud wall. The sample type of housing distribution in the project area is given in figure below.

4.23 Trade, Industry and Tourism

A significant number of industries are spread across sectors of the economy within the county. These include: the service industry where shipping lines, ship repair and servicing yards, container freight stations, transport, clearing and forwarding firms and grain bulk handling occur. Additionally, there are several manufacturing industries such as export processing (apparel) companies, oil refineries (both edible and petroleum), glassware, flour mills and car assembly plants. These industries offer employment and business opportunities to residents. Mvita, Kisauni and Changamwe sub-counties host majority of these industries.

There are several tourist attractions and world heritage sites in Mombasa County namely; the historic Fort Jesus Museum-a UNESCO World Heritage site, the Likoni Ferry Services, and the Elephant Tusks along Moi Avenue, Old Port building, the white sandy beaches, Mombasa Marine Park, Haller Park and Butterfly Pavilion.

The main species of wildlife found in the private nature trails operated by the Bamburi Cement Factory are buffaloes, wildebeests, giraffes, hippopotamus, tortoise and multiple species of birds and butterflies.

According to the Mombasa county CIDP 2023-2027, there are over 430 beach and tour operator firms that provide various tourist-related services. There are over 200 registered hotels and lodges with a total bed capacity of more than 8,000 beds and an average annually bed occupancy of 64 per cent. However, hotel and cottage occupancy and sustainability of the tour operator firms are dependent on number of tourists visiting the coastal region and the season.

CHAPTER FIVE

5.0 STAKEHOLDER ENGAGEMENT PROCESS

5.1 Introduction

This section discusses the stakeholder engagement activities undertaken by the ESIA team for the proposed Glass Bottle Manufacturing plant project on Plot No. Mombasa/Municipality Block LX/1483 at Dongo Kundu Special Economic Zone in Mombasa County. It outlines the objectives of undertaking stakeholder consultation and identification of the stakeholders. It further discusses the national and international frameworks for undertaking stakeholder consultation. Subsequently, this section outlines the process followed for undertaking the public meetings and identifies the key issues, concerns, and expectations that the stakeholders raised. Finally, the section concludes by suggesting the next steps following the stakeholder engagement associated with this ESIA Study.

5.2 Objectives of stakeholder consultation

Stakeholder engagement refers to a process of sharing information and knowledge, seeking to understand the concerns of others and building relationships based on collaboration and partnership. It is a long-term process that requires the building of trust through open dialogue and the delivery of commitments.

The most important objective of stakeholder consultation is to provide sufficient and accessible information to potential Interested and Affected Parties (I&APs) in an objective manner and to provide a platform for constructive participation in the application process thereby assisting I&APs to:

- Gain an understanding of the project, the various components, and the potential impacts (positive and negative).
- Raise issues of concern and suggestions for enhanced benefits and commenting on reasonable alternatives.
- Verify that their issues have been recorded (Stakeholder Engagement Logs) and considered in investigations; and
- Contribute relevant local information and traditional knowledge to the process.

Milly Glass SEZ Ltd recognizes that open and transparent communication is essential due to the importance of the activities in which it is engaged and the impact on the local, regional and national economies and individuals.

For the proposed Glass Bottle Manufacturing project, Milly Glass SEZ Ltd team based in Mombasa worked together with the ESIA Team in undertaking the stakeholder engagement meetings.

5.3 Requirements of Stakeholder Consultation

Stakeholder consultation is required by the Kenyan environmental legislation as well as the International Finance Corporation's (IFC) Performance Standard 1. Each of these requirements is discussed below.

5.3.1 National Requirements

At a national level, stakeholder consultation on ESIA studies is embedded within section 58 of Environmental Management Coordination Act of 1999. Rule 17 of Legal Notice 101 titled Environment (Impact Assessment and Audit) Regulations, 2003 calls for Public participation and consultation throughout the impact assessment study.

It requires the Proponent to:

1. Seek the views of persons who may be affected by the project in consultation with the Authority (NEMA);
2. Publicize the project and its anticipated effects and benefits by erecting posters in strategic public places informing the affected parties and communities of the proposed project;
3. Publish a notice on the proposed project for two successive weeks in a newspaper that has a nation-wide circulation and make announcement in both official and local languages in a radio with a nation-wide coverage at least once a week for two consecutive weeks;
4. Hold public meetings with the affected parties and communities to explain the project and its effects, and to receive their oral or written comments. Ensure that appropriate notices are sent out at least one week prior to the meetings and that the venue and times of the meetings are convenient for the affected communities and the other concerned parties; and
5. ensure, in consultation with the NEMA that a suitably qualified coordinator is appointed to receive and record both oral and written comments and any translations thereof received during all public meetings for onward transmission to NEMA.

Following the submission of the ESIA report to the NEMA, the Authority shall, within fourteen days of receiving the environmental impact assessment study report, invite the public to make oral or written comments on the report upon which, if deemed necessary, the Authority may hold a public hearing.

Additionally, Kenyan Court have held that public participation in environmental issues, at a minimum, entails the following elements:

- i. programme of public participation that accords with the nature of the subject matter. The public participation programme must take into account both the quantity and quality of the governed to participate in their own governance;
- ii. innovation and malleability depending on the nature of the subject matter, culture, logistical constraints, and other related factors that ensure that the public participation is effective;
- iii. the public participation programme must include access to and dissemination of relevant information;
- iv. those most affected by a policy, legislation or action must have a bigger say in that policy, legislation or action and their views must be more deliberately sought and taken into account; and any clear and intentional attempts to keep out bona fide stakeholders would render the public participation programme ineffective and illegal by definition;
- v. public participation should be conducted while going through the motions or engaging in democratic theatre so as to tick the Constitutional box. All the views received as part of public participation programme should be taken into consideration, in good faith; and
- vi. the right of public participation is not meant to usurp the technical or democratic role of the office holders but to cross-fertilize and enrich their views with the views of those who will be most affected by the decision or policy at hand.

The Proponent will adhere to the above principals in the public participation process.

5.3.2 International Requirements

The Kenyan legislation on Public participation is aligned with the IFC's information disclosure and public consultation requirements as specified under Performance Standard 1 on Assessment and Management Assessment and Management of Environmental and Social Risks and Impacts. This requirement calls for Milly Glass SEZ Ltd to conduct and provide evidence of meaningful, free, prior and informed consultation with the communities likely to be affected by environmental and potential social impacts, and with all identified local stakeholders.

Stakeholder engagement is an ongoing process that may involve, in varying degrees, the following elements: stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and ongoing reporting to Affected Communities. The nature, frequency, and level of effort of stakeholder engagement may vary considerably and will be commensurate with the project's risks and adverse impacts, and the project's phase of development.

5.3.2.1 Stakeholder Analysis and Engagement Plan

According to IFC performance standard 1, the Proponent is required to develop and implement a Stakeholder Engagement Plan that is scaled to the project risks and impacts and development stage and be tailored to the characteristics and interests of the Affected Communities. The standard requires the proponent to identify individuals and groups that may be directly and differentially or disproportionately affected by the project because of their disadvantaged or vulnerable status and put in measures so that adverse impacts do not fall disproportionately on them.

A Stakeholder Engagement Plan for this project has been prepared illustrating the engagement activities that were carried out during the ESIA phases and those that will be carried during the construction and operations phase.

5.3.2.2 Consultation and Participation

According to IFC performance standard 1, the proponent is required to conduct an Informed Consultation and Participation Process that will result in the Affected Communities' informed participation.

The key principles of effective stakeholder engagement that have been undertaken by Milly Glass SEZ Ltd are summarized as follows:

- Providing meaningful information in a format and language that is readily understandable and tailored to the needs of the target stakeholder group(s)
- Providing information in ways and locations that make it easy for stakeholders to access it and that are culturally appropriate
- Two-way dialogue that gives both sides the opportunity to exchange the views and information, to listen and to have their issues heard and addressed
- Inclusiveness in representation of views, including ages, women, and men, vulnerable and/or minority groups
- Processes free of intimidation and coercion
- Clear mechanisms for responding to people's concerns, suggestions, and grievances; and
- Incorporating where appropriate and feasible, feedback into project or program design, and reporting back to stakeholders

5.3.2.3 Grievance Mechanism

According to IFC PS 1, where there are affected communities, Milly Glass SEZ Ltd is required to establish a grievance mechanism to receive and facilitate resolution of affected communities' concerns and grievances about the client's environmental and social performance.

A Grievance Mechanism procedure has been prepared to allow stakeholders to raise questions or concerns with the proponent and have them addressed in a prompt and respectful manner.

5.3.2.4 Ongoing Reporting to Affected Communities

IFC PS 1 requires Milly Glass SEZ Ltd to provide periodic reports to the affected communities that describe progress with implementation of the project action plans on issues that involve ongoing risk to or impacts on affected communities and on issues that the consultation process or grievance mechanism have identified as a concern to those communities.

Through the Stakeholder Engagement Plan and the Grievance Mechanism, Milly Glass SEZ Ltd will continuously engage the affected communities and disclose pertinent project information.

5.4 Stakeholder Identification and Mapping

A comprehensive stakeholder identification and analysis process was conducted where stakeholders were identified and mapped. This formed the foundation for planning and designing of successive stakeholder engagement activities. The stakeholder mapping was done based on the identification of individuals, communities, groups, and institutions who:

- Are most likely to experience at significant levels, the positive and/or negative impacts of the proposed project;
- Have the mandate over the various elements of the project's activities (such as Government ministries and agencies);
- Are considered vulnerable members of the society within the proposed project area; and
- Are considered the projects main supporters and opponents

The stakeholder analysis process sought to prioritize identified stakeholder based on: interest and expectations in relation to the proposed project; required levels of participation for each stakeholder throughout the project lifecycle; degree of influence of each stakeholder group to the direction and success of the proposed project; interrelationships between different stakeholders and the convergence/divergence between their interests and expectations.

For the proposed project, project stakeholders include the following categories of persons or institutions:

- a. Those directly impacted by the project such as people living in villages within the project area. This includes residents of the Mrongondoni, Tembo and Mwangala villages near the project site.
- b. Stakeholders that will be affected by the project activities thereby requiring consent to utilize their resources included institutions such as Kenya Ports Authority, Kenya National Highways Authority, Kenya Urban Roads Authority, Kenya Railways Corporation, and Mombasa Water Supply and Sanitation Company (MOWASSCO).

- c. Mombasa County Administration at the county, sub county, ward, location, and village level. Specifically, the region affected by this project is Bububu Sub-Location, Nguta Location Mtongwe ward- Likoni Constituency.
- d. Government parastatals such as National Environment Management Authority (NEMA), Kenya Forest Service
- e. Community based organizations operating in the project area and its environs
- f. Private sector businesses in the vicinity of the proposed project.
- g. The project proponent-Milly Glass SEZ Ltd

5.5 Public Consultations

Public engagement and stakeholder consultation are fundamental to an effective environmental and social impact assessment process and for the successful implementation of the proposed Glass Bottles Manufacturing Plant. It serves to promote mutual confidence and trust between the proponent and project stakeholders

Public engagement is an on-going process; for the proposed Glass Bottles Manufacturing Plant, stakeholder consultation was initiated during the scoping phase and will continue throughout the detailed ESIA process, construction, operational phases of the project respectively. The approach to public engagement has been designed to promote meaningful, two-way communications between Milly Glass SEZ Ltd and the stakeholders.

The public consultation was focused on engaging community residents (Mrongondoni, Tembo and Mwangala Villages resident), businesses, local/public authorities, community leaders, as well as other individuals or groups that express interest in the project. Milly Glass SEZ Ltd is committed to effective and open consultation to ensure that potentially affected members of the public are fully aware of the project and have the opportunity to make their views known. The concerns will help ensure that all the important issues are considered in the environmental assessment.

The public consultation program included:

- a. Preliminary consultations;
- b. One on One meetings;
- c. Public baraza meeting; and
- d. Focus Group Discussions
- e. Household questionnaires

It is important to note that stakeholder consultation is an ongoing process and further stakeholder engagement will be conducted as the project progresses. Minutes of the meetings held during the public consultation and digital photographs taken during the meeting are appended the end of this report.

5.6 Stakeholder Engagement Activities

5.6.1 Preliminary Consultations

The ESIA Team made a reconnaissance visit to the proposed site on January 24th, 2026. The consultants were able to establish the general project site and specifically made a transect walk to the project site and neighboring villages.

The Team was accompanied by a representative from Milly Glass SEZ Ltd who had a good knowledge and understanding of the proposed project.

Later, the consultants had a meeting with the Chief and Assistant Chief of Nguta Location and Bububu Sub Location and informed them of the proposed project and the ESIA studies to be undertaken. The ESIA team also expressed their intention to conduct public baraza meetings with communities in the project area. The Chief and Assistant Chief were well informed on the proposed project site. This involved project site familiarization and identification of potentially affected communities.

In February 6th, 2026, the ESIA Team conducted a meeting with Assistant County Commissioner, Chief, Assistant Chief, KPA representative and 3 village elders in charge of the potentially affected villages in Nguta location (Bububu sub-location). The agenda of the meeting was to discuss on:

- Social organization of the local community (demographics of the people they represent).
- Identification of other stakeholder representatives in the Community i.e., NGOs, CBOs etc.
- Areas of challenge within the community.
- Solicitation and guidance on how to carry out community engagement i.e., methods of mobilization and project information dissemination

It was agreed that the first public baraza would be held at the project site on 13th February 2026 with residents from the Mrongondoni, Mwangala and Tembo Villages.

The Assistant County Commissioner was adequately briefed by the Consultants together with the local administration. Mobilization of the attendees was done by area chief and assistant chief through

- a) Word of mouth with the assistance of the village elders and “mabalozi”,
- b) Through phone calls and text messages.

Subsequent to the site visit, a kick-off meeting was held with the Proponent on 2nd February, 2026 to discuss the project activities and the ESIA study for the proposed Glass Bottle Manufacturing plant. The consultants were provided with background information of the proposed project and the companies/partners involved in its development, objectives of the project, information on previous stakeholder engagement meetings with relevant National agencies and the agenda for a public baraza meeting scheduled on February 13th, 2026.

Additionally, the ESIA team held initial consultations with other stakeholders within the project footprint as highlighted below.

5.6.2 Disclosure of the Project Information

Dissemination of project information was done through verbal discussions, and information documents. The documentation was prepared prior to the meetings with pertinent project information that the Proponent was prepared to disseminate.

In addition, public notices were placed in strategic places within the community i.e. The Chief's office Notice Board, the project site and at shops within the local area, giving people information on the proposed project; its location, the ESIA requirements and inviting them to contact the Consultants with comments or concerns on the proposed project using the contacts provided in the notice.

5.6.3 Stakeholder Engagement Activities during Assessment

5.6.3.1 Stakeholder Identification and Analysis

Stakeholders for the project in the assessment were identified mainly for the proposed Glass Manufacturing Plant in Dongo Kundu and included local residents especially those residing in the adjacent villages and Key informants and vulnerable groups.

They were grouped into the following categories:

- Lead agencies; National Environment Management Authority, KURA, KeNHA
- Affected communities; the Mrongondoni village, Mwangala village and Tembo village adjacent to the project site
- Vulnerable Groups; Women
- Parties affected by the access road; Institutions such as Kenya National Highways Authority, Kenya Railways Corporation, and KPLC.

5.6.4 Public Baraza Meetings

2 public baraza meetings were held at the project site. The first meeting was held on 13th February 2026. The second meeting was held on 8th March 2026 while the third meeting was held on 24th March 2026. The project site was an ideal venue for the baraza meeting because it was a common point for majority of the targeted stakeholders.

The public baraza meetings were held with residents from the Mrongondoni, Mwangala and Tembo villages in Bububu Sub-Location. Residents from the three villages are the only ones that live within the vicinity of the proposed site for the Glass Manufacturing plant and are likely to be impacted most by the project and its activities. The meeting was also attended by the National Government Authority Officers in charge of the area i.e., the Chief, Assistant Chief together with the village elders.

The Consultants together with the proponent's project managers were in attendance to provide information to the public and to receive and address comments. The barazas were presented with information on:

- Description of the project (project design and location);
- The requirements of the EMCA for new projects in Kenya;
- The Environmental Assessment Process;
- Baseline environmental studies being undertaken as part of the ESIA; and
- Potential environmental and social impacts associated with the proposed project.

After giving presentations on the proposed project, the stakeholders were provided an opportunity to comment and give views on their perceptions of the proposed project.

The verbal discussions were done in Swahili language as it had been established through the Chief that the audience would be most comfortable with the Swahili language.

The respondents were able to comment on the project, highlight the potential positive and negative impacts of the project and if they are for or against the project.

All substantive issues raised with the Environmental Experts during the baraza were noted and responded to. The issues were then recorded in an Issues and Response Report.



Figure 21: Images of Baraza Meeting with the local residents

5.6.4.1 Focus Group Discussion with Business Operators

In consultation with key informants from the community i.e., the Chief, Village elders and members of the public (during the public baraza meeting), business operators were identified.

The key views, concerns and requests collected during these consultations are aggregated in this report

5.6.5 One on One Meetings with Relevant organizations/Lead Agencies and Government departments

During the SR Phase, the following organizations and government departments relevant to the project were identified and consulted:

- The Likoni Assistant County Commissioner (ACC);
- National Environmental Management Authority (NEMA);
- Kenya Ports Authority (KPA);
- Kenya National Highways Authority (KeNHA) Coast Region;
- Kenya Urban Roads Authority (KURA) Coast Region;
- Mombasa Water Supply and Sanitation Company (MOWASSCO);
- Kenya Power and Lighting Company (KPLC);
- Department of Public Health, Mombasa County;
- Department of Lands, Urban Planning and Housing, Mombasa County; and
- Fire Department, Mombasa County.

Through tele-conversations and visits to the offices of interest, arrangements for consultation meetings were made and the dates, time and venues agreed.

The objectives, dates and locations of the meeting are as highlighted below.

Data collected during these meetings has been included in the socio-economic baseline data.

Table 11: Summary of the one-on-one Engagement Objectives

Stakeholder Group		Date & time	Engagement Objectives
Assistant County Commissioner, Assistant Chief, Village elders	County Chief,	February 2 nd , 2026	• Project introduction • Obtain information on: ✓ Policies and plans relevant to the project. ✓ Developmental activities in the area. ✓ Facilitation and coordination of public participation in the proposed project. ✓ Get their views and concerns on the proposed project.

Land and Physical Planning Department	March 18 th , 2026	• Project introduction • Obtain information on: ✓ Land use and future planning for the area; ✓ Zoning/zoning maps of the project area; ✓ Licensing the project footprint; and ✓ Any other physical planning issues
KURA Coast Region	March 19 th , 2026	• Project introduction • Obtain information on: ✓ Road usage and plans for the area ✓ Permits required for road use in the area and during construction ✓ Get their views and concerns on the proposed project.
KeNHA Coast Region	March 19 th , 2026	• Project introduction • Obtain information on: ✓ Road usage and plans for the area ✓ Permits required for road use in the area and during construction ✓ Get their views and concerns on the proposed project.
National Environment Management Authority (NEMA) – Mombasa County	March 20 th , 2026	• Introduce the proposed project including, location, project description, and potential environmental and social impacts • Obtain information on: ✓ Prevailing environmental issues with the project area/Mombasa County ✓ Waste management in Mombasa County and in particular Likoni sub-county ✓ Get their views and concerns on the proposed project.
County Fire Department	March 21 st , 2026	• Project introduction • Obtain information on: ✓ Emergency response policies and plans relevant to the project. ✓ Fire stations and community response ✓ Get their views and concerns on the proposed project.

Public Health Department	March 21 st , 2026	• Project introduction • Obtain information on: ✓ How community health is handled in the area; ✓ Public Health issues facing the area; ✓ Statistics on morbidity and mortality ✓ Medical facilities that serve the project area; ✓ Specific laws that are applicable to this project; ✓ Permits/licenses that should be obtained; ✓ Sanitary facility requirements for this type of plant during construction and operation; and ✓ Measures put in place in case of a pandemic. ✓ Get their views and concerns on the proposed project.
Mombasa Water Supply and Sanitation Company (MOWASSCO)	March 31 st , 2026	• Project introduction: location, project description, Potential impacts and the proposed mitigation measures; • Obtain information on: ✓ The water resources in the project area including; rainfall, surface water and ground water; and ✓ The prevailing water issues within the project area. ✓ Get their views and concerns on the proposed project.
KPLC	March 6 th , 2026	• Project introduction • Give an overview of the ESIA process and studies being undertaken to assess the project potential impacts; • Get their views and concerns on the proposed project.

5.6.5.1 Second Public Baraza Meeting

A second public baraza was held at the project site on 24th March 2026 as indicated earlier. The public baraza meeting was held with residents from the Mrongondoni, Tembo and Mwangala Villages in Bububu Sub-Location. The meeting was attended by a total of 55 residents. As indicated in the first meeting, residents from the three villages are the only ones that live within the vicinity of the proposed site for the Glass Bottle Manufacturing plant and are likely to be impacted most by the project and its activities. The meeting was also attended by the National Government Authority Officers in charge of the area i.e., the Chief, Assistant Chief together with the village elders.

The EIA/EA Experts and the Proponent's representatives were in attendance to provide information to the public and to receive and address comments.

Using verbal discussions, the baraza was presented with information on:

- Brief description of the project (update on newly acquired project information)
- The potential positive and negative impacts and subsequently the enhancement measures and mitigation measures, respectively.
- The Grievance Redress Process and expected feedback from the community

Subsequently, the views/concerns/comments from the attendees were collected and responded to.

Discussions were conducted in both Swahili and English languages.

5.6.6 Disclosure of the Impact Assessment Findings

Just like dissemination of project information, disclosure of impact assessment findings was done through verbal discussions, diagrammatic presentations, and information documents. The key tool prepared was a presentation flip chart that contained diagrammatic presentation of the project components of the Glass Bottle Manufacturing Plant.

In addition, mobilization for the public disclosure meetings was done in reference to the public posters initially placed in strategic places within the community i.e. The Chief's office notice board, shops at the in the villages, giving people information on the proposed project; it's location, the ESIA requirements and inviting them to contact the Consultants with comments or concerns on the proposed project using the contacts provided on the notice. Mobilization for the public disclosure meeting was done by the office of the chief in collaboration with opinion leaders and village elders.

The public baraza was conducted in Kiswahili language. Questions and comments were received and noted down.



Figure 22: Area chief talking during the meeting



Figure 23: Local community attending the meeting

5.6.7 Identification and recording issues of concern

During the stakeholder consultations, different views and concerns were expressed by the stakeholders consulted. These views were captured and recorded through meeting minutes and issues and response reports (IRR). Responses to the views and comments were undertaken as part of the detailed environmental and social impact assessment.

Table 12: Key stakeholder views captured during stakeholder consultations

Subject	Issue	Response
Dust during along the access road	One of the community members asked what measures shall be put in place to manage dust along the material haulage roads.	The expert answered by stating that they will propose a number of measures to prevent or reduce dust along the access road. These measures include sprinkling water along the access roads at least twice a day, use of road signage, and speed reduction as appropriate and applicable
Clearance of vegetation on site	Vegetation on site shall be cleared during project implementation. Some of the native trees at the site are used for traditional medicine.	The native trees at the site shall be identified and the expert shall advise the project proponent replant the trees after the project development is complete

Employment	Whether the Proponent will employ locals.	The proponent is committed in ensuring effective local content in terms of sourcing of skilled, semi-skilled labor.
Skill Enhancement	Whether there will be skill enhancement at the facility to enable the employees secure jobs in similar developments once the plant has been decommissioned	The setting up of the glass bottle manufacturing plant will require highly skilled, skilled semi- skilled and unskilled labor. The unskilled have to be supervised by the skilled personnel, however, the unskilled will be presented with an opportunity to learn from the skilled as they work together.
Impacts on air quality	How the dust generated from construction will be managed	The contractor will implement dust suppression measures including, sprinkling water, undertaking excavation works when its less windy, use of road signage, dust traps and speed reduction as appropriate and applicable The contractor will regularly engage the neighboring business establishments whenever activities that are likely to cause nuisance or disturbance are planned
Wastewater Management	How will the wastewater from the factory be managed? They sort to know whether waste water will be into the ocean	Wastewater shall be managed using an onsite wastewater treatment plant. The treated water shall be reused within the factory premises. There shall be no release of wastewater outside the factory premises
Corporate Social Responsibility (CSR)	Request for scholarship for bright students coming from needy families in the area. Improve educational facilities in the area	CSR activities will be determined in consultation with community members and will take into account the greatest area of challenge to the people.
Contractor Management	How the proponent will manage the Contractor and ensure they honor the agreements especially with the local communities and residents	The Construction activities will be managed by a HSE Officer to ensure recommendations made in the ESIA are implemented by the contractor Additionally, the Proponent will hire a Community Liaison Officer from the community who will handle

		grievances related to the project and ensure that they are addressed appropriately.
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CHAPTER SIX

6.0 IMPACT DESCRIPTION AND ASSESSMENT

This chapter describes and assesses the significance of potential impacts related to the proposed glass bottle manufacturing plant, as described in Section 3. The potential impacts described in this chapter have been identified by the ESIA project team with input from stakeholders and I&APs. The sequence in which these issues are listed are in no order of priority or importance.

All identified impacts are considered in a cumulative manner such that the impacts of the current baseline conditions on and surrounding the site and those potentially associated with the project are discussed and assessed together.

Mitigation measures to avoid, reduce, remediate or compensate for potential impacts are provided, as are optimization measures to enhance the potential benefits. The mitigated assessment assumes that technical design controls, as well as mitigation measures would be included in the detailed design of the plant and implemented when the plant is constructed and operated.

6.1 Impact on Biophysical Environment

6.1.1 Issue: Increase in ambient air concentrations

Description of impact:

Development of the site and operation of the plant presents activities that would contribute to ambient air concentrations. Pollutants of concern associated with the proposed project include particulate matter (PM), sulfur dioxide (SO₂) and nitrogen dioxide (NO₂). The site is located within the Dongo Kundu Special Economic Zone in Mombasa. Ambient concentrations for PM_{2.5} and PM₁₀ in the region have been recorded to exceed Kenyan daily and annual average limits. Baseline Ambient air quality in the project area was conducted through Zonal Laboratory Ltd between 24th – 26th February 2026 at selected locations within and around the project site. The monitoring aimed to establish background concentrations of key air pollutants including particulate matter (PM_{2.5} and PM₁₀), sulfur dioxide, (SO₂), carbon monoxide (CO₂), nitrogen oxides (NO_x), and ozone (O₃), as well as local meteorological conditions (temperature, humidity, wind direction, and wind speed).

Measured PM_{2.5} concentrations ranged between 7.9–14.5 µg/m³, while PM₁₀ concentrations were between 15.7–28.7 µg/m³ across all monitoring locations. These values are well below the limits prescribed under the Environmental Management and Coordination (Air Quality) Regulations, 2014 (PM_{2.5} – 75 µg/m³; PM₁₀ – 100 µg/m³), indicating that the area is currently subject to low levels of particulate pollution.

Sulfur Dioxide (SO₂): Background concentrations ranged from 10.2–23.2 mg/m³, well below the regulatory limit of 80 µg/m³. This indicates negligible industrial SO₂ emissions in the vicinity.

Carbon Monoxide (CO): Observed concentrations ranged from 0.05–0.09 mg/m³, significantly lower than the EMCA threshold of 2.0 ppm (~2.26 mg/m³). This low CO concentration reflects the limited combustion sources in the area, consistent with the rural setting.

Nitrogen Oxides (NO_x): Levels ranged between 11.9–18.1 µg/m³, below the 80 µg/m³ regulatory limit, indicating minimal vehicular or industrial NO_x emissions.

Ozone (O₃): Measured concentrations ranged between 17–28 µg/m³, which are typical of rural background conditions and well within ambient limits.

The construction phase presents activities that are temporary in nature. The operational phase would present more long-term activities and related emission sources. It is expected that residential facilities would be most vulnerable to health risks from air quality.

Greenhouse gas (CO₂) emissions from the operations are likely to arise primarily from fuel combustion in the boilers/vehicles (direct) and the consumption of imported electricity (indirect).

Impact assessment:

During construction dust generated from vegetation clearing, soil grubbing, material handling and the movement of vehicles on unsurfaced areas may contribute to elevated particulate matter levels in the air. In addition, wind erosion from exposed materials could also contribute to elevated particulate matter levels. This could result in increased dust fall on a local scale and higher particulate matter loads. Emissions would also be generated by vehicles and other combustion-driven equipment (e.g. generators) that release Nitrogen Oxides (NO_x), carbon dioxide (CO₂), carbon monoxide (CO) and volatile organic compounds (VOC). With mitigation, and given that the construction phase is short term/temporary, the overall intensity and consequence of potential impacts would be low. The related significance is considered to be **LOW** without mitigation and **VERY LOW** with mitigation.

Operational activities present the most potential for negative air quality impacts. Gaseous pollutants would be generated from fuel combustion in the furnace (Sources of SO₂ and NO_x), emissions generated by vehicle engines and other combustion-driven equipment (e.g. generators) (Sources of NO_x, CO₂, CO and VOC). Particulate emissions would arise from materials handling in the batch plant and entrainment from vehicles on paved roads (contributing to increased dust fall and particulate fractions). All of these activities would be conducted over for the life of the plant.

The assessment considers the more significant impacts associated with PM_{2.5} and PM₁₀ emissions. The impact on air quality and the related inhalation health impacts is considered to be of **HIGH** significance without mitigation and **LOW to MEDIUM** significance with design controls and additional mitigation.

Mitigation:

The following measures are recommended:

- Design and manage the facility to conform to the Third Schedule of the Environmental Management and Co-ordination (Air Quality) Regulations, 2024
- Design and manage the emissions control equipment on the batch plant to achieve 98% control efficiency.
- Mitigation of vehicle entrainment emissions from the unpaved access roads using through watering; strict enforcement of speed limits (maximum 20 km/h on access roads); covers for vehicles; and regular clean-ups of road spillages.

Monitoring

The following monitoring is recommended:

- Dust fall and fine particulate monitoring.
- Conduct Emissions monitoring in accordance with the reporting requirements for glass works.
- Implementation of the reporting procedures.

Table 13: Increase in Ambient Air Concentrations

Issue: Increase in ambient air concentrations		
Phases: All, primarily operations		
Criteria	Without Mitigation	With Mitigation
Intensity	Prominent change, disturbance or nuisance	Minor change, disturbance or nuisance
Extent	Long-term	Long-term
Duration	Local area, beyond the site boundary	Whole site
Consequence	High	Medium
Probability	Probable	Possible
Significance	High	Low to Medium
Nature of cumulative impacts	Depending on the type of developments within the area, additional contributions to air quality impacts could occur.	
Degree to which impact can be reversed	Fully on cessation of operations.	
Degree to which impact may cause irreplaceable loss of resources	Possible.	

Degree to which impact can be mitigated	High for direct impacts.
Residual impacts	With design controls and mitigation, it is unlikely that air quality health issues would be felt beyond the life of the project.

6.1.2 Issue: Loss of agricultural soil resource through physical disturbance

Description of impact:

Construction and operation of the infrastructure and related services has the potential to damage soil resources through physical disturbance including removal, compaction and/or erosion.

Soil, and more specifically topsoil, is considered a valuable resource that supports a variety of ecological systems including providing a growth medium for most vegetation. Its disturbance and loss should be prevented wherever this is avoidable. Given the potential for the plant to have a life in excess of 20 years, the loss of soil is considered from the perspective of its value as a growth medium to support rehabilitation and landscaping of disturbed areas post construction and its beneficial use to third parties where excess soil cannot be used on site.

Impact assessment:

Site preparation and earthworks will require the removal and stockpiling of soil. Improper recovery and separation of soil could result in topsoil being left under infrastructure or mixed with fill and spoil material and thus lost. Improper handling of the soils could compromise the soil structure and functionality. Vehicle and machinery movement could result in the compaction of soil. In the case of compaction, the soils' functionality would firstly be compromised through a lack of rooting ability and aeration, and secondly the compacted soils are likely to erode because with less inherent functionality there would be little chance for the establishment of vegetation and other matter that naturally protects the soils from erosion. Disturbed and exposed soils are susceptible to erosion (through action of wind or water) as a result of the lack of vegetative cover and friability of the soil structure. The soil on site is considered to be highly erodible and if erosion occurred on disturbed areas the soils would be lost from the site.

The above impacts are expected to occur during the construction phase. A site boundary was established around the site. With the establishment of the boundary wall, the impacts would therefore be limited to the project site. During operations, once landscaping has taken place, no further physical disturbance of soils is expected.

Stripping and handling of soils would affect the inherent functionality of the soil and the soil would be permanently lost from the area. The soils on site are however considered to be of low to moderate agricultural potential. With mitigation that ensures appropriate stripping, handling and beneficial use of topsoil the significance of any impacts

can be reduced. The loss of agricultural soil resources through physical disturbance is considered to be of **MEDIUM** significance without mitigation and **VERY LOW to LOW** significance with mitigation.

Mitigation:

The following measures are recommended:

- Limit the project footprint to that identified in this report.
- Establish the site boundary (as presented in this report) at the start of construction and keep all activities within this boundary.
- Restrict vehicle and machinery movement to designated areas.
- Strip, store and maintain soils in line with the soil management plan (including measures for erosion control).
- Rehabilitate and landscape disturbed areas not occupied by infrastructure.
- Identify beneficial uses for excess topsoil that cannot be used on site. This could include sale to third parties.

Table 14: Loss of agricultural soil resource through physical disturbance

Issue: Loss of agricultural soil resources through physical disturbance		
Phases: Planning and Design, Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance	Moderate change or disturbance
Extent	Long-term	Short-term
Duration	Whole site	A part of the site
Consequence	Medium	Low
Probability	Definite	Probable
Significance	Medium	Very Low to Low
Nature of cumulative impacts	Loss of soils due to other developments within the same area could contribute to cumulative impacts. The area, however, is earmarked for industrial use as part of the Dongo Kundu Special Economic Zone and therefore a cumulative loss of soils across the earmarked area is unavoidable.	
Degree to which impact can be reversed	The loss of in-situ soils is irreversible, however where mitigation can be applied the soil can be used for beneficial uses.	

Degree to which impact may cause irreplaceable loss of resources	High
Degree to which impact can be mitigated	Moderately high
Residual impacts	Once soil is removed from in-situ and handled, the area of land and natural soil functionality would be permanently lost. The beneficial use of the soil would limit the residual impact.

6.1.3 Issue: Loss of agricultural soil resource through contamination

Description of impact:

Construction and operation of the plant site and related services has the potential to damage soil resources through contamination.

Soil, and more specifically topsoil, is considered a valuable resource that supports a variety of ecological systems including providing a growth medium for most vegetation. Its disturbance and loss should be prevented wherever this is avoidable. Given the potential for the plant to have a life in excess of 20 years, the loss of soil is considered from the perspective of its value as a growth medium to support rehabilitation and landscaping of disturbed areas post construction and its beneficial use to third parties where excess soil cannot be used on site.

Impact assessment:

Contamination of soil resources could occur through potential spillages from the use and handling of fuels, lubricants and other potential contaminants. Additionally, dirty surface water runoff or effluent from activity areas and poor waste management practices could result in soil contamination. This could alter the soil composition, negatively impacting on the chemistry of the soils such that current growth conditions are impaired. Contamination of soils also has the potential to indirectly (through runoff and seepage) impact surface and groundwater resources.

Sources of contamination exist during both the construction and operational phases. During construction the scale of events would be small. Although events may occur frequently, these would generally be of a negligible intensity. Standard construction controls should eliminate the majority of the risk. Contamination of soil resources is considered to be of **LOW** significance without mitigation and **VERY LOW** significance with mitigation (not shown in the table).

During operations it is expected that the scale and frequency of contaminant events would be relatively low given the control measures that are planned for the project. Contamination of soil resources is considered to be of **LOW to MEDIUM** significance without mitigation and **VERY LOW** significance with mitigation (see Table below).

Mitigation:

The following measures are recommended:

- Contain potential contamination at source.
- Prevent and manage spills.
- Manage waste generated on site.
- Handle major spillage incidents in accordance with the emergency response procedure.

Table 15: Loss of agricultural soil resource through contamination

Issue: Loss of agricultural soil resources through contamination		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Prominent change or disturbance	Moderate change or disturbance
Extent	Medium term	Short term
Duration	A part of the site	A part of the site
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	Low to Medium	Very Low
Nature of cumulative impacts	Contamination incidents from/of surrounding land uses could add to the loss of resources if not mitigated.	
Degree to which impact can be reversed	Partially reversible where bioremediation of soils takes place.	
Degree to which impact may cause irreplaceable loss of resources	High	
Degree to which impact can be mitigated	High	
Residual impacts	With mitigation, no residual impacts are expected.	

6.1.4 Issue: Increase in disturbing noise levels affecting potential human receptors

Description of impact:

Construction and operation of the plant as well as project-related traffic presents activities that would contribute to current ambient noise levels. Project activities have the potential to cause a noise disturbance and/or nuisance at potentially sensitive receptors. The ambient noise levels at the proposed development site and its environs were between 57.3dB (A) and 67.1dB (A) during the day, and 47.5dB (A) - 52.8dB (A) during the even

Noise pollution will have different impacts on different receptors because some are very sensitive to noise and others are not. It is expected that residential and educational facilities would be most vulnerable to noise disturbances from the proposed project. The noise threshold expected to cause a behavioral response by cattle is 85 to 90 dB.

Noise Levels

Zonal Laboratory Ltd undertook a specialist environmental noise survey at the proposed project site and its environs. In the noise survey, reference was made to the First and Second Schedule Maximum Permissible noise levels in the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

The major noise generating sources during the construction phase are chain saws for cutting trees at the site, vehicular traffic, construction equipment like dozer, scrapers, concrete mixers, cranes, generators, pumps, compressors, rock drills, pneumatic tools, vibrators, piling machine etc. The operation of these equipment will generate noise ranging between 75 – 120 dB (A).

Impact assessment:

When considering material handling and vehicle movement on site, these will make use, to varying degrees, of reverse alarms and hooters. If unmitigated these could result in numerous noise complaints, especially where these activities take place at night.

Impacts are expected in both the construction and operational phases. The impact on human noise receptors is considered to be of **MEDIUM** significance without mitigation and **LOW** significance with mitigation (see Table below).

Mitigation:

The following measures are recommended:

- Design and construct the plant to have the lowest noise emissions where possible.
- Enclose noise generating equipment and machinery.
- Implement a maintenance programme to keep all equipment and machinery in proper working order.
- Limit non-routine noisy activities to day-time hours.
- If monitoring indicates noise levels at the neighboring residential areas exceed 85 dB (A), implement screens.
- Register and address any noise complaints.

Monitoring

The following monitoring is recommended:

- Annual noise monitoring at the site and the neighboring residential areas.
- Noise monitoring in response to complaints received.

Table 16: Increase in disturbing noise

Issue: Increase in disturbing noise levels affecting potential human receptors		
Phases: All, primarily operations		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change, disturbance or discomfort	Negligible change, or disturbance nuisance
Extent	Long-term, to end of operations	Long-term, to end of operations
Duration	Beyond the site boundary, affecting immediate neighbors	Whole site
Consequence	Medium	Low
Probability	Probable	Probable
Significance	Medium	Low
Nature of cumulative impacts	Developments within the area could contribute to increased noise impacts on third party receptors. The developments, however, are likely to fit within the existing and planned commercial/industrial use of the area.	
Degree to which impact can be reversed	Low.	
Degree to which impact may cause irreplaceable loss of resources	Not applicable.	
Degree to which impact can be mitigated	Medium to High.	

Residual impacts	With mitigation it is unlikely that noise induced stress and related health issues would be felt beyond the life of the project.
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6.1.5 Issue: Loss of terrestrial habitat and biodiversity through physical disturbance Description of impact

Construction of the plant infrastructure and related services has the potential to damage soils and vegetation and the biodiversity these support through physical removal and disturbances, both direct and indirect.

Natural habitat and biodiversity are considered important natural resources that support sustainable ecological systems and ultimately provide ecosystem services that add value to human life. Although the site currently consists of secondary grassland, which had previously undergone extensive modification and then subsequently returned to a 'grassland' state. The secondary nature of the vegetation, ongoing grazing regime and development in surrounding areas has resulted in limited species diversity and a habitat that is considered to be of moderately low to low ecological importance and sensitivity.

Impact assessment

Site preparation and earthworks would result in removal of vegetation and soils. The development of infrastructure over these areas would completely transform the site, rendering it unavailable as habitat for flora and fauna. Vehicle and machinery movement, material storage and handling and other construction activities are likely to result in trampling of vegetation and compaction of soils in the adjacent areas. This would dramatically reduce the habitat quality and alter biodiversity. Such areas could be partially restored during landscaping and rehabilitation such that certain naturally occurring flora and fauna occupy the site. Approximately 6 ha would be permanently lost as natural habitat.

The increased level of activity (the presence of people, vehicles, machinery and related noise) would render the site and adjacent surrounds less suitable as habitat for faunal species, except those adapted to high levels of anthropogenic activities. The loss and transformation of habitat as well as increased levels of disturbance would also render the site less suitable as a corridor for the movement of biodiversity between remaining habitats in the region. The establishment and spread of alien invasive floral species as a result of disturbances could further degrade habitat and limit food availability of various faunal species.

The above impacts are expected to mainly occur during the construction phase. During operations, once landscaping has taken place and a site boundary established, no further physical disturbance of vegetation is expected. However the activity and noise disturbances would continue for the duration of the operation. The impact on the terrestrial biodiversity resources is considered to be of **MEDIUM** (during construction) and **VERY LOW** (during operations) significance without mitigation and **LOW** (during construction) and **VERY LOW** (during operations) significance with mitigation (see Table below).

Mitigation

The following measures are recommended:

- Implement soil mitigation measures.
- Manage waste generated on site.
- Limit the project footprint to that identified in this report.
- Restrict vehicle and machinery movement to designated areas.
- Provide appropriate sanitary facilities.
- Manage alien invasive plant species
- Rehabilitate and landscape disturbed areas not occupied by infrastructure.
- Utilize locally appropriate, indigenous plant species in the landscaping.
- Promote natural landscapes rather than park-type landscapes.
- Handle major spillage incidents in accordance with the emergency response procedure.

Table 17: Loss of terrestrial habitat and biodiversity

Issue: Loss of terrestrial habitat and biodiversity through physical disturbance		
Phases: Primarily construction, limited risk during operations		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance (Minor during operations)	Minor (Slight) change or disturbance (Negligible during operations)
Extent	Long-term, to end of operations (Medium-term during operations)	Medium-term (Very short during operations)
Duration	Beyond the site boundary, affecting immediate neighbors	Whole site.
Consequence	Medium (Low during operations)	Low (Very Low during operations)
Probability	Definite/ Continuous (Possible during operations)	Definite/ Continuous (Conceivable during operations)
Significance	Medium (Very Low during operations)	Low (Very Low during operations)

Nature of cumulative impacts	The loss of natural habitat would be cumulative with other historic and ongoing transformation of grassland for development. The area is earmarked for development (Within the Dongo Kundu Special Economic Zone) and does not form part of regional biodiversity conservation targets.
Degree to which impact can be reversed	Removal of the facility and rehabilitation of the land would reverse the impact, at least in part. However, this is considered unlikely. Once developed as an industrial site, future use would likely remain industrial/commercial. The impact is not reversible.
Degree to which impact may cause irreplaceable loss of resources	Low. The site does not host any species of conservation concern or other irreplaceable resources.
Degree to which impact can be mitigated	Moderate.
Residual impacts	The permanent loss of approximately 6 ha of natural habitat.

6.1.6 Issue: Loss of wetland habitat and biodiversity through physical disturbance Description of impact

Construction of the plant infrastructure and related services has the potential to damage wetlands (soils and vegetation) and the biodiversity these support through physical removal and disturbances, both direct and indirect.

Wetlands are important freshwater resources that ultimately provide essential ecosystem services (e.g. water purification, water retention, flood reduction). Although the site does not contain any wet areas, activities at the site could impact wetland areas downstream.

Impact assessment

The impact on wetland habitat is considered to be of **LOW** significance without mitigation and **VERY LOW** significance with mitigation. Operation of the plant is not anticipated to result in loss of wetland habitat.

Mitigation

The following measures are recommended:

- Limit the project footprint to that identified in this report.
- Restrict vehicle and machinery movement to designated areas.

Table 18: Loss of wetland habitat and biodiversity

Issue: Loss of wetland habitat and biodiversity through physical disturbance		
Phases: Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Minor (Slight) change or disturbance	Negligible change
Extent	Whole site.	A part of the site.
Duration	Medium-term	Medium-term
Probability	Low	Very Low
Consequence	Probable	Conceivable
Significance	Low	Very Low
Nature of cumulative impacts	The loss of wetland habitat would be cumulative with other historic and ongoing transformation for development. The area is earmarked for development (at Dongo Kundu Special Economic Zone) and does not form part of regional biodiversity conservation targets.	
Degree to which impact can be reversed	Removal of the facility and rehabilitation of the land would reverse the impact, at least in part. However, this is considered unlikely. Once developed as an industrial site, future use would likely remain industrial/commercial. The impact is not reversible.	
Degree to which impact may cause irreplaceable loss of resources	Low. The wet areas are not with the project site.	
Degree to which impact can be mitigated	High.	
Residual impacts	With mitigation, impacts on downstream wetland will be insignificant	

6.1.7 Issue: Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality

Description of impact

Aquatic habitats are considered important natural resources that support sustainable ecological systems and ultimately provide essential ecosystem services (e.g. water purification, water retention, flood reduction). The nearest natural freshwater resources to the site are Kaya Mrongondoni and Kaya Tembo which are approximately 1.2km and 2km respectively from the project site. The aquatic habitat in the Mrongondoni and Tembo Kayas are currently of a low ecological state and sensitivity. Water quality and aquatic habitats in these systems are under threat due to anthropogenic stresses.

Contaminated run-off from the site and the release of treated effluent from the sewage package plant has the potential to affect freshwater habitats through changes in flow and water quality, thus affecting aquatic biodiversity in the downstream environment.

Impact assessment

Earthworks during construction could increase sediment loads in storm water runoff and contaminants arising from spillages of fuels, lubricants and paints as well as poor waste management could be transported downstream to the water sources. This would reduce the water quality in these important water sources and impact aquatic habitat and related biodiversity.

During operations attenuated storm water from the site would be clean (as dirty activities would only be undertaken within contained areas) and therefore would not contribute to any contamination impacts. Sediments accumulating on the roads and paved surfaces may be washed to the downstream water sources.

The sewage package plant would be designed and operated to achieve effluent qualities compliant with the NEMA discharge standards and the quality parameters in the Environmental Management and Co-ordination (Water Quality) Regulation, 2024. The released effluent would wash downstream and could impact on surface and ground water sources. Baseline ground water quality was conducted in neighboring borehole and the quality of water was found to comply with Kenyan Standard Specification for portable water. Where poor quality discharge is released into the environment, this would degrade aquatic habitats and related biodiversity. Where discharge of treated effluent is at the same quality as the majority of the flow in the natural drains, it is not anticipated to cause a detectable impact to freshwater habitat or aquatic biodiversity.

Construction impacts would be of short duration and would occur away from the natural water resource. Any contamination, if significant, could be long-term. During operations impacts are likely to be limited to those associated with discharge from the site, as soils/vegetation would not continue to be disturbed and contaminants would be contained and handled in banded areas.

The assessment considers the more significant impacts associated with discharges during operations. Disturbance of the downstream natural aquatic habitat and related biodiversity is assessed to be of **LOW to MEDIUM** significance without mitigation and **LOW to VERY LOW** significance with mitigation (see Table below).

Mitigation

The following measures are recommended:

- Undertake the primary earthworks activities in the drier months.
- Implement soil management measures.
- Operate the sewage treatment plant to achieve the NEMA discharge standards.
- Only release treated effluent which complies with the standards authorized in terms of the Environmental Management and Co-ordination (Water Quality) Regulations, 2024.
- Construct conservancy tanks for the treatment plant to store effluent during periods of maintenance.

Monitoring

The following monitoring is recommended:

- Test the quality of the effluent prior to release to ensure that only effluent of an acceptable standard is being released to the receiving environment.
- Monitor water quality in the Kaya Mrongondoni and Kaya Tembo biannually through a NEMA accredited laboratory.

Table 19: Disturbances of aquatic habitat and related biodiversity

Issue: Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality		
Phases: All, primarily operations		
Criteria	Without Mitigation	With Mitigation
Intensity	Minor change or disturbance	Minor change or disturbance
Extent	Long term, to end of operations	Long term, to end of operations
Duration	Local area, extending beyond the site boundary	Local area, extending beyond the site boundary
Consequence	Medium	Medium
Probability	Possible	Unlikely
Significance	Low to Medium	Very Low to Low
Nature of cumulative impacts	The contribution of the project to the cumulative impact is insignificant.	

Degree to which impact can be reversed	The impact could begin to be reversed on cessation of discharge.
Degree to which impact may cause irreplaceable loss of resources	Unlikely. Existing ambient conditions in the Vaal tributary are such that the discharge is unlikely to cause irreplaceable loss.
Degree to which impact can be mitigated	Mitigation is not required as it forms part of the plant's design and operating conditions.
Residual impacts	None.

6.1.8 Issue: Alteration of drainage patterns affecting the flow of water in downstream systems

Description of impact

Water for the project will be sourced from a bore well to be drilled at the project site.

The project will introduce large areas of impermeable land cover, which could if not mitigated, increase the volume of runoff generated during a storm event. This could alter drainage patterns and result in the flooding of downstream systems (flash floods). Where any discharges take place, this could increase flows within downstream systems and the risk of flooding. Discharges from the project site include treated domestic sewer effluent, treated industrial plant effluent and attenuated storm water.

Post development Flood-lines

It is likely that the project's discharge at the site would increase the flood height and would have a limited effect on the low-lying areas of the site. By limiting the project's discharge rate (i.e. by constructing a large attenuation pond) any flooding risk to the site could most likely be prevented. Alternatively, the glass bottle manufacturing plant's platform could be raised above the potential flood water surface elevation by lifting it by approximately 80 cm (at the lowest elevation). Construction of storm water channels, if required, should be considered in consultation with other developers in the area.

Impact assessment

Implementation of the project would result in increased runoff flows due to hard standing areas within the plant. These storm water management measures would ensure that storm water run-off would have minimal effects on the natural flow regime, under regular rainfall events. The development should consider constructing a large attenuation pond to limit storm water discharges.

Operation of the sewage package plant would result in the generation of treated sewage effluent daily. While a number of alternatives for reuse and recycling of the treated effluent would be investigated, it is likely that most (or all) of the treated effluent would be discharged to the environment.

Alterations to drainage patterns would commence at the start of the construction phase as the site is developed, and reach a maximum discharge volume during operations. Without considering the flood-lines and in the absence of storm water controls, this could result in a prominent change in drainage patterns.

An alteration of drainage patterns affecting the flow of water in downstream systems is assessed to be of **MEDIUM** significance without mitigation and **LOW** with mitigation (see Table below).

Mitigation

The following measures are recommended:

- Inspect and maintain the storm water management system in a functional state.
- Reuse and recycle treated effluent within the plant as far as possible.
- Design and construct a storm water attenuation pond within the site.
- Ensure the discharge channels have suitable gradient and liner to provide effective operation and prevention of erosion.
- Develop and maintain a dynamic climatic water balance for the site to inform water uses on site, attenuation of storm water and discharge requirements.

Monitoring

The following monitoring is recommended:

- Measure flows within the plant and discharge volumes on a continuous basis (i.e. flow meters).
- Undertake regular inspections and maintenance of the drainage channels.

Table 20: Alteration of drainage patterns affecting the flow of water in downstream systems

Issue: Alteration of drainage patterns affecting the flow of water in downstream systems		
Phases: All, primarily operations		
Criteria	Without Mitigation	With Mitigation
Intensity	Prominent change or disturbance	Moderate change or disturbance
Extent	Beyond the site boundary, affecting immediate neighbors	A part of the property
Duration	Long-term	Long-term
Consequence	Medium	Medium
Probability	Probable	Possible

Significance	Medium	Low
Nature of cumulative impacts	Where developments take place upstream of the site and within the same sub catchment, discharges (depending on the discharge flow and rate) could increase flow in the system and increase the risk of downstream flooding. In this case further limitation of storm water discharge rates may be required, or the plants floor level should be raised.	
Degree to which impact can be reversed	Fully on cessation of discharge.	
Degree to which impact may cause irreplaceable loss of resources	Unlikely.	
Degree to which impact can be mitigated	High with the implementation of appropriate engineering design.	
Residual impacts	None expected.	

6.1.9 Issue: Discharges from the project affecting the quality of downstream freshwater resources

Potential contamination impacts on surface water resources as a result of runoff or discharge from the project has been assessed from the perspective of aquatic ecosystems. It is assumed that if impacts on freshwater resources are mitigated in a way that addresses potential impacts on the aquatic ecosystem, then any potential impacts on human uses of downstream resources would indirectly be mitigated.

6.1.10 Issue: Contamination of groundwater quality affecting the aquifer

Description of impact

Groundwater is a valuable resource and is defined as water which is located beneath the ground surface in rock pore spaces and in the fractures of lithological formations. Activities on surface could result in seepage of contaminants into the groundwater system.

Impact assessment

Water for the project will be sourced from a bore well which shall be drilled at the project site. Baseline ground water quality in a neighboring plot's borehole was conducted by Zonal Laboratory Ltd. Seepage from spillages of fuels, lubricants and other potential contaminants as well as dirty surface water runoff or untreated effluent from activity areas could result in contamination of groundwater resources. Based on the material, expected size and expected

frequency of spills a moderate reduction in groundwater quality could occur. Even though sources of contamination can be temporary in nature, related potential contamination can be long term. Potential contaminant plume would occur due to the circulation of groundwater within the geological formations that occur in the area. There is a borehole located about 50m from the project site. The aquifer on site has a high permeability and water circulates quickly within the formation therefore contaminant impacts on third party users are anticipated.

During construction the scale of spills and related seepage events would be small. Although events may occur frequently, these would generally be of a negligible intensity. Standard construction controls should eliminate the majority of the risk. Contamination of soil resources is considered to be of **LOW** significance without mitigation and **VERY LOW** significance with mitigation (not shown in the table).

During operations contamination of the aquifer is unlikely given the control measures that are planned for the project. Contamination of the aquifer would be of **LOW to MEDIUM** significance without mitigation and **VERY LOW** significance with mitigation (see Table below).

Mitigation

The following measures are recommended:

- Store and handle all contaminants in areas with engineered containments.
- Manage waste generated on site.
- Implement spill prevention and effluent design controls measures.
- Implement soil mitigation measures.

Monitoring

The following monitoring is recommended:

- Monitor groundwater quality biannually through a NEMA accredited laboratory.

Table 21: Contamination of groundwater

Issue: Contamination of groundwater quality affecting the aquifer		
Phases: Planning and Design, Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance	Minor (Slight) change or disturbance
Extent	Long-term	Medium-term
Duration	Whole site	A part of the site boundary
Consequence	Medium	Low

Probability	Probable	Conceivable
Significance	Low to Medium	Very Low
Nature of cumulative impacts	Developments within the area could contribute to groundwater impacts depending on the type of development and if it is associated with any potential groundwater contamination sources.	
Degree to which impact can be reversed	Possible with pumping and treatment,	
Degree to which impact may cause irreplaceable loss of resources	Unlikely, with mitigation.	
Degree to which impact can be mitigated	High	
Residual impacts	Once soil is removed from <i>in situ</i> and handled, the area of land and natural soil functionality would be permanently lost.	

6.1.11 Issue: Alteration of the visual environment

Description of impact

Development of the plant and related services infrastructure has the potential to alter the visual environment and aesthetics of the site.

Visual/aesthetic value is the emotional response derived from the experience of the environment with its natural and cultural attributes. The response is usually to both visual and non-visual elements and can embrace sound, smell and any other factors having a strong impact on human thoughts, feelings and attitudes (Young, 2018).

Impact assessment

Development of the site will result in a series of structures which do not currently exist. These structures would have a physical presence and would change the fabric and character of the landscape. The proposed structures would contrast strongly with existing activities or facilities. The site is highly visible. The local community is likely to be sensitized to industrial development in this area. Residents of in the local area could have a higher sensitivity to the project. The visual exposure to the project would generally be a middle ground or more distant view.

The visual impact would occur incrementally during construction, reaching a peak as the structures are erected and then declining partially as the cladding, finishes and landscaping are installed. The impact on the visual environment is considered to be of **MEDIUM** significance without mitigation and of **LOW** significance with mitigation during operations (see Table below).

Mitigation

Limited mitigation is available during the construction phase however this is only expected to be for a two-year period. The following measures are recommended for construction:

- Only remove vegetation and topsoil where this is necessary.
- Implement dust suppression during construction.
- Rehabilitate and landscape disturbed areas not occupied by infrastructure.
- Establish indigenous tree screens along all the north, east and south of the site.
- Utilize locally appropriate, indigenous plant species in the landscaping.
- Maintain landscaped areas as natural rather than park-type landscapes.
- Paint structures with colors that reflect and compliment the surrounding landscape.
- Cladding and external surfaces of structures should be articulated or textured to create interplay of light and shade.
- Install light fixtures that provide precisely directed illumination.
- Avoid high pole top security lighting along the periphery of the site.
- Minimize the number of light fixtures, including security lighting, to the minimum required.

Table 22: Alteration of the visual environment

Issue: Alteration of the visual environment		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change, disturbance or discomfort	Minor (Slight) change, disturbance or nuisance
Extent	Long term, to end of operations	Long term, to end of operations
Duration	Local area, extending far beyond site boundary.	Beyond the site boundary, affecting immediate neighbors
Consequence	High	Medium
Probability	Possible/frequent	Conceivable

Significance	Medium	Low
Nature of cumulative impacts	The development fits within the planned commercial/industrial use of the area. Thus, while the change is noticeable at the site scale, it will not be considered significant at the area scale.	
Degree to which impact can be reversed	Removal of the facility and rehabilitation of the land would reverse the impact. However, this is considered unlikely. Once developed as an industrial site, future use would likely remain industrial/commercial. The impact is not reversible.	
Degree to which impact may cause irreplaceable loss of resources	While the visual environment and aesthetics of the site will be altered, the development will have its own character and no irreplaceable loss is anticipated.	
Degree to which impact can be mitigated	Appropriate use of architectural style, building materials and landscaping can mitigate that visual impact to a large degree.	
Residual impacts	No residual impact is anticipated. Once built the structure will form part of the altered visual environment and aesthetics of the site.	

6.2 Impact on Socio-Economic Environment

6.2.1 Issue: Economic impact (positive and negative)

Description of the impact

The development of a project of this nature has the potential to impact on the economy both positively through potential growth in the industry and agricultural sectors and diversification of the local economy and negatively through the potential loss of existing economic activities. This section focuses on the potential positive and negative economic impacts associated with the project and assesses these collectively.

Predicted Economic Values

The anticipated capital to establish the proposed glass bottle manufacturing operations is approximately Kshs. 6 billion. The proposed development is expected to increase the value of the current vacant land to equivalent or well above the going rate for other industrial land. The operation of the facility would create approximately 800 employment opportunities. Even when excluding the capital financial contribution, this project would contribute significantly more to the national and local economy in comparison to current or potential alternative land uses.

Impact assessment

There is predicted to be a direct positive economic impact on the local, regional and national economies in both the construction and operational phases. Approximately 800 temporary and 300 permanent jobs would be created in the construction and operational phases respectively. Direct benefits would be derived from wages, taxes and profits. Indirect benefits would be derived through the procurement of goods and services, and the increased spending power of employees. Positive economic impacts could include:

- Revenue generation over the life of the project;
- An income to the employees;
- Increase in secondary sectors supported by the demand of the project for construction materials, equipment, goods and services required for the ongoing plant operations.

In addition to the direct and indirect economic impacts discussed above, the project will through its corporate social investments, would contribute towards the local economic development in the area. The operation of the plant is anticipated to have the following positive socio-economic benefits to its employees and surrounding communities:

- Development of skills through its skills development plan;
- Learnership programmes to provide learners with an occupational qualification;
- Investment in infrastructure development through local economic development and integrated development programmes;
- SMME development.

The land needed for the project is owned by KPA and leased to the project proponent. Therefore, no negative economic loss is expected, even in the unmitigated scenario.

When considering alternative land uses feasible for the project site such as agriculture, the economic benefits of the plant are predicted to significantly outweigh the maximum revenue that could be realized from commercial farming.

The impact would occur from the start of the construction phase through to the operational phase. The overall significance is likely to be a **HIGH positive** without mitigation increasing to a **VERY HIGH positive** with mitigation (see Table below).

Mitigation

The following measures are recommended:

- Implement recruitment and procurement policies and procedures.
- Implement local corporate social investment strategies.
- Implement influx management plan.
- Implement health management plan for employees.

Table 23: Economic impact (positive and negative)

Issue: Economic impact (positive and negative)		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Prominent change or improvement	Substantial change or improvement
Extent	Long-term	Very long, permanent
Duration	Local area, extending far beyond the site boundary	Local area, extending far beyond the site boundary
Consequence	High	Very High
Probability	Probable	Probable
Significance	High (positive)	Very High (positive)
Nature of cumulative impacts	Any other feasible developments within the area would contribute to a positive economic impact.	
Degree to which impact can be reversed	Not applicable	
Degree to which impact may cause irreplaceable loss of resources	Not applicable	
Degree to which impact can be mitigated	High	
Residual impacts	Positive economic impacts could extend beyond the life of the plant through training and skills development.	

6.2.2 Issue: Social benefits associated with employment and economic development

Description of the impact

Unemployment is a key issue for the Dongo Kundu area. There are a high number of job seekers and discouraged workers, in part due to general economic downturn in Kenya. Low investment into the region combined with the generally poor economic conditions and high unemployment have led to the local and regional areas experiencing an economic depression.

The glass bottle manufacturing plant would be a substantial investment that has the potential to provide direct economic benefit at the local and regional level. Employment and economic development have the potential to improve livelihoods of individuals living in the local area through increased disposable income for individuals and households and the flow of revenue into local services and support sectors.

Impact assessment

A potential positive local social impact could occur in both the construction and operational phases. The direct impact of employment opportunities and indirect local economic improvement as well as local economic investment and development could contribute towards improving the quality of life for local communities. This may include increased disposable income for individuals and households.

New employment opportunities are likely to be of direct economic benefit at the local and regional level. The number of new employment opportunities associated with the project may, however, be limited for local people, as professional and skilled positions are likely to be brought in from other areas of Kenya or from outside Kenya. In addition, contractors may make use of existing staff during construction, which could limit the real number of new skilled, semi-skilled and unskilled opportunities. Despite this, there is likely to be an increase in employment locally, as the high number of opportunities during construction is likely to have a notable impact on the temporary employment sector. During operations, it is expected that any skilled individuals brought into the area would likely become local residents, potentially contributing towards local economic stability. Specific internal policy to provide opportunity to local persons would maximize the benefit.

The investment of capital into a new development project, such as the proposed project and the operation of the plant, would likely have a trickle-down effect in terms of supporting local industries and the flow of revenue into local services and construction sectors. This in turn supports the development of the local economy through enabling businesses to grow or maintain their economic contribution. A substantial operation such as the glass bottle manufacturing plant will require a wide variety of support services and material inputs which would provide opportunity for local businesses and service providers. The sourcing, management and provision of external cullet is a potential business opportunity. Where economic benefits are spread out over county or regional economies, the economic impact on local communities would likely be diluted.

The degree to which this project would benefit local people and communities depends on a number of factors. This includes, the number of new opportunities realized locally (i.e. not through existing contractors with staff from outside the local area), and the manner in which income is used to benefit households and individuals (that is, spending on

positive aspects such as education and food versus on negative social behavior such as drug and alcohol abuse). The latter aspect is outside of the control of the project, but the former can be improved through specific internal policy and implementation thereof.

Social benefits during the construction phase would be temporary (for a period of two years) and would likely be diluted due to the largely industrialized nature of the area and the very large local urban population. Greater benefits, however, could be secured where local labor and procurement are prioritized during the construction phase. A similar situation is expected during the operational phase, although employment could be longer and for the duration of the plant's operations. Nonetheless, the promotion of employment in Kenya is always supported and is seen as a direct positive benefit of the project. Permanent employment of local people would help in improving the livelihoods of individuals living in the local area.

The impact would occur from the start of the construction phase through to the operational phase. The overall significance is likely to be a **LOW** positive without mitigation increasing to a **MEDIUM** positive with mitigation (see Table below). Key to realizing the mitigated significance is to recruit employees and procure services locally as far as possible.

Mitigation

The following measures are recommended:

- Implement recruitment and procurement policies to prioritize local content and local employment.
- Implement local corporate social investment strategies.
- Implement health management plan for employees.

Table 24: Social benefits

Issue: Social benefits associated with employment and economic development		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Minor change or improvement (Negligible during construction)	Minor change or improvement
Extent	For the construction period (2 years) and then long term, to end of operations	For the construction period (2 years) and then long term, to end of operations
Duration	Regional / National	Regional / National
Consequence	High	High

	(Low during construction)	(Medium during construction)
Probability	Unlikely (Probable during construction)	Conceivable (Probable during construction)
Significance	Low (positive)	Medium (positive)
Nature of cumulative impacts	Any other feasible developments within the area would contribute to positive social benefits.	
Degree to which impact can be reversed	Not applicable, as this is a positive impact.	
Degree to which impact may cause irreplaceable loss of resources	Not applicable, as this is a positive impact.	
Degree to which impact can be mitigated	Possible for mitigation to increase the positive significance of potential impacts.	
Residual impacts	Residual impacts can occur, either positive or negative, depending on the manner in which income is used to benefit households and individuals (that is, spending on positive aspects such as education and food versus on negative social behavior such as drug and alcohol abuse).	

6.2.3 Issue: Changes in land value

Description of the impact

Development and operation of the site could impact on land values both positively and negatively. Positive impacts are observed where the project site value is expected to increase due to the capital investment and the fact that land zoned for industrial purposes in the project locality is valued higher than agricultural land. Negative impacts are observed when the value of land surrounding operations is compromised by unacceptable negative environmental and social impacts.

Impact assessment

The value of land with infrastructure is significantly higher than that for vacant land or even vacant agricultural land with medium agricultural potential. This provides an indication that the establishment of infrastructure will significantly increase the value of the land. Even without mitigation, an increase in property value is expected.

In the unmitigated scenario it is probable that land surrounding the project would experience unacceptable social and environmental impacts, which would likely cause a loss in related land values. In the scenario where the project successfully implements the stipulated environmental and social management measures, these impacts can be managed to acceptable levels. Although it is difficult to predict the potential changes in land value of surrounding properties, with mitigation it is expected that these would be positive.

The overall significance is likely to be a **MEDIUM negative** without mitigation increasing to a **LOW positive** with mitigation (see Table below).

Mitigation

The measures recommended in the ESMP should be implemented to prevent unacceptable negative environmental and social impacts.

Table 25: Changes in land value

Issue: Changes in land value		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance	Moderate change or improvement
Extent	Long term	Long-term
Duration	Beyond the site boundary, affecting neighbors	Beyond the site boundary, affecting neighbors
Consequence	Medium	Medium
Probability	Probable	Possible
Significance	Medium	Low (positive)
Nature of cumulative impacts	Any other feasible developments within the area could contribute to changes in land value, either positively or negatively.	
Degree to which impact can be reversed	Reversing negative impacts would be possible.	

Degree to which impact may cause irreplaceable loss of resources	Not applicable
Degree to which impact can be mitigated	High
Residual impacts	Changes in land value could extend beyond the life of the plant depending on the post-operational land use.

6.2 4 Issue: Reduction in grazing land affecting livelihoods of local farmers

Description of impact

The project site is open land comprising secondary grasslands which is used for informal livestock grazing. The livestock grazing is undertaken by the local farmers.

The dry land agricultural potential of soils that would be disturbed by the project is considered to be medium to low. The topsoil is sandy, erodible and has low natural fertility and would require careful nutrient management for crop production.

The proposed project site was zoned for industrial use. The proposed development is in keeping with the proposed land use for the area, namely industrial use and will contribute towards the economic development and infill of industrial area within the Dongo Kundu Special Economic Zone Development Framework.

Impact assessment

Development of the plant, with a site boundary of 6 ha, would result in a permanent change and a loss of this land for grazing purposes. The site constitutes informal grazing land used within the immediate area of the Dongo Kundu area and is used throughout the year. The site is located on government-owned land (Under Kenya Ports authority) and was leased to the Proponent (Milly Glass SEZ Ltd). There is no formal agreement in place (legal or verbal) to use this site for grazing. However, this land together with the surrounding vacant land is indicated to have been used informally for grazing for the longest period of time. Other areas already used for grazing could continue to be used. While the livestock owners do not have any legal right to the use of the land, they do rely on the land to support their livelihoods.

The loss of grazing land, could result in the farmers needing to buy additional feed to supplement grazing of the cattle. The loss of grazing land is unlikely to undermine future grazing practices but may increase existing grazing pressures.

The impact would occur from the start of the construction phase through to the operational phase. The overall significance is likely to be a **LOW** negative without mitigation increasing to a **VERY LOW** positive with mitigation and implementation of the potential benefits (see Table below).

Mitigation

No direct mitigation is possible and as potential alternative land in the area is already being used for grazing. However, as the impact is of low significance, mitigation is not required. The only concession would be for grazing to continue on areas surrounding the site until such time those areas are also developed. Where Corporate Social Responsibility initiatives (or similar plans) are considered for the project, preference should be given to the local farmers.

Table 26: Reduction in grazing land

Issue: Reduction in grazing land affecting livelihoods of local farmers		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Minor change or disturbance	Negligible change (positive)
Extent	Long term	Long term
Duration	Whole site	Whole site
Consequence	Medium	Low
Probability	Possible	Possible
Significance	Low (negative)	Very low (positive)
Nature of cumulative impacts	Where other developments are established within the kraal's informal grazing area, the cumulative loss of grazing land would increase.	
Degree to which impact can be reversed	Unlikely	
Degree to which impact may cause irreplaceable loss of resources	The loss of land as a resource for informal grazing would be permanent.	
Degree to which impact can be mitigated	Possible to some extent through Corporate Social Responsibility initiatives.	
Residual impacts	No residual impacts expected	

6.2.5 Issue: Disturbance to third party road users by project-related traffic

Description of impact

The positioning of the project with good access to the Mombasa southern Bypass (Dongo Kundu) road is important as the facility would receive large volumes of raw materials and distribute large volumes of glass bottles. The existing road network surrounding the site is a well-established public road network used for motorized transport. It provides good access to Mombasa City. Increased traffic on existing public road networks and introduction of heavy vehicles, in both the construction and operational phases, can result in reduced road capacity, greater accidents (for people and animals) and/or increased road damage. This in turn can put pressure on the relevant roads authority to increase the maintenance programmes and/or upgrade the roads.

Impact assessment

Project-related traffic has the potential to cause congestion on the roads due to an increase in light and heavy vehicles, degrade roads due to the type of vehicles and/or a result in a number of incidents which could cause serious injury and/or death to third parties including pedestrians and animals. This applies to both the construction and operational phases. The construction phase would present abnormal heavy loads, although these are expected to be infrequent, while the construction and operational phases would require the transport of hazardous materials. In the absence of mitigation that focuses on increasing the Southern bypass (Dongo Kundu) road and the access point to the plant would present a potential risk to third party road users.

The overall significance is likely to be a **HIGH** (negative) without mitigation improving to **LOW** (positive) with design controls and mitigation (see Table below).

Mitigation

The following measures are recommended:

- Implement traffic upgrades in line with traffic specialist study.
- Maintain road and traffic upgrades.
- Maintain all equipment and vehicles in proper working order
- Take care when placing signage in close proximity of access points.
- Co-ordinate the transport of any abnormal heavy loads with the relevant roads department.
- Comply with NEMA requirements for the transport of any hazardous substances.
- Report any issues pertaining to damages and poor road conditions in close proximity of the project to the applicable authority and custodian of the respective roads.
- Handle any road accident involving or caused by project related traffic in accordance with the emergency response procedure.

Monitoring

The following monitoring is recommended:

- Monitor and evaluate use of relevant road intersections.

Table 27: Disturbance by project-related traffic

Issue: Disturbance to third party road users by project-related traffic		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate disturbance	Prominent improvement
Extent	Long term	Short term
Duration	Local area, beyond the site boundary	Whole site
Consequence	High	Medium
Probability	Definite	Conceivable
Significance	High (negative)	Low (positive)
Nature of cumulative impacts	With the development of other commercial/industrial facilities in the area, the impacts on traffic would increase	
Degree to which impact can be reversed	Any accidents that occur as a result of project related traffic is non-reversible.	
Degree to which impact may cause irreplaceable loss of resources	Could result in serious injury or death of people or animals.	
Degree to which impact can be mitigated	High	
Residual impacts	Any accidents that occur as a result of project related traffic would likely have residual impacts. The potential for accidents would, however, cease if and when operations cease.	

6.2.6 Issue: Increase in safety risks to third parties and communities

Description of the impact

The development and operation of the plant includes a number of activities that could present safety risks to third parties and communities.

Impact assessment

There will be a change in nature of the site during the construction phase, as the site currently comprises open grassland. The introduction of construction activities, large machinery and vehicles, and the presence of a large number of construction workers could negatively affect public safety. The safety risk to the local community and cattle (grazing around the site and crossing local access roads) and pedestrians (crossing the open land) could be increased during construction. The site is however surrounded by a boundary wall which would prevent accidental or deliberate access to the site. In the absence of mitigation, any potential injury to third parties or animals could be severe and have a long-term impact.

The overall significance is likely to be **HIGH** without mitigation reducing to **LOW** with planning, design controls and mitigation (see Table below).

Mitigation

The following measures are recommended:

- Maintain security and access control.
- Undertake regular patrols of the plant perimeter.
- Undertake community awareness programme.
- Handle any injury or death in accordance with the emergency response procedure.

Table 28: Increase in safety risks to third parties and communities

Issue: Increase in safety risks to third parties and communities		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Prominent change or disturbance	Negligible change or disturbance
Extent	Long-term	Long-term
Duration	Beyond the site boundary, effecting neighbors	Beyond the site boundary, effecting neighbors
Consequence	High	Medium

Probability	Probable	Conceivable
Significance	High	Low to Medium
Nature of cumulative impacts	Unless multiple developments occur in the area at the during the same time period, cumulative impacts are unlikely.	
Degree to which impact can be reversed	Any accidents that occur as a result of uncontrolled third-party access to the site would be non-reversible.	
Degree to which impact may cause irreplaceable loss of resources	Could result in serious injury or death of people or animals.	
Degree to which impact can be mitigated	High	
Residual impacts	Any accidents that occur as a result of access to the site would likely have residual impacts.	

6.2.7 Issue: Change in land use affecting sense of place

Description of the impact

The development of the site from open grassland to an industrial site will change the nature of the site. A number of impacts of varying spatial scale and significance have been identified through the ESIA process. These have the potential to change the way the site is experienced. The activities and land-uses within the area are common within the sub-region and show signs of deterioration due to industrial and utility activities. The general landscape does not evoke a strong or positive sense of place. The more significant receptor groups are expected to be the informal grazing activities, residential areas and commercial facilities located within 300 m of the project site. The majority of receptors are on the local highways, and these receptors are exposed to existing industrial uses.

Impact assessment

The proposed development will be industrial in nature and will transform the largely underdeveloped site of open grassland into an industrial facility. The proposed development would however be in consistent with the areas being zoned as industrial.

The only community/group that uses the proposed development site is the cattle herders, and there is no apparent social connection to the site, other than informal use (i.e. grazing). Other nearby land uses such as residential and

educational areas are expected to have varying levels of social connection to the area surrounding the site. The development is however in consistent with the area being zoned as industrial (Dongo Kundu Special Economic Zone – Industrial Park).

Changes introduced into the existing landscape as a result of the project would start at the construction phase and continue through to operations. It is expected that once the development is in place and the presence of the plant becomes a familiar component of the environment, the operational phase should have a negligible change on the overall sense of place.

In the absence of mitigation, a minor change or disturbance is expected. With mitigation this can be reduced. The overall significance is likely to be a **LOW to MEDIUM** without mitigation and **LOW to VERY LOW** with mitigation (see Table below).

Mitigation

The following measures are recommended:

- Effective implementation of all mitigation measures as outlined in the ESMP to reduce the overall impact on the environment and surrounding land uses.

Table 29: Change in land use affecting sense of place

Issue: Change in land use affecting sense of place		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance	Minor change or disturbance
Extent	Long-term	Long-term
Duration	Beyond the site boundary, affecting immediate neighbors	Beyond the site boundary, affecting immediate neighbors
Consequence	Medium	Medium
Probability	Probable	Conceivable
Significance	Low to Medium	Low to Very Low

Nature of cumulative impacts	The development fits within the planned commercial/industrial use of the area. Thus, while the change is noticeable at the site scale, it is not considered significant at the area scale.
Degree to which impact can be reversed	Removal of the facility and rehabilitation of the land would reverse the impact, at least in part. However, this is considered unlikely. Once developed as an industrial site, future use would likely remain industrial/commercial. The impact is not reversible.
Degree to which impact may cause irreplaceable loss of resources	While the sense of place will be altered, the development will have its own character and no irreplaceable loss is anticipated.
Degree to which impact can be mitigated	Appropriate use of architectural style, building materials and landscaping as well as on-going maintenance can mitigate the impact to a large degree.
Residual impacts	No residual impact is anticipated. Once built the structure will form part of the altered environment and aesthetics of the site.

6.3 Impact on Heritage Resources (Including Paleontological Resources)

6.3.1 Issue: Disturbance of ground resulting in damage to heritage resources

Description of impact

Construction of the plant infrastructure and related services has the potential to damage or uncover heritage resources through direct physical disturbance.

Heritage resources are places or objects of cultural significance and are protected by the National Museums and Heritage Act, 2006. The assessment of the site did not identify any heritage resources on the site.

Impact assessment

Given that no heritage resources, of the type and range outlined in the National Museums and Heritage Act, 2006 occur on the site, **NO IMPACT** is anticipated during the construction or operational phase. Once excavations commence it is however possible that heritage resources may be exposed by project activities, and in such cases a Chance Find Protocol must be implemented.

Mitigation

No mitigation measures are recommended, except in the case of the uncovering of a heritage resource:

- Implement Chance Find Protocol.

6.4 Decommissioning and Closure Impacts

At the time when the facility is decommissioned and closed, which is likely to be more than 25 years in the future, the local environment and regulatory context would likely have changed significantly from the current state. Future use of the site has not been considered, but given the location it is unlikely to be anything other than commercial or industrial use.

It is therefore not currently reasonable or feasible to undertake a comprehensive assessment of the decommissioning and closure related impacts.

6.5 No-Go Alternative Impacts

Description of impact

The No-Go alternative represents the option not to proceed with the proposed glass bottle manufacturing plant project, which would leave the project's area of influence (i.e. plot L.R number Mombasa/Municipality Block LX/1483 at Dongo Kundu Special Economic Zone in Mombasa County and the surrounding area) in its current state, except for variation by natural causes and other human activities.

Impact assessment

The No-Go alternative would prevent any of the potentially negative environmental impacts from occurring, but would also forego the possible advantages of the proposed project (e.g. economic stimulation, job creation and community upliftment).

Given the location of the project in an established (but still developing) industrial area, and assuming that all mitigation measures as outlined in the ESMP would be implemented, the overall impact of the project is assessed as being generally low negative to neutral on the biophysical aspects and low to significantly beneficial in certain socio-economic aspects. No fatal flaws or negative impacts of medium or greater significance have been identified. It follows that the impact of the No-Go alternative would be neutral tending to negative in certain aspects.

The overall significance of the No-Go alternative is likely to be a **LOW** without mitigation and **MEDIUM** with mitigation. It is therefore not recommended that the No-Go alternative be implemented

CHAPTER SEVEN

7.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This Environmental and Social Management Plan (ESMP) seeks to manage and keep to a minimum the negative impacts of the proposed contractors' camp site project and at the same time, enhance the positive and beneficial impacts.

7.1 Objectives of the ESMP

The objectives of the ESMP are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- To identify measures that could optimize beneficial impacts;
- To create management structures that address the concerns and complaints of stakeholders with regards to the development;
- To establish a method of monitoring and auditing environmental management practices during all phases the project;
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management;
- Detail specific actions deemed necessary to assist in mitigating the environmental and social impact of the project;
- Ensure that the safety recommendations are complied with;
- Propose mechanisms for monitoring compliance with the ESMP and reporting thereon; and
- To ensure that the legal requirements applicable to the project are complied with

7.2 ESMP roles and responsibilities

Several professionals will form part of the construction team. The most important from an environmental perspective is the Project Manager, the Project EHS Officer and the Contractors that will be engage.

The Project Manager is responsible for ensuring that the ESMP is implemented during the **construction** phases of the project.

The Project EHS Officer is responsible for monitoring the implementation of the ESMP during the **construction** phases of the project.

Each of the proponent appointed Contractors is responsible for abiding by the mitigation measures of the ESMP which are implemented by the Project Manager during the **construction** phase.

Milly Glass SEZ Ltd Project Manager is responsible for ensuring that each of the Contractors complies with the mitigation measures and ESMP requirements during the **design, preconstruction** and **construction** phases of the project.

The proponent will be responsible for implementation of the ESMP during the **operational** and **decommissioning** phases of the project. Decommissioning will however entail the appointment of a new professional team and

responsibilities will be similar to those during the design, pre-construction and construction phases. It is unlikely that the Marine Terminal will be decommissioned for several years.

7.2.1 Project Manager

The Project Manager is responsible for overall management of the project and ESMP implementation. The following tasks will fall within his/her responsibilities:

- Be aware of the findings and conclusions of the Environmental Social Impact Assessment and the conditions stated within the ESIA License issued by NEMA;
- Be familiar with the recommendations and mitigation measures of this ESMP, and implement these measures;
- Monitor site activities on a daily basis for compliance;
- Conduct internal audits of the construction site against the ESMP;
- Confine the construction site to the demarcated area; and
- Rectify transgressions through the implementation of corrective action(s).

7.2.2 Environmental Manager

The Environmental Manager will be responsible for the implementation of the ESMP during the construction phase as well as liaison and reporting to the client, appointed Contractors and Authorities. The following tasks will fall within his/her responsibilities:

- Be aware of the findings and conclusions of the Environmental and Social Impact Assessment and the conditions stated within the EIA License;
- Be familiar with the recommendations and mitigation measures of this ESMP;
- Conduct periodic (e.g., monthly) audits of the construction site according to the ESMP and EIA License conditions;
- Educate the contractors about the management measures of the ESMP and ESIA License conditions;
- Regularly liaise with the Contractors and the Project Manager on the ESMP implementation;
- Recommend corrective action for any environmental non-compliance incidents on the construction site; and
- Compile a regular report highlighting any non-compliance issues as well as good compliance with the ESMP.

7.2.3 The Local Contractor

The local contractors are responsible for the implementation and compliance with recommendations and conditions of the ESMP. The Contractor will:

- Ensure compliance with the ESMP at all times during construction;
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. Examples of such incidents include:
 - ✓ Public involvement/complaints;
 - ✓ Health and safety incidents;
 - ✓ Incidents on site; and
 - ✓ Non-compliance incidents.

7.2.4 Environmental management responsibilities

The following are the environmental management responsibilities of the various parties during construction and operational phases. Unless otherwise stated the ESMP will be adhered to as follows:

- The Contractor's EHS Officer will be accountable for compliance with this ESMP during the construction phase as it applies to their work area;
- The monitoring party will be led by Milly Glass SEZ Ltd Environmental Manager;
- The method of record keeping will be regular inspections depending on the stage of the project;
- The inspection technique will include a review of records that will be kept on site by the Contractor EHS Officer and/or site inspections;
- Milly Glass SEZ Ltd will bear ultimate responsibility for environmental management.

7.3 Environmental monitoring

A monitoring program will be implemented for the duration of the construction phase of the project. This program will include:

- Monthly environmental inspections to confirm compliance with the ESMP and EIA License conditions. These inspections can be conducted randomly and do not require prior arrangement with the Project Manager;
- Compilation of an inspection report complete with corrective actions for implementation;
- Monthly EHS committee meetings to be held to ensure compliance with the OSHA and its subsidiary legislation.

The EHS Officer shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable.

During the pre-construction, construction and operational phases, Milly Glass SEZ Ltd will implement its Grievance Mechanism. Each appointed Contractor shall be responsible for acquiring all necessary permits during the construction phase of the project. Such licenses include any abstraction of water permits, local authority approvals and operations, extraction of aggregates from borrow pits and their rehabilitation, etc.

7.3.1 Compliance with the ESMP and associated documentation

A copy of the ESMP must be kept on site during the construction period at all times. The ESMP will be made binding on all contractors operating on the site and must be included within the Contractual Clauses. It should be noted that in terms of the principles of environmental management espoused through the EMCA, those responsible for environmental damage must pay the repair costs both to the environment and human health measures to reduce or prevent further pollution and/or environmental damage (the polluter pays principle).

7.3.2 Training and Awareness

7.3.2.1 Training of Construction Workers

The construction workers must receive basic training in environmental awareness, including the storage and handling of construction materials and substances, minimization of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must also be appraised of the ESMP's requirements.

7.3.2.2 Contractor Performance

The appointed Contractors must ensure that the conditions of the ESMP are adhered to. Should the Contractor require clarity on any aspect of the ESMP, the Contractor must contact the Project Manager for advice.

7.4 ESMP requirements for the construction phase

The requirements that need to be fulfilled during the construction phase of the project are as follows:

- There should be continuous liaison between Milly Glass SEZ Ltd, its appointed Contractor and the community to ensure all parties are appropriately informed of construction phase activities at all times;
- The community should be informed of the starting date of construction as well as the phases in which the construction will take place;
- The appointed Contractor must adhere to all conditions of contract including the ESMP;
- The appointed Contractor should plan its construction program taking cognizance of climatic conditions especially wet seasons and disruptions that can be caused by heavy rains;
- The Community Liaison Officer must keep a proper record of all complaints received and actions taken to resolve the complaints;
- The Environmental Manager and Contractor's EHS officer should implement this ESMP;
- Internal environmental inspections and audits should be undertaken during and upon completion of construction. The frequency of these audits should be quarterly;

A formal communications protocol should be set up during this phase. The aim of the protocol should be to ensure that effective communication on key issues that may arise during construction be maintained between key parties such as the Project Manager, Environmental Manager, Social Performance Manager and the contractors. The protocol should ensure that concerns/issues raised by stakeholders are formally recorded and considered and where necessary acted upon. If necessary, a forum for communicating with key stakeholders on a regular basis may need to be set up. The communications protocol should be maintained throughout the construction phase.

7.4.1 Site preparation

Site clearing will be limited to the project site. Site clearing must take place in a phased manner, as and when required. The area to be cleared must be clearly demarcated and this footprint strictly maintained.

7.4.2 Establishment of construction materials yards

The proponent will establish their work area in an orderly manner and all required amenities shall be installed at its work area before the main workforce move onto site. The Contractor shall provide ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in provided facilities.

The Contractor shall supply waste collection bins and all solid waste collected shall be disposed of using NEMA approved waste handlers. A Waste Tracking Sheet required by Waste Management Regulations, 2024 will be obtained by the Contractor and kept on file. The disposal of waste shall be in accordance with the Waste Management Regulations, 2024. Under no circumstances may any form of waste be burnt on site.

7.5 Decommission plan

A detailed decommissioning Plan of the site will be developed by the demolition contractor in consultation with this ESMP of this SR and it outlines procedures for dismantling, demolition and the removal of the above ground and subsurface structures. In summary the plan presents the procedure, order, and scale of on-site activities to:

- Identify existing subsurface and underground structures
- Identify structures that will not be removed or demolished
- address all the potential Environmental and social impacts associated with the decommissioning process
- Estimate the anticipated number of site workers
- Estimate equipment and materials utilized during demolition
- Maximize recycling and reuse of waste products, and
- Describe transportation methods and total number of on-/off-site trips

7.5.1 Demolition Preparation

A plan to undertake dismantling and demolition activities will be developed by the demolition contractor in consultation with the proponent. The plan will refer to the ESMP in this report ensure good management of potential EHS issues associated with the demolition activities. OSHA requirements for worker protection will be adhered to during all dismantling and handlings activities and will be outlined in the task-specific Job Safety Analysis (JSA). The contractor will track and report daily progress, planned activities, and plan modifications.

7.5.1.1 Licensing

The demolishing contractor/ subcontractors will be required to acquire all the required permits and licenses which includes

- Demolishing license from county council of Mombasa
- NEMA license for the waste handler

7.5.1.2 As-built layout for the site

Milly Glass SEZ Ltd will prepare and provide an as-built drawing of the existing facility site showing the location and the dimensions of all the above ground and underground structures. The layout will enable the contractor to make an informed decision on the demolitions method to be used.

7.5.1.3 Job Safety Analysis

Dismantling will require the use of oxy-acetylene torches to cut piping and equipment. A JSA will be completed and followed for specific operations. Prior to any cutting or hot work, a site “Hot-Work Permit” will be secured from the proponent. A fire watch will be required for all hot work activities.

7.5.1.4 Personnel and Logistics

Demolition activities will require 30 to 40 on-site personnel. The demolition contractor will employ the workers anticipated to be residents of the surrounding area so transport arrangements of workers would not be necessary. The access to the site is tarmacked.

7.5.1.5 Site Controls

The existing security measures at the site will be enhanced to allow the demolition workers access and leave the site as required. Site access will be restricted during all work periods to protect human health and safety. The existing perimeter fence, with locked gates, should keep pedestrian and vehicle traffic away from site operations. On-site controls will include fencing (interior to the perimeter fence), construction fencing, cones, barricades, barrier tape, and other precautions to keep non-involved workers and equipment from open excavations and active work areas. Any open excavations will be backfilled or fenced off before work is concluded. Equipment will remain on site overnight within the secured interior fenced area.

7.5.1.6 Equipment Required for Demolition

The equipment to be utilized for this activity will be task specific and dependent upon the methods selected by the demolition contractor. The following is a tentative list of equipment that is anticipated to be used during the demolition project.

- Excavators as required
- tractor trailers
- forklifts
- backhoes,
- Dual loader
- Waste hauling trucks,
- Welding/cutting tools
- Dump trucks, as needed
- Five tool trucks
- Hand tools

7.6 Waste Management Plan

All project generated wastes will need to be managed and disposed of in a manner to prevent potential impacts on the environment and risks to human health.

7.6.1 Objectives

The demolition, construction and operation of the proposed project will generate various type of waste which will need appropriate collection, transportation, primary treatment and disposal. Hence, to serve the purpose, a Waste Management Plan has been formulated to demonstrate:

- Characterization of waste in different type of categories like garbage, rubbish, hazardous, waste etc.;
- Maintain the site in a clean and tidy state to reduce the attraction of pest species, impacts on the local environment and negative impacts on visual amenity; and
- Suggestion of options for waste handling and disposal during construction and operation phase of the project.

7.6.2 Scope

This plan shall be applicable to the proponent and the other contractors engaged by Milly Glass Ltd during the construction phase of the proposed project. The elements of the plan will be directly implemented by the contractors hired by the Developers while overall management and responsibility will lie with the proponent. The Plan also

identifies the individuals currently assigned to the various roles designated in this Plan. Applicable Standards and Legislations

- The Environment Management and Coordination (Waste Management) Regulations applicable. The salient features are:
 - Section 4 Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed of such waste in the manner provided for under these Regulations.
 - Section 5 Segregate such waste by separating hazardous waste from non-hazardous waste.
 - Section 6 minimize the waste generated by adopting cleaner production principles
 - Section 7 No person shall be granted a license under the Act to transport waste unless such person operates a transportation vehicle approved by the Authority
 - Section 8 Transportation of waste shall be in such a state that shall not cause the scattering of, escaping of, or flowing out of the waste or emitting of noxious smells from the waste;
 - Section 17 Installation of anti-pollution technology for the treatment of waste emanating from such trade or industrial undertaking
 - Section 18 No discharge or dispose of any waste in any state into the environment, unless the waste has been treated
- IFC PS 3
- Pollution Prevention-The proponent will be required to avoid the release of pollutants or, when avoidance is not feasible, minimize and/or control the intensity and mass flow of their release.
- Waste and Hazardous Materials Management-the proponent should avoid the generation of hazardous and non-hazardous waste materials. Where waste generation cannot be avoided, the client will ensure that the developers reduce the generation of waste and recover and reuse waste in a manner that is safe for human health and the environment.
- The developers should investigate options for waste avoidance, waste recovery and/or waste disposal during the design and operational stage of the project. Material Safety Data Sheet (MSDS) for all the hazard chemicals to be used during construction and operation phase should be readily available.

7.6.3 Roles and Responsibilities

7.6.3.1 Site Supervisor of Developer

Site Supervisor will be responsible for the following activities:

- Management of onsite waste generation associated with construction works to help avoid excessive generation where practicable;
- Maintaining of all records of waste type which are construction waste and debris, hazardous waste; and
- To have authorization for hazardous waste generation and storage granted

7.6.3.2 EHS Manager of Developer

The following responsibilities are entrusted to the EHS Manager:

- Demarcation of area within the construction area for keeping of segregated wastes;
- Labelling of the drums containing hazardous wastes like used oil;
- Maintaining of receipts for hazardous waste management records;

- Notifying the Site Supervisor of any activity that may generate a large amount of waste to allow appropriate controls to be put in place to manage waste generated; and

7.6.4 Waste Types and Quantities Generated

All wastes generated from the project will be categorized as either non-hazardous or hazardous following an assessment of the hazard potentials of the material, in line with local and national requirements.

The construction and renovation phases will require the use of hazardous materials such as diesel or petrol to cater the fuel equipment and vehicles and maintain equipment. The following hazardous wastes will also be produced from construction activities.

- Dismantled tanks waste consisting of iron sheets and tank fittings
- Demolition waste which includes concrete, reinforcement steel rods, masonry stones, pipe fittings and roofing materials
- Cleared vegetation
- Spoil materials from site preparations
- Steel and timber offcuts
- Oily rags, Used oil and oil filters - from generators or vehicle maintenance; and
- Packaging material especially paint cans.
- Grey and black water
- Domestic waste including food waste, food packaging material and water bottles
- Office waste including empty printer cartridges, papers and packaging materials

7.6.4.1 Operation Phase

Operations and maintenance of the terminal is not expected to generate significant amount of waste. The minimal waste produced will include

- Sanitary waste from workers
- Oily rags from workshop and pumps maintenance
- used oil from equipment service and generator sets
- food waste
- Office waste
- Paint cans during maintenance activities

7.6.5 Waste Handling, Management and Disposal

7.6.5.1 Renovation and Construction Phase

Waste from dismantling, demolition and construction activities will include

- The metallic waste will be sold to a licensed metal waste recycling plants within Mombasa
- Worn out steel will be reused at the project site
- Concrete and masonry stones from the demolition activities will be reused at the site for ground filling and the excess will be dumped at the approved dumping site at Mombasa.

7.6.5.2 Construction Phase

All wastes produced from the project activities on site will be temporarily stored in designated waste storage areas. All wastes that cannot be reused or recycled will be collected by approved waste contractors and transferred to an appropriately licensed waste management facility for treatment and disposal. Following steps will be taken to manage the waste generation during construction phase:

- Fuel will be stored on site in temporary aboveground storage tanks and will be stored in a locked container within a fenced and secure temporary staging area;
- Trucks and construction vehicles will be serviced on-site;
- All concrete mixing be undertaken on impermeable plastic lining to prevent contamination of the soils and surrounding areas;
- Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently;
- The use, storage, transport and disposal of hazardous materials used for the project will be carried out in accordance with all applicable regulations;
- All hazardous waste to be disposed through NEMA approved waste handlers;
- Material Safety Data Sheets for all applicable materials present on site will be readily available to on-site personnel;
- All construction debris will be placed in appropriate on-site storage containers and periodically disposed of by a licensed waste contractor;
- The construction contractor will remove refuse collected from the designated waste storage areas at the site at least once a week;
- It is proposed that the Contractors will supply the required temporary ablution facilities and be responsible for the removal and treatment thereof. Portable toilets would be provided for onsite sewage handling during construction. Sewage would be pumped out and removed regularly and disposed of in compliance with waste regulations in Kenya (Environment Management and Coordination (Waste Management) Regulations, 2024).
- Empty fuel containers will also be stored at a secured area designated for scrap and sold to authorized vendors. All packaging material will also be collected at the storage area and sold to scrap dealers.
- Tree from the site will be cut into small pieces and sold out as firewood within Mombasa, grass and shrubs will be dumped at approved dumping sites within Mombasa.
- Top soil and other spoil will be gathered and temporary stored within the site for reuse. The excess will be dumped at the approved dumping sites within Mombasa

7.7 Construction EHS management plan

7.7.1 Purpose of a construction EHS plan

A construction HSE plan is a management tool used to manage HSE activities associated with the construction of a project. It is a prerequisite for satisfying the Proponent that the successful contractor has implemented a management system for the safe operation of construction related activities in a project.

The construction HSE plan sets out the HSE management system as well as the resources required to implement it. It includes the minimum requirements for compliance with local HSE laws and regulations in order to prevent injuries to workers, damage to property or the environment. In the absence of relevant legislation, the main contractor and nominated sub-contractors will ensure compliance with international standards, guidelines and best practices in the safe operation of construction activities associated with the project.

7.7.2 Objectives of a construction EHS plan

The principal objectives of a construction HSE plan include:

- Prevention or limitation of injuries to workers, damage of property or the environment through an emergency preparedness and response plan;
- Prevention of recurring accidents or incidents through a program of root cause analysis;
- Ensuring that safe work practices and procedures are issued and understood by all construction workers;
- Verification through planned audits and reviews that procedures and instructions are complied with fully; and
- Counselling construction workers involved in near misses on better safe work practices.

In order to implement the construction HSE plan, the main contractor and nominated subcontractors will implement the following strategy:

- The HSE goals/objectives of the project will be verified and commented upon in each HSE meeting;
- A monthly HSE theme relevant to the planned objectives will be issued;
- Monitoring and control of unsafe practices;
- Initiate an unsafe act/condition report system for conveying accountability to affected employees including a disciplinary action system for non-compliance;
- Initiate an HSE recognition and rewards program for good HSE behavior among construction workers;
- Organize HSE competitions to promote interaction of construction workers through direct involvement in routine HSE objectives.

7.7.3 HSE organization

HSE is a management responsibility. Subsequently construction management of the proposed project shall form part of the daily responsibility of each member of the main contractor's management team and the sub-contractors' they supervise.

7.7.4 HSE performance measurement

The main contractor will be required to develop, rollout and implement an HSE performance measurement system. The measurement system will be used to recalibrate the HSE performance of the project during the construction phase to ensure that there are no injuries to people, damage to property or the environment. Some of the performance measurement metrics that should be considered for tracking include the following lagging and leading indicators:

- No. of fatalities;
- Lost time incident rate (LTIR);

- No. of fire incidents;
- No. of environmental incidents;
- Equipment damage/minor injuries;
- No. of health and hygiene reports;
- No. of HSE meetings conducted;
- No. of HSE inspections undertaken;
- No. of HSE training courses conducted.

7.7.5 HSE interface between contractor and proponent

Throughout the construction phase, there will be an interface between the proponent and the main contractor on HSE management. The objectives of this activity are to ensure that:

- The main contractor achieves the same or higher HSE standards than those stipulated by the Proponent;
- All HSE related hazards of the construction phase are identified, evaluated and appropriate control measures implemented;
- The main contractor understands their obligations with respect to HSE associated with the project;
- HSE performance management arrangements are in place by mutual definition.

The interface on HSE management may be achieved by the proponent and main contractor through meetings, reviews and audits during the design and construction phases of the project respectively. Some of the meetings may be defined as follows:

- HSE kick-off meeting;
- Weekly HSE progress meetings;
- Ad-hoc HSE meetings called by either the proponent or the main contractor to discuss specific HSE issues; and
- HSE reviews/inspections undertaken by either the proponent or the main contractor or both.

7.8 Safety Action Plan

7.8.1 Construction and fabrication phase

7.8.1.1 Safety hazards and critical areas

Prior to commencing construction, the main contractor will identify potential hazards to the safety of personnel associated with construction phase of the project. The main contractor and nominated sub-contractors shall also comply with relevant requirements of L.N. 40: Building Operations and Works of Engineering Construction Rules, 1984. The list of potential hazards will be updated on-site at regular intervals. For each hazard identified the main contractor will ensure that there is a safe work procedure that is developed, rolled-out and implemented for the project.

7.8.1.2 Safety procedures

As a petroleum experienced contractor will be engaged for this project, it is envisaged that they will already have safe work procedures developed for similar types of projects. These procedures will be customized for the proposed project and used throughout the construction phase. Examples of construction activities for which safe work procedures are required include:

- Cranes and lifting equipment operations;
- Electrical work;

- Confined space entry;
- Fire protection and prevention;
- Emergency response;
- Permit-to-work;
- Job safety analysis (JSA);
- Risk analysis;
- Root cause analysis;
- Safety incentive program; and
- Disciplinary system, etc.

7.8.1.3 Safety training

Health and safety training of workers is required by Kenyan legislation under the Occupational Health and Safety Act, 2007 (OSHA). Additionally, the main contractor will be required to train their sub-contractors on the safe work procedures some of which are identified above. Health and safety training needs will be identified by the contractor prior to commencement of the construction phase of the project.

Health and safety training associated with the project will be extended to all levels of management and workers who may potentially be exposed to health and safety risks during the construction phase of the project. Health and safety training records will be maintained on site by the main contractor for review by appropriate lead agencies and the Proponent.

7.8.1.4 Safety guidelines and rules of operation

The proposed project will be put up in an area with hot activities. The proponent and the contractors will have the following in place to prevent hot-work fire incidents at the project area

- The proponent will inform County Fire Department of the proposed construction work and keep them updated of the construction plans. The County Fire Fighting team will be in a position to activate mutual ERP in case of any emergency during construction.
- All the potential fire risk associated with the proposed project will be identified and all safety precautions measures will be collectively put in place.
- All combustible materials will be removed near hot works area and whenever possible hot works will be performed away from other activities
- Having fire extinguishers nearby and ready to use
- Assigning a fire watch for all hot-work activities

The contractor will be required to have a formal PPE program that can be implemented for the proposed project. The PPE program will in the main include instructions for:

- Selection of correct type of PPE based on the hazards at the job site;
- Issuance of PPE;
- Correct use of PPE;
- Inspection and maintenance of PPE;
- Replacement of worn-out PPE.

In addition to the PPE program, the contractor will evaluate all risks associated with working at heights (1.8m above grade level). For such work, the construction workers will be provided with appropriate safety harnesses or safety nets. All construction vehicles will be fitted with seat belts that operators must wear while working.

The construction site will contain appropriate signs, signals and barricades that are visible to the workers to protect them from potential hazards. Trenches and other excavation will also be provided with appropriate barricades, signs and signals. Where it is necessary to perform work at night, the main contractor will ensure that their sub-contractors provide artificial lighting sufficient to permit work to be carried out safely, efficiently and satisfactorily.

All tools and equipment deployed by the main contractor and their sub-contractors shall be free from defects, be in good operating condition and maintained in a safe condition. Any equipment that falls under the Examination of Plant Order under the OSHA shall be inspected by a DOHSS approved person and a certificate issued prior to its use at the construction site. Some of the tools, equipment and plant expected to be used for the proposed project include:

- Hand and portable power tools;
- Compressed gas cylinders;
- Scaffolds;
- Cranes and lifting equipment;
- Motor vehicles;
- Ladders.

In addition to the above, the main contractor will develop, rollout and implement the following health and safety rules for the construction site:

- Job site transportation;
- Daily construction plant inspection;
- Electrical operation;
- Floor and wall openings and stairways;
- Excavation and trenching;
- Steel erection;
- Confined space entry;
- Work near pressurized pipelines;
- Medical services;
- Alcohol and drug abuse.

7.9 Occupational Health Action Plan

An occupational health plan is primarily concerned with identification, evaluation and control of environmental health exposure that result from construction processes. The stresses can be physical, chemical, biological and physiological and may cause sickness, impaired health or discomfort to employees. An occupational health plan therefore addresses the above concerns as they apply to the project and to provide cost effective solutions to assure the health and well-being of project employees.

7.9.1 Medical and health program

The medical and health plan provides the necessary and important parts of a construction project medical and health program. The objectives of this program are to:

- Protect employees against occupational health hazards at the construction worksite.
- Facilitate placement of workers according to their physical, mental and emotional capabilities without endangering their own health and safety or that of others; and
- Ensure adequate medical care and rehabilitation of the occupationally injured or ill person.

The contractors will engage the services of a DOHSS approved Designated Health Practitioner (DHP) for undertaking medical examinations in accordance with the Second Schedule of the OSHA and Legal Notice No. 24: Medical Examination Rules, 2005. For those occupations defined in the Second Schedule of the OSHA, the main contractor will avail their employees to a DHP for medical examinations throughout the construction phase of the project during the following occasions:

- Pre-assignment;
- Periodic;
- Post illness or injury; and
- Termination.

An occupational injury or illness will be diagnosed as promptly as practical and treated as appropriate within the capabilities of the workplace medical facility. The main contractor's occupational health program should include treatment of emergency conditions at the work site which may occur during the construction phase of the project.

Construction workers and other employees will be inducted to the potential occupational health hazards that they may encounter in their specific roles. The induction will include methods of recognizing and preventing adverse health and safety effects at the work place.

The occupational health program will also include training of construction workers on the correct use and maintenance of PPE issued to them. The site HSE Manager will periodically inspect and evaluate the workplace for potential adverse occupational health hazards.

Occupational health record keeping will be maintained by the site HSE Manager for all employees that are medically examined. The records will contain sufficient data to reproduce a chronology of an employee's medical occurrences, illnesses and injuries. All employee medical records will be maintained confidentially.

If the main contractor engages catering personnel for their staff, it will be mandatory for each food handler to be immunized every six months as required by the Local Government Act and comply with the requirements of the Public Health Act.

7.9.2 Record keeping requirements

Medical records will provide data for use in job placement, establishing health standards, health maintenance, treatment and rehabilitation, worker's compensation cases and assisting project management with program evaluation and management. The record keeping requirements will comply with Kenyan laws and regulations as well as the Proponent's insurance requirements.

The contractor and their appointed DHP will maintain occupational health records of workers as required by Kenyan legislation (OSHA, WIBA and L.N. 24). The DHP will confidentially maintain health examination records of all employees that visit him/her. Examples of records that need to be maintained include:

- Physical examination reports.
- Clinical reports.
- Chest x-rays,
- Audiograms, etc.

The medical records shall be maintained in locked files and only authorized persons shall have access to them. In certain situations, requests for specified medical information may be sought by authorized Government officials. Additionally, an employee or his/her designated representative may seek information about themselves or their environmental exposure. These requests shall be turned over to the project manager for handling.

7.9.3 Inspection program

The site HSE Manager will conduct sanitation and health inspections at the job site to ensure compliance with the Public Health Act. The sanitation inspections will cover the following areas:

- Drinking water
- Control of vermin and pests
- Toilet facilities
- Waste disposal
- Lunch areas.

Written reports will be issued having target dates for corrective actions to be taken by responsible supervisory personnel.

7.9.4 Training

During the construction phase, the contractor will be required to arrange for training on first aid, health and safety, security and fire safety.

7.9.5 Communications system

The main contractor will be required to develop, rollout and implement a rapid communications system to ensure fast and reliable emergency communications between the project site and crews at the scene of an accident.

7.9.6 Procurement and material control

The contractor's HSE Manager will develop a master listing of all medical and first aid materials, supplies and equipment that will be needed during the construction phase of the project. First Aid boxes will be stocked in accordance with L.N. 160: First Aid Rules, 1977.

7.10 Environment Action Plan

The purpose of a construction environment management plan (CEMP) is to specify environmentally sound working methods in order to minimize environmental impact of the construction works associated with the proposed project.

The CEMP identifies key environmental aspects and the related impacts which may occur and specifies methods, measures and controls that the main contractor will comply with during the construction phase of the project.

7.10.1 Key environmental positions

The beginning of this section identified the key HSE positions that will be used to manage health, safety and environmental aspects during the construction phase of the project. The primary persons from the main contractor's organization responsible for implementing the CEMP include:

- Construction Manager; and
- HSE Manager.

The Construction Manager will have overall responsibility for all aspects related to environmental issues and to ensure that the main contractor's environmental policy statement and objectives are complied with.

The Construction Manager will be responsible for developing, rolling out and implementing environmental procedures and work instructions in conjunction with the HSE Manager. The HSE Manager will be responsible for several environmental functions such as:

- Coordinating environmental inputs to the project and advising the Construction Manager on environmental matters.
- Coordinating the development, rollout and implementation of the main contractor's environment management system (EMS) for the project;
- Routine monitoring of implementation of the main contractor's EMS at the project site;
- Authority to halt any works where actions are found to be in contravention of particular environmental procedures, work instructions or legal requirements;
- Authority to amend work instructions and procedures as required by sound environmental management including amendments to the EMS as identified by audits.

Environmental training: The main contractor's management and their sub-contractors will receive environmental induction training prior to commencement of the construction phase of the project. The training will cover the contractor's EMS and environment work instructions relevant to the construction activities.

7.10.2 Environmental objectives

The contractor will develop an environment management system (EMS) in order to comply with basic environmental objectives and targets set for the project. Environmental objectives for the construction phase will be discussed and agreed between the Proponent and the main contractor. The EMS will detail the environmental standards for the project and will include a number of environmental work instructions. The EMS will be implemented in conjunction with the main contractor's health, safety and environment action plan. Environmental activities will be audited regularly to ensure continued compliance with predetermined environmental objectives.

Environmental work instructions will be developed to comply with all legislative and regulatory requirements as a minimum. The objective is to endeavor to minimize and prevent where possible adverse environmental impacts. The environment work instructions will apply equally to all the main contractor's workers, sub-contractors, project consultants and suppliers.

The main contractor will provide environmental training for their workers in order to minimize the likelihood of environmentally damaging incidents occurring.

7.10.3 Environmental procedures

The contractor will develop, rollout and implement environmental procedures for the construction phase of the project. The procedures will be organized under two categories namely:

- Management and Organization procedures; and
- Environmental Management Procedures.

The above types of environmental procedures will be developed jointly by the HSE Manager and construction team. Once drafted, the procedures will be discussed with the Construction Manager to ensure operability.

7.10.4 Environmental performance meetings

The contractors will schedule regular meetings to discuss environmental performance of the project during the construction phase. The meetings will be attended by the Environmental and social management plan

Construction Manager, HSE Manager and the Proponent. Minutes of the meetings will be circulated to all employees and posted on construction site notice boards.

7.10.4.1 Environmental reviews

Environmental reviews include both inspections and audits to be conducted by the contractor. Audits will be conducted by the HSE Manager and will include monitoring of construction phase environmental effects against identified performance targets. Findings and recommendations will be shared with the Construction Manager and the Proponent.

Inspections of working areas will be performed periodically using appropriate checklists. Inspections will be undertaken by construction supervisors and findings/corrective actions discussed in daily construction meetings. A tracking system shall be employed for monitoring status of implementation of corrective actions. Records of inspections will be filed on-site and made available to relevant lead agencies and the Proponent.

7.10.5 Soil conservation and erosion mitigation

The civil contractor will develop a soil conservation and erosion mitigation plan which will include details on how to perform clearing, grading, excavation, trenching and backfilling work at the project site.

During the construction phase, the main contractor will take adequate measures to prevent soil erosion especially during the rainy season. The integrity of soil erosion mitigation shall be sufficient to provide continued protection against erosion until the site soils have stabilized and added protection is no longer necessary.

7.10.6 Site restoration

Prior to handover of the completed project to the Proponent, the civil contractor will undertake a final clean-up of the entire project site including removal of all non-hazardous and hazardous waste or excess materials. Surface restoration and stabilization will be performed in accordance with environmentally sound practices

7.11 Traffic Management Plan

There will be increase of traffic along the Dongo Kundu Bypass Road. Transportation of construction materials, project components and equipment to the proposed site will be by vehicular trucking transport. At the peak of construction work it is envisaged that approximately 10 trucks especially tippers and concrete mixers will visit the site daily. This increase in traffic will potentially create congestion along the road, short term disruptions and safety hazards for current road users.

The Traffic Management Plan (TMP) during construction and operation will be developed and implemented to ensure appropriate management procedures to mitigate potential traffic impacts associated with the project. The TMP will outline the mechanisms for managing the movement of all land traffic and will be associated with the Project for each of the three phases (construction, operation and decommission), in order to minimize associated risks for traffic accessing the construction site from the main road.

The TMP will highlights the hazards, and the standard operating practices, which will be adhered to in order to minimize the potential for undesirable incidents on site, on public roads and at seawater routes for the period of the construction phase onshore and offshore and also during operations.

It should be noted that at the time of producing this EIA, detailed information on the construction, operation and decommission of the sites is unavailable. The principal role of this section is to provide framework guidance on preparation of the comprehensive TMP.

7.11.1 Objectives of the TMP

Objectives of the Plan will be as follows:

- Promote the safe movement of equipment and personnel to and from the Project site and facilities;
- Promote safe transport of personnel and equipment for Project related activities; Identify and respond to stakeholder concerns
- Address environmental management associated with shipping and road transports during the construction phase
- Ensure that all relevant statutory requirements in relation to The Traffic Act 2012 are met during the construction, operation and decommissioning of the Project
- Establish the baseline traffic conditions
- Describe the access routes for traffic generated by the Project
- Detail traffic management measures to be implemented by the Project
- Outline the roles and responsibilities for traffic management for both onshore and offshore traffic schedule
- Outline a program to monitor and audit Project related traffic and associated impacts
- Minimize disruption, congestion and delays as a result of construction activity along the Roads

7.11.2 Roles and Responsibilities

The proponent will provide all necessary supervisory staff to ensure that the TMP is implemented and adhered to during all aspects of the Project. The TMP will be monitored to ensure compliance by all site personnel, including management, supervisory staff, and contractors. All site personnel will be responsible for the identification, reporting

and correction of areas found to be in non-compliance to the TMP, and adapt the plan where required, to encompass operational change during the phases of construction.

The Project Manager is responsible for the safe implementation of this Plan and evaluating all information received from involved personnel and to define corrective actions in case of need.

The HSE Manager is responsible for the overall evaluation of the health, safety, and environmental aspects of this Plan and confirmation that the appropriate hazard studies are performed for the planning, design, construction, and operations phases. The HSE Manager reports to the project manager who in turn will report to Milly Glass SEZ Ltd Management.

The Community Liaison Officer will be responsible for any communication with counterparts and the community associated with the TMP

It will be the responsibility of the proponent to ensure that all vessels, equipment, and vehicles shall comply with the required statutory and state legislation.

7.11.3 Regulations and standards

The TMP should comply with the requirements of following regulations and standards

- ✓ The Traffic Act of 2012 and its subsidiary legislations
- ✓ The Occupation Safety and Health Act of 2007 and subsidiary legislations
- ✓ The Petroleum Act, 2019
- ✓ The Energy (LIQUEFIED PETROLEUM GAS) Regulations, 2009
- ✓ KS 1938 on Handling, Storage and Distribution of Liquefied Petroleum Gas in Domestic, Commercial and Industrial Installations

7.11.4 Traffic Activities

During construction, the traffic activities can be broken down into. Transportation of equipment and machinery to and from the construction site; Transportation of raw materials to the construction site, Transportation of workers to the facility and Transportation of equipment and machinery during maintenance.

7.11.5 Traffic Risk Management

Risk Assessment should be undertaken to identify and analyze the potential negative environmental and social impacts associated with the above traffic activities. The proponent will be required to establish and maintain a process for identifying E&S risks that are related to the construction and operation of the proposed project, in accordance with OSHA 2007.

Risks associated with traffic will be identified, assessed and managed to prevent or reduce the likelihood and consequence of incidents, subsequently an effective risk assessment and management should ensure the following;

- All the potentially affected road users within the project site are comprehensively consulted and their views incorporated in the risk assessment
- Safe vehicle operating practices and procedures are established

- Drivers and other members of the staff are properly instructed in their use
- Systems are in place to monitor and steward compliance with applicable Laws
- There are safe dispatches to all customers, each delivery route and site must be assessed for potential risk
- Assessments are performed prior to first delivery to the customer, and whenever this is a significant change in routing or site facilities
- Persons conducting Risk Assessments must be trained in Risk Assessment Methodology.
- The management endorses risk assessments

Fit-for-purpose risk controls will be developed, to prevent and mitigate the negative impacts of the assessed risk. Risk control will require use of appropriate techniques such as HAZOP which should cover:

- All activities, products, and/or services controlled by GCG and those influenced by GCG, such as suppliers.
- The activities, products, and/or services carried out by all personnel having access to the workplace and facilities at the workplace including suppliers
- Routine (frequently performed), non-routine (infrequently performed), and/or emergency operating conditions and activities. Sometimes the categories of normal and abnormal operating conditions are also considered.
- The lifecycle of an asset or activity, from the planning stage, through operation to decommissioning, and disposal and restoration.
- Risk prevention, mitigation, and recovery measures.

7.11.6 Evaluation and Monitoring

Monitoring will be achieved through monthly reporting, which will come under the proponent's overall auditing and compliance procedure. This will ensure that the relevant legislation within the project area is adhered to. A monitoring plan will be developed to ensure there is a routine, risk-based, 'internal' steps to confirm the effectiveness of a prescribed process or activity.

7.11.7 Implementation Schedule

The implementation schedule of the traffic management plan will be determined in accordance with the project's implementation and operation schedule. Thus, it will be accurately be able to be determined during the early stages of implementation, before construction and more precisely upon awarding of the specific works contract to contractors and suppliers.

7.12 Emergency Planning during Operation

There are usually three levels of emergency response to be considered during the operation of the proposed project:

Installation emergencies- These are normally of a small nature, e.g., leaks, small fires and can in almost all cases be dealt with by the operator. It is included as part of the operating procedures, which are simple and straightforward. Therefore, they will not be considered in this ESMP.

Site emergencies- These are emergencies that result from a fire or explosion which usually only has an effect on the installation itself and on any other surrounding installations within the boundaries of the site. An emergency response plan must be drawn up for the camp site.

Off-site Emergencies -These are Emergencies that involve the outside public and local authorities. An off-site emergency plan or procedure is the responsibility of the local emergency services and needs to be prepared, reviewed and updated with the assistance of the proponent.

7.12.1 Administration

The plan should be readily available on site for all persons to use when needed (i.e., it should not only be a document on the computer system, there should be summary copies at key locations). The plan, or at least the parts readily available for use, should be simple and concise. The plan should be part of a quality management system, which includes means to control the document. Ensure revision and updating every 3 years, require witnessing and inclusion of the relevant authorities in reviewing the plan, etc. All personnel, visitors, contractors, etc. should be trained in the relevant aspects of the emergency plan. Commitment to annual emergency drills. The plan should indicate the need to inform the relevant authorities of every occurrence, which has brought the MHI aspects of the plan into action, of actual MHI incidents as well as of near misses. Commitment to communicate all necessary emergency planning information to potentially affected neighbors. Emergency plan signed by Chief executive Officer

7.12.2 Roles and Responsibilities

The procedures should address all different groups of persons on site, e.g., person who discovers the emergency situation, visitors, staff, first response team, emergency coordinator, etc.

All personnel should be able to easily determine which group of people they fit into. An organogram is particularly useful.

The actions of the person discovering the emergency situation need to be clearly spelled out.

The person who has over-all responsibility during an emergency clearly designated, e.g., the emergency controller, his/her name and normal job title.

Contact names and numbers for key role players should be clearly indicated.

7.12.3 Raising the alarm and evacuation

There should be means of raising the alarm. Clear indication of who is responsible for raising the alarm (or the various levels of alarm if there are more than one) and the method of doing so.

The procedures must clearly describe what actions all personnel are to take in the event that the alarm is raised. If specific groups are to take different actions, this must be clear.

Procedures for testing the alarm must be indicated.

The circumstances under which evacuations are undertaken must be clear.

The details of muster/assembly points should be available in the procedures. A map showing the location should be included.

The responsibilities of the different persons at the muster points must be clearly defined.

Depending on the site and the nature of the risks, there may need to be an indication that the nature of the emergency may require changes in the location of assembly points or actions to be taken, once there.

7.12.4 Type of emergencies

The plan should cover the major risks assessed, i.e., fire, and toxic releases.

The plan must be easy to interpret, i.e., the sections dealing with fire, and toxic gas events must be clearly identifiable on the first or second page and the written layout of the plan should be logical and systematic.

Ideally the plan should differentiate between potential fire and explosion situations and the situation after an initial fire or explosion.

The plan must indicate the location of emergency equipment such as BA sets, foam supplies, etc.

Persons responsible for ensuring the maintenance of such equipment must be clear.

The actions of First Response Teams or emergency controllers may need to be specified in more details, e.g., go to assembly point, don suitable PPE, approach the location of the emergency, isolate releases, activate firefighting systems, etc.

The location of the designated emergency control center should be indicated.

The facilities to be available at this location and the persons responsible for maintenance thereof must be indicated.

7.12.5 Contact with outside

There must be an indication of who is responsible for notifying the external emergency services and which services must be contacted under what circumstances. There must be an indication of which external neighboring facilities need to be notified and who is responsible for this. Contact details for external services and neighboring facilities must be in the procedures and readily available to the responsible persons.

There must be a clear indication of what will be communicated to the emergency services, as well as to neighbors, as per a pre-agreed plan of action.

The manner in which roles and responsibilities change once external emergency services are on site needs to be clear. Access to the site / area during an emergency should be controlled and the means of achieving this must be described. If a specific offsite emergency plan exists, then this should be referred to by name/number.

7.13 Environmental and Social Management and Monitoring Plan-Construction Phase.

Table 30: Environmental and Social Management and Monitoring Plan – Construction Phase

No.	ACTIVITY	NEGATIVE IMPACT	MITIGATION MEASURE	RESPONSIBILITY	PERFORMANCE INDICATOR	COST (KSH)
Design Phase						
1.	Proposed Project	Landscape visual impact	- Design of infrastructure that conforms with the project site features (topography and aesthetics)	Milly Glass SEZ Ltd Design Consultant	Site infrastructure design blending with host environment	Approx. 500,000/=
2.	Proposed Project Sanitation Facilities	Soil and water contamination	- Design appropriate containments for oils/other construction chemicals and sanitary waste from the contractor's camp.	Milly Glass SEZ Ltd Design Consultant	Availability of sanitary facility and paved containments in the design	Approx. 700,000/=
3.	Proposed Project site Vegetation Cover	Removal of existing Vegetation	- Design of appropriate construction that provides for incorporation of existing vegetation on the site	Milly Glass SEZ Ltd Design Consultant	Site infrastructure incorporating existing vegetation on site	Approx. 200,000/=
Pre-Construction Phase						
1.	Project acceptance by the community	Potential lack of support from project area community	- Timely dissemination of project facts to community and stakeholders	Milly Glass SEZ Ltd Environmental consultants	Feedback information and forms from project area community	Approx. 500,000/=

			- Convening of meetings with Community and Stakeholders to carry out sensitization and disseminate project facts			
2.	Clearing of Proposed Project site vegetation	Vegetation damage, and invasion by exotic species	- Maintain native mangrove cover by selective removal of trees which cannot be incorporated in the project design by use of manual clearing technics; - This is in line with: Environmental Management and Coordination Act (EMCA), 1999 Amended 2015 OP 4.01 Environmental Assessment	Milly Glass SEZ Ltd Contractor	Existing vegetation on site incorporated in the constructed Site area	Approx. 600,000/=
3.	Clearing of Proposed site Project vegetation	Generation of Solid Waste	- Contractor to provide strategically located solid waste collection container (skip); Collect together all generated waste from site clearing; - Transport and dispose all waste away from site; - Liaise with the County government on suitable dumping site for spoils; This is in line with:	Milly Glass SEZ Ltd Contractor	Presence of waste collection bins Contract with NEMA Registered Waste Disposal Firm	Approx. 100,000/= for waste collection bins 10,000/= per month for Waste Disposal

			Environmental Management and Coordination Act (EMCA), 1999 Amended 2015, - Water Act 2012 and Public Health Act, Cap 242 OP 4.01 Environmental Assessment			
4.	Clearing of Propose Project site vegetation	Noise pollution (excess noise and vibration)	- Use of noise reduction/ hearing protection devices when working with noisy equipment; - Use of serviceable chain saws (low noise emission); - Instruct machinery operators to avoid raving of engines; - Carry out site preparation activities during the day; This is in line with Environmental Management and Coordination Act (EMCA), 1999 Amended 2015; Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 OSHA Act, 2007. OP 4.01 Environmental Assessment	Milly Glass SEZ Ltd Contractor	Records of machine and vehicle maintenance Availability and use of Ear Muffs	Approx. 200,000/= for Provision of noise pollution controls

5.	Clearing of Proposed site Project vegetation	Sanitary other Domestic Waste	- Provide site clearing workers with solid waste bins for their use; - Ensure site has toilet facilities; - Sensitize workers on site cleanliness and hygiene This is in line with: Environmental Management and Coordination Act 1999 Amended 2015; Water Act 2012; OP 4.01 Environmental Assessment; Public Health Act, Cap 242	Milly Glass SEZ Ltd Contractor	Presence of waste bins and Toilets for use by workers	Approx. 400,000/= for provision of Sanitary and waste collection facilities.
Construction Phase						
1.	Soil Excavation at Proposed Project site	Soil Erosion	- Excavated soil is to be used for backfilling excavated areas while excess soil is disposed of off-site; - Soils are not to be left exposed to wind/water; This is in line with: Environmental Management and Coordination Act 1999 Amended 2015	Milly Glass SEZ Ltd Contractor	Ground cover in constructed areas Quality of surface water at the site and in the neighbouring surface water pots, Water abstraction permit.	Part of Construction Obligation

			Water Act 2012, OP 4.01 Environmental assessment Sinking of a borehole for water abstraction at the site.			
2.	Construction of the Proposed Project site	Air Pollution (dust, fuel and smoke emissions)	- Control speed of vehicles and Prohibit idling; - Spray water during construction; - Maintenance vehicles & equipment regularly; - Provision of dust masks for use in dusty conditions; - Use serviceable vehicles/machinery to reduce smoke; - This is in line with: Environmental Management and Coordination Act 1999 Amended 2015 Occupational Safety and Health Act (OSHA) 2007 OP 4.01 Environmental Assessment; Public Health Act, Cap 242	Milly Glass SEZ Ltd Contractor	Records of machine and vehicle maintenance Availability and use of Noise Masks Low dust generation during construction	Approx. 500,000/= for air pollution prevention

3.	Construction of the Proposed Project site	Excess noise and vibration	- Use noise hearing protection devices when working with noisy equipment or noisy environment; - Use serviceable equipment with low noise emission; - Instruct truck/machinery operators to avoid raving engines; - This is in line with: Environmental Management and Coordination Act 1999 Amended 2015 Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Occupational Safety and Health Act (OSHA) 2007 OP 4.01 Environmental Assessment	Milly Glass SEZ Ltd Contractor	Records of machine and vehicle maintenance Availability and use of Ear Muffs	Approx. 300,000/= for Provision of noise pollution control equipment
4.	Construction of the Proposed Project site	Generation of Solid Waste	Provide communal solid waste collection containers (skip) for the collection and storage prior to appropriate disposal; County Government/NEMA to provide waste dumping site;	Milly Glass SEZ Ltd Contractor NEMA Registered Waste Collection and Disposal Firm	Clean, Organized, Neat Site Presence of waste collection receptacles	Approx. 200,000/= for waste containers

			- Engage a NEMA Registered Waste Collection Firm; - Excavation activities to be done during the dry season to avoid soil erosion and siltation of streams; - Site soil to be used to backfill excavated sites; This is in line with: Environmental Management and Coordination Act 1999 Amended 2015, Waste Management Regulations, 2006 Water Act 2012		Contract with NEMA Registered Waste Disposal Firm	10,000/= per month for waste collection and disposal
5.	Construction of the Proposed Project site	Generation of Liquid Waste - used oil and other Chemicals (Hazardous Waste)	- Construct a paved containment for storage of oils and other liquid chemicals being used in the construction site; - Provide containers for storage of used oils from vehicles /machines/equipment being used at the construction site; - Engage a NEMA Registered Firm for the collection, transportation	Milly Glass SEZ Ltd Contractor NEMA Registered Used Oil Collection and Disposal Firm	Presence of paved area storage of oils and other chemicals Presence of oil containers.	Approx. 400,000/= for paved containment & used oil containers. 10 ,000/ = per month for collection and

			and appropriate disposal of used oil; This is line with; Environmental Management and Coordination Act 1999, Amended 2015 Waste Management Regulations, 2006 Water Act 2012 Public Health Act, Cap 242 and Environmental Assessment			disposal of used oil.
6.	Construction of the Proposed Project site	Risk of fire	- Provide firefighting equipment at the construction site area; - Contractor staff to be sensitized on firefighting equipment use; - No burning of materials is to be permitted at the site. This is in line with: Occupational Safety and Health Act (OSHA) 2007 Public Health Act, Cap 242 OP 4.01 Environmental Assessment	Milly Glass SEZ Ltd Contractor	Performance records Presence of Fire Extinguishers at construction site	Approx. 300,000/= for Fire extinguishers

7.	Construction of the Proposed Project Site	Potential pollution of Surface and Groundwater	- No disposal of domestic waste at the project site; - Provision of used oil containers at a central point; - Use of waste bins/proper wastes management; - Pave parking area for trucks and direct drainage to containment; - Analysis of water at the site area 2 times a year This is in line with; Environmental Management and Coordination Act (EMCA), 1999 Amended 2015, Public Health Act Cap 242 OP 4.01 Environmental Assessment	Milly Glass SEZ Ltd Contractor	Water Quality Report Presence of Waste Bins	Approximately 50,000/- for communal waste containers 200,000/- Per year.
8.	Construction of the Proposed Project site	Safety of Workers and other visitors to construction site	Use of construction site barrier tapes to isolate the site(working) area to bar intruders from accessing the area in case of a dropping object; – Appropriate head, hand and foot protection (PPE) during the	Milly Glass SEZ Ltd Contractor	Workers have Safety Gear Medical records Emergency contacts for Hospital and Police available	Approx. 300,000/= safety gear

			manual clearing of vegetation and construction activities; – Adopting ergonomic work flow designs that fit physical tasks to employees and not vice versa. – Maintain work productivity; – Construction site visitors require appropriate safety Gear. This is in line with: Occupational Safety and Health Act (OSHA) 2007 Environment Management and Coordination Act (EMCA), 1999 Amended 2015 OP 4.01 Environmental Assessment Public Health Act Cap 242			
9.	Construction of the Proposed Project site	Working at heights	– Testing of structures for integrity prior to undertaking work; – Implementation of fall protection including induction on climbing techniques and use of fall protection measures,	Milly Glass SEZ Ltd Contractor	Medical Records and Training records availability and use of proper PPE Availability of Fall Protection Equipment at the Construction Site	Approx. 500,000/= for special safety equipment

			– Provision of harnesses and scaffolds for working at heights; – Inspection, maintenance, and replacement of fall protection equipment; – Use of helmets and other protective devices that are going to mitigate against scratches, bruises; lacerations and head injuries due to dropping objects – Provide first aid facilities at the site; This is in line with: Occupational Safety and Health Act (OSHA) 2007 OP 4.01 Environmental Assessment Public Health Act Cap 242			
10.	Construction of the Proposed Project site	Health issues of construction workers and Community	Occupational Safety and Health Act (OSHA) 2007 OP 4.01 Environmental Assessment	Milly Glass SEZ Ltd Contractor Ministry of Health	Pamphlets on Health Matters Records of disease incidences/prevalence	500,000/= for sensitization and provision of condoms

				NGOs and Donor Agencies Local Administration		Health facility cost to be determined
11.	Construction of the Proposed Project site	Community misconceptions	– Awareness creation amongst the community on project facts; – Community issues to be responded to promptly; – Project progress reports and monitoring reports to be prepared and recommendations implemented;	Milly Glass SEZ Ltd Local administration Local Leaders	Records of Meetings with Community Records of community issues recorded and responses	Approx. 100,000/= for convening meetings
12.	Construction of the Proposed Project site	Increase in social vices/ Security Concerns	– Conduct Information Education and Communication; (IEC) amongst the community and the project staff; – Hold meetings between Contractor Staff and Community; – Have regular police patrols at the beginning of project development; – Collect information on persons coming into the project area to settle during project implementation.	Milly Glass SEZ Ltd Ministry of Education Local Police Local Administration Local Leaders	Meeting reports Police records on project area security	Approx. 300,000/= for convening meetings

13.	Construction of the Proposed Project site	Surface run off and sedimentation from construction activities	– Construction of effective drainages and culverts; – Plant soil binding grasses and other native plants This is in line with: Environmental Management and Coordination Act 1999 Amended 2015 Water Act 2012 OP 4.01 Environmental Assessment	Milly Glass SEZ Ltd Contractor	Surface runoff water impact protection facilities in the project area	Construction Obligation
14.	Construction of the Proposed project site	Sanitary facilities for construction workers	– Installation of appropriate sanitary facilities; – Having a monitoring programme for the septic tanks to ensure no overflow takes place This is in line with: Environment Management & Coordination Act (EMCA), 1999 Amended 2015, Waste Management Regulations, 2006	Milly Glass SEZ Ltd Contractor	Presence of Toilet Facilities for Workers and Visitors to the Construction site	Construction Obligation
15.	Construction of the Proposed Project site	Dangers of having Child Labour issues arising	– Contractor to be strictly advised not to engage any underage persons (under 18 years of age) to	Milly Glass SEZ Ltd Contractor	List of workers that does not contain underage persons	Construction Obligation

			perform any form of work at the site during construction – Contractor will be required to comply with the Employment Act, 2007 This is in line with: Employment Act, 2007			
Operation Phase						
1.	Operation of Proposed Project Facility	Maintenance of facilities Working at heights	– Use of protective devices to mitigate against injury; – Provide first aid facilities at the site; This is in line with; Occupational Safety and Health Act (OSHA) 2007 OP 4.01 Environmental Assessment	Milly Glass SEZ Ltd Site manager	Use of Proper PPE and Equipment Handouts on safety	Approx. 200,000/=
2.	Operation of Proposed Project Facility	Ambient Air Quality. Gaseous pollutants would be generated from fuel combustion in the furnace (Sources of SO₂ and NO_x), emissions generated by vehicle engines and other	– Design and manage the facility to conform to the Third Schedule of the Environmental Management and Co-ordination (Air Quality) Regulations, 2024 – Design and manage the emissions control equipment on the batch	Milly Glass SEZ Ltd Site manager	Presence of biannual ambient air quality reports,	Approx. 100,000 per report

		combustion-driven equipment (e.g. generators) (Sources of NO _x , CO ₂ , CO and VOC). Particulate emissions would arise from materials handling in the batch plant and entrainment from vehicles on paved roads.	plant to achieve 98% control efficiency. – Mitigation of vehicle entrainment emissions from the unpaved access roads using through watering; strict enforcement of speed limits (maximum 20 km/h on access roads); covers for vehicles; and regular clean-ups of road spillages			
3.	Operation of Proposed Project Facility	Risk of Fire	– Sensitization of Workers on Fire Safety Risks; – No burning of any materials near or in the site This is in line with: Occupational Safety and Health Act (OSHA) 2007 Environmental Management and Coordination Act 1999 Amended 2015; OP 4.01 Environmental Assessment	Milly Glass SEZ Ltd County government	Handouts on Fire Hazards and Safety	Routine Site Operation Activity
4.	Operation of Proposed Project Facility	Pollution of surface water and Waste management	– Ensure solid waste is collected and appropriately disposed of; – Ensure that used oil from trucks are not released to the ground;	Milly Glass SEZ Ltd	Presence of solid waste containers	Approx. 20,000/= for Provision of

			– Used oil is to be put into containers and appropriately disposed of by a NEMA approved agent; – Provision of used oil containers for use by truck drivers; This is in line with: Environment Management and Coordination Act (EMCA), 1999 Amended 2015, Water Act 2012 Public Health Act Cap 242		Containers for storage of used oil recovered from trucks	used oil containers
5.	Operation of Proposed Project Facility	Site Solid Waste Management during Operation	– Provision of communal solid waste containers (skip); – Provision of secured solid waste collection containment where waste container (skip) is to be placed; – Regular disposal waste depending rate fill up. This is In line with: Environment Management and Coordination Act (EMCA), 1999 Amended	Milly Glass SEZ Ltd manager	Waste Collection and Disposal Reports Presence of Waste Bins	Approx. 20,000/= for Waste Containers 10,000/= per month for waste disposal by NEMA Approved Firm

			2015, Waste Management Regulations, 2006 Water Act 2012 Public Health Act Cap 242.			
6.	Operation of Proposed Project Facility	Health issues of Facility Workers, Truck Drivers and Community	– Sensitize workers and community on sexually transmitted diseases especially STIs and HIV/AIDS which is spread through socialization and unprotected sex; – Provide workers and community with condoms. – Encourage Workers, Truck Drivers and Community to go for HIV Testing and Counselling in order to live a productive life; This is in line with: Public Health Act Cap 242 Occupational Safety and Health Act (OSHA) 2007	Milly Glass SEZ Ltd Ministry of Health Local Administration	Presence of a HIV Programme at the Facility Records of disease incidences /prevalence (URTI, HIV/AIDS, Water Borne Diseases etc.	100,000/= for sensitization and provision of condoms.
7.	Operation of Proposed Project Facility	Monitoring and Evaluation of the	– Implementation of monitoring of – facility operations and success of proposed mitigations	Milly Glass SEZ Ltd site manager Local Administration	Quarterly Reports on Facility performance	Routine Operation of the Facility

		effectiveness of project Mitigations	– Health Trends (URTI, Malaria, STIs and HIV/AIDS); – Livelihood and socio-economic status of project area community; – Community perception on the facility – Any new emerging issues, threats and benefits of the LPG Storage Facility			
Decommissioning Phase						
1.	Decommissioning of Proposed Project Facility	Air Pollution (dust, smoke, fuel emissions)	– Control of demolition vehicle speeds; – Prohibition of idling of vehicles; – Water is to be sprayed on building undergoing demolition during decommissioning o reduce dust emission; Regular maintenance of vehicles and equipment; – Provision of dust masks for use in dusty conditions. – Use of serviceable vehicles and machinery to avoid excessive smoke emission	Milly Glass SEZ Ltd Decommissioning Contractor	Decommissioning Records	Approx. 200,000/= for nose protection equipment (dust masks)

			These is in line with: Environmental Management and Coordination Act 1999 Amended 2015 Occupational Safety and Health Act (OSHA) 2007			
2.	Decommissioning of Proposed Project Facility	Noise pollution	Noise reduction/ hearing protection devices when working with noisy equipment; Use of serviceable equipment with low noise level; Instruction to truck/machinery operators to avoid raving engines; Use of noise protection (ear muff) during demolition; This is in line with: Environmental Management and Coordination Act 1999 Amended 2015. Occupational Safety and Health Act (OSHA), 2007.	Milly Glass SEZ Ltd Decommissioning Contractor	Decommissioning Records	Approx. 200,000/= for noise pollution mitigation
3.	Decommissioning of Proposed Project Facility	Potential Injury to Workers	– Use of appropriate head, hand and feet protection (PPE) during demolition of structures	Milly Glass SEZ Ltd Decommissioning Contractor	Availability appropriate gear/Records Use of Proper PPE	Approx. 200,000/= for PPE and other

			– Adopting ergonomic work flow designs that fit physical tasks to employees and not vice versa while maintaining a balance with productivity; This is in line with: Occupational Safety and Health Act (OSHA) 2007			safety equipment
4.	Decommissioning of Proposed Project Facility	Working at heights	– Use construction site barrier tape to isolate the site to guard site visitors from accidents and injuries; – Implement a fall protection program that includes training in climbing techniques and use of fall protection measures, Provide Harnesses;	Milly Glass SEZ Ltd Decommissioning Contractor	Availability of appropriate Safety Gear/Records Proper use of PPE	Approx. 100,000/= for PPE and other safety equipment

CHAPTER EIGHT

8.0 RECOMMENDATIONS AND CONCLUSION

This chapter summarizes the key findings of the study, makes a conclusion regarding the impact assessment findings and presents the environmental consultants' recommendations on the Proposed Glass Bottles Manufacturing Plant on Plot No. Mombasa/Municipality Block LX/1483 Dongo Kundu Special Economic Zone in Mombasa County.

8.1 Summary and Conclusion

The applicant, Milly Glass SEZ Limited is facilitating the application for a glass bottle manufacturing plant which would be developed and operated on a 6 Ha parcel of land registered as L.R No. Mombasa/Municipality Block LX/1483 Dongo Kundu Special Economic Zone in Mombasa County. The proposed plant would mainly produce amber colored pharmaceutical bottles. The facility would comprise a batch plant, main manufacturing warehouse with LPG/HFO fired 75 TPD furnace, two warehouses. The annual glass bottles production target would be approximately 290 000 tons. The proposed facility would be located on L.R number Mombasa/Municipality Block LX/1483 within the Dongo Kundu Special Economic Zone in Bububu Sub-Location, Nguta Location within Likoni Sub-County in Mombasa County.

The development and operation of the proposed glass bottle manufacturing plant includes activities listed in the EMCA Amended Second Schedule through Legal Notice No 31 of 2019 as a High-Risk project category (9) Processing and manufacturing industries, including: - (d) glass works, for which a full environmental and social impact assessment study shall be undertaken. This environmental and social impact assessment was undertaken in order to apply for authorization from NEMA for the development of the proposed glass bottles manufacturing plant.

Specialist input was provided to assess likely impacts of the proposed project on the biophysical, socioeconomic and cultural aspects of the environment. The findings of the specialist studies and other relevant information have been integrated and synthesized into this ESIA study report. The two main objectives of this ESIA study report are, firstly, to assess the environmental significance of impacts resulting from the proposed glass bottle manufacturing plant activities and to suggest ways of mitigating negative impacts and enhancing benefits, and secondly to provide interested and affected persons (I & Aps) with an opportunity to comment on the environmental impacts of the proposed project.

A summary of the assessment of potential environmental impacts associated with the proposed project is provided in Table 8-1.

The mitigated assessment assumes that technical design controls, as included in the project scope, together with mitigation measures included in the environmental and social management plan (ESMP) would be included in the detailed design of the plant and implemented when the plant is constructed and operated. As a result, the majority of potential biophysical impacts associated with the proposed glass bottle manufacturing plant shall be short-term and limited either to the site or neighboring land. These include impacts on soils, terrestrial habitats and biodiversity, wetlands, drainage patterns, groundwater aquifers and the visual environment. The potential impacts on biophysical aspects are considered to be of **LOW** or **VERY LOW** significance with mitigation.

Table 31: Summary of Significance of the Potential Impacts of the Proposed Project

Potential impact	Significance of impacts	
	Without mitigation	With mitigation
Increase in ambient air concentrations	H	L to M
Loss of agricultural soil resources through physical disturbance	M	VL to L
Loss of agricultural soil resources through contamination	L to M	VL
Increase in disturbing noise levels affecting potential human receptors	M	L
Loss of terrestrial habitat and biodiversity through physical disturbance	M	L
Loss of wetland habitat and biodiversity through physical disturbance	L	VL
Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality	L to M	L to VL
Alteration of drainage patterns affecting the flow of water in downstream systems	M	L
Discharges from project affecting the quality of downstream freshwater resources	* Assessed under aquatic habitats	
Contamination of groundwater quality affecting the aquifer	L to M	VL
Alteration of the visual environment	M	L
Economic impact (positive and negative)	H+	H to VH+
Social benefits associated with employment and economic development	L+	M+
Changes in land value	M	L+
Reduction in grazing land affecting livelihoods of local farmers	L	VL+
Disturbance to third party road users by project-related traffic	H	L+
Increase in safety risks to third parties and communities	H	L
Change in land use affecting sense of place	L	VL
Disturbance of ground resulting in damage to heritage resources	No impact	

VH – Very High; H – High; M- Medium; L – Low; VL – Very Low; + denotes a positive impact;

Operational activities present the most potential for negative air quality impacts as these activities would be conducted over a long period. More significant impacts are predicted to occur due to PM_{2.5} and PM₁₀ emissions from material handling at the batch plant. Design controls and additional mitigation would reduce potential impacts. The impact on air quality and the related inhalation health impacts is considered to be of **HIGH** significance without

mitigation and **LOW to MEDIUM** significance with design controls and additional mitigation. Maintenance of a high efficiency for emissions controls during operations will be important.

The nearest residential area to the project site is the staff accommodation associated with the correctional services facility and the informal cattle kraals. Potential noise impacts on these receptor groups could be significant during all project phases, more especially at night. Noise controls that focus on mitigating noise emissions at source have been designed into the plant with the addition of a noise screen between the plant and the correctional services staff accommodation. With these design controls and mitigation measures, potential noise impacts could be reduced to **LOW** significance.

Potential discharge of treated effluent from the on-site sewage package plant could impact on the aquatic ecosystem in the downstream water resources. However, the treatment plant would be operated to treat effluent to acceptable standards for discharge into the environment. Therefore, any impacts on downstream aquatic habitats are considered to be of **VERY LOW to LOW** significance with mitigation.

Economic impacts associated with employment and economic development is considered to be of **HIGH** significance even without mitigation. With mitigation this is considered to be of **HIGH to VERY HIGH** significance. The substantial capital investment is likely to increase land values, unless other negative environmental and social impacts affect adjacent land use. The project would generate significantly more employment and economic value than the site currently does. These factors would contribute to economic growth and socio-economic development in the area. The related social benefits are also considered to be positive in nature. Key to realizing the **MEDIUM** positive mitigated significance of social benefits associated with increased employment and economic development is to recruit employees and procure services locally as far as possible and implement corporate social responsibility initiatives in the local area.

A reduction in grazing land used by the local community could affect the livelihoods of local farmers. Even without mitigation this is predicted to be of **LOW** significance. Where the local community is given preference in Corporate Social Responsibility initiatives, the significance of potential impacts is considered to be **VERY LOW positive**.

The project has the potential to present safety risks to third parties through project-related traffic on public roads and uncontrolled access to the site. However, with design controls and mitigation, potential safety impacts are considered to be of **VERY LOW** significance. In the case of project-related traffic, proposed road and pedestrian accommodation upgrades would result in a **LOW positive** improvement of the road network.

No impacts on heritage and cultural resources are expected as no heritage resources occur on the project site and paleontological resources, if they do exist, would be located well below the foundations of the plant.

Proceeding with the project attracts potentially significant economic benefits and potential negative environmental and social impacts of moderate or lower significance. Not proceeding with the project retains the status quo, but with a loss in employment opportunities, revenue generation and related social benefits, which could potentially be

generated by the development. The project is located within an area earmarked for commercial and industrial development in the Dongo Kundu Special Economic Zone in Mombasa County.

8.2 Opinion of Environmental Assessment Consultants

The key principles of sustainability, including ecological integrity, economic efficiency, and equity and social justice, are integrated below as part of the supporting rationale for recommending an opinion on whether the proposed project should be approved.

Ecological integrity

The key ecological impact would be the loss of approximately 6 ha of indigenous vegetation, which is predominantly grassland. Fieldwork confirmed that the grassland is secondary in nature and degraded due to intensive grazing. The area was assessed as being of moderately low ecological sensitivity. The site does not have wetlands. The disturbance of grassland that would result from the development of the project structures and supporting infrastructure is considered of negligible significance as these areas are not ecologically sensitive nor are, they of conservation significance. It is also recommended that the future landscaped areas be managed as natural areas.

Discharge of treated sewage effluent could pose a risk to the downstream aquatic environment. However, as the proponent will ensure the treated effluent conform to standards for discharge into the environment, it is not anticipated to cause a detectable impact to aquatic biodiversity.

Economic efficiency

Due to the scale of investment and revenue, the proposed project could contribute significantly to local economy through the provision of employment opportunities for individuals and procurement opportunities for locally based enterprises. Land value, direct revenue and employment value that could be derived from the project significantly outweigh the maximum values that could be realized from the current use or even commercial farming. The positioning of the project with good access to major highways is important as the facility would receive large volumes of raw materials and distribute large volumes of glass bottles. Overall, the proposed development is considered to be economically efficient.

Equity and social justice

The proposed project is considered to be consistent with and in support of the broad national policy framework for the development of the manufacturing industry in Kenya. On a regional and local level, the proposed project is in line with the planning frameworks for the region. With the recent rezoning of the site area as a special economic zone, the proposed project would be in line with the consent use of the zoning.

At present, there is no glass factory in East and Central Africa producing pharmaceutical bottles and this will be the first of its kind. Having a local pharmaceutical glass manufacturing plant will also make Kenya attractive to pharmaceutical manufacturing entities in setting up their plants in the country. This will have a ripple effect in

spurring manufacturing within the country and a positive step towards retaining foreign currency from repatriation. The realization of project benefits to local participants would require specific internal policy and locally focused Corporate Social Responsibility initiatives.

The proposed project would, however, have a direct impact on residents living at the local area in terms of traffic, noise and visual impacts. However, with the implementation of the recommended mitigation measures it is believed that these impacts can be sufficiently mitigated. From an air quality perspective, the project could further impact the ambient air quality. Compliance with the PM₁₀ and PM_{2.5} concentrations could be achieved with additional mitigation (i.e. 98% efficiency on the emission controls at the batch plant).

Conclusion and Recommendation

It is the opinion of the environmental experts that in terms of the sustainability criteria described above there is no reason why the proposed project, with implementation of the proposed mitigation measures, should not receive a favorable decision. The management and mitigation measures recommended for the proposed project are detailed in the Environmental and Social Management Plan for construction and operation.

CHAPTER NINE

9.0 REFERENCES

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Constitution of Kenya, 2010;

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ANNEXES

1. Copy of proponent's certificate of incorporation
2. Copy of proponent's KRA PIN
3. Copy of lease agreement,
4. Evidence of public participation
5. Copies of experts practicing licenses
6. Baseline soil and water analysis results
7. Baseline noise survey
8. Copy of site plan