Environmental Impact Assessment Study Report for the Proposed Edible Oil Refinery and Godowns on Plot No. 1313/III/MN, Kikambala, Kilifi County.

3°54'22.20'' South and Longitude 39°46'14.56'' East

Proponent

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CERTIFICATION

LEAD CONSULTANT/TEAM LEADER

I, **FREDRICK OWITI AWUOR** submits this Environmental Impact Assessment study, for the proposed **EDIBLE OILS REFINERY AND GODOWNS** on **plots no. 1313/III/MN KIKAMBALA, KILIFI COUNTY.** The Environmental Impact Assessment Study has been carried out according to the Environmental Management and Coordination act cap 387 and Environmental (Impact Assessment and Audit) Regulations, 2003.

Signed at Mombasa on this…….. ***Day of NOVEMBER, 2018***

Signature. …….

Designation: EIA/Audit Lead Expert Reg. No. 1265

PROPONENT

We MVITA OILS LIMITED submit this Environmental Impact Assessment study report, for the proposed **edible oils refinery and godowns** on **plot no. 1313/III/MN Kikambala Kilifi County.** The Environmental Impact Assessment Study has been carried out according to the Environmental Management and Coordination Act cap 387 and Environmental (Impact Assessment and Audit) Regulations, 2003.

Signed at* Mombasa *on this…….. ***Day of November, 2018.***

Signature. …….

Designation: Proponent

ACKNOWLEDGEMENTS

The consultancy team Greplan Management Consultants Limited would like to acknowledge the client: Mvita Oils Limited for providing logistics and necessary support to enable the carrying out of the assessment for the proposed Edible oil Refinery and godowns in Kakambala. We would also like to acknowledge the initial work done by Mr. Simon Nzuki and his team which has become the backbone of our study. We would like to acknowledge the neighbours who offered to share with us their views concerning the proposed project. We could not acknowledge everyone inidividually, but to all we say thank you.

EXECUTIVE SUMMARY

Introduction

Over the year there has been unprecedented economic growth without due regard to the conservation of environment. This has led to environmental degradation hence affecting the same resource base that economic development should be anchored. Kenya having enacted its environmental law in EMCA in 1999 and revised it in 2015 demands that projects such as the proposed edible oil refinery and godown under the second schedule of EMCA act cap 387 of 2015 undertake an environmental study report so as to unravel the grey areas that may appear in a proposed project.

The proposed project of Edible oil refinery and godowns will be located in Kikambala, within Kilifi County in an area designated as a light industrial zone. This has also installations like water purification plants, hotels, Export Processing zones (EPZ) just to name a few. This therefore correctly zones the proposed project as 'correctly located" according to physical planning act. The proposed project will occupy a total area of 10,500sqm.

Project location

The proposed site is along Mombasa-Kilifi road, part of the expansive land borders the road. This makes entry and exit convenient and hence will not interfere with the neighbours. The site is currently occupied with old structures which were previously used for poultry farming. The neighborhood is predominantly a mix of residential, industrial and agricultural establishments, and is generally consistent with the ongoing development. Among the several developments neighboring the site include the Anwar farm, the SSall's farm and Bablin's house

EIA project report methodology and approaches

The general methodology for preparation of EIA study reports in Kenya is prescribed by NEMA (2003). Initial due procedures for the project included environmental screening and scoping which was undertaken by the consultancy firm (Envasses Environmental Consultants limited in June 2018 under the lead Expert Simon Nzuki) in consultation with the project proponent was used. Participatory approaches (Lelo, 2002) which included use of semi structured interviews transect walks, observations and correspondences were employed to collect pertinent data and information. The methodology for the EIA study further included photography, sites visits, desktop environmental studies and systematic observations to provide additional data and information especially in impact identification, classification and assessment. Analyses of the possible alternatives to the investment were also considered.

Project design and description

The proposed project will involve the demolition, construction, subsequent operation and possible decommissioning of a commercial development. The proposed development will typically comprise of a construction of godowns and offices, installation of edible oil refineries and soap making plant on plot no MN/III/1313

The complete project will comprise of a typical ground and first floor plan. It shall consist of the following sections:

- Refinery on the ground and first floor
- Four godowns
- Office block ground floor and first floor
- Store blocks on the ground and first floor

Other installations to support the edible oil refinery will include:

- Boilers
- Generator room
- Reverse osmosis plant
- Water treatment plant

NB. Soap making plant will be installed to use the waste product (PFAD) of edible oil refinery process, hence making it a closed loop process.

Project's benefits

The project's direct benefits include but are not limited to the following;

1. Provision of edible oil and soap to the local community.
2. Employment and source of income to consultants including engineers, architects and EIA experts and the locals.
3. Income to government in form of taxes, levies and licensing fees
4. Development in the area
5. Meeting godowns demands of the client

Relevant legal, regulatory and policy framework

The EIA study reported herein was informed by various legislative and regulatory

Requirements:

- The Environmental Management and Coordination Act cap 387
- The National Environment Action Plan (NEAP);
- Physical Planning Act (Cap. 286);
- Land Planning Act (Cap. 303);

- Occupational Safety and Health Act No. 15 of 2007; and
- The Water Act of 2016.
- Devolution act 2012

Stakeholder concerns during public consultation

The issues raised by neighbours of the plot were thought to be pertinent to the eventual success of the proposed project. These were:

- Noise and dust pollution at early stages of the project cycle (demolition and construction).
- Health and safety of workers during operations;
- Management of Heavy Commercial Traffic during operational phase;
- Acquisition of EIA licence from NEMA;

The following issues were addressed by:

- The client will not use the community access road but instead use the main get immediately facing the road.
- Safety and health issues will be observed during the phases of the project.
- Noise and dust will be fully addressed through engineering and administrative methods
- The proponent will only operate after acquisition of EIA licence.

NEGATIVE IMPACTS OF THE PROJECT AND MITIGATION MEASURES AT DEMOLITION PHASE

Noise pollution

Noise is expected from movement of vehicles, demolition vibrations and construction equipment. It would also arise from construction activities at the site such loading and offloading of material, carpentry, masonry and partial demolition activities.

Recommended mitigation measures

- Restricting demolition to day time only.
- Using well-conditioned demolition machines.

- Providing those working at the site with PEE such as ear muffs and earplugs to reduce the levels of noise reaching the inner ear.
- Apply for a demolition Permit from the County Government of Kilifi.
- Ensure compliance with the set noise level limits in line with schedule I of LN. 61 of 2009
- Employees using equipment that produce peak sounds shall be provided with PPE such as earmuffs,

Impact on air quality

Air quality is anticipated to deteriorate as a result of (suspended particulate matter (SPM), noxious fumes and GHGs. At this phase, SPM (dust) would be the primary cause of air pollution expected from the removal of the roofing materials, cement and applications of backing and facing whereas noxious fumes and GHGs will be expected from petroleum powered equipment, paints etc. These if generated in large quantities may present a respiratory hazard and also cause visual intrusion hence presenting health risks.

Recommended mitigation measures

- The rubble will be sprinkled with water.
- Demolition will be conducted within the shortest time possible
- Restricting demolition to daytime at times when the wind intensity is low.
- The site will be sheltered to minimize exposure to the neighbours
- Workers on site will be provided with the necessary PPE such as dust masks.
- The contractor will deploy dust control screens.

Demolition waste

Solid wastes generated during this demolition phase will result from discarded materials which include; roofing waste, metal and wood cuttings, rejected materials and paints. If not properly managed, these generated wastes will add to risks on health, safety and environment such as water pollution,

Recommended mitigation measures

- Comply with the Waste Management Regulations, 2006
- Recyclable waste to be collected and sent to NEMA licensed recyclers
- Woods from the roofing to be reused for fueling or sold to neighbours
- Hand over all 'unusable' solid wastes to the contracted NEMA licensed waste handler

- All recyclable materials should be collected and sent to NEMA licensed recyclers
- Recover the reusable and recyclable components of the waste either for use in the new construction or for sale to other constructors/ recyclers.

Occupational health and safety hazards

Workers at the site will be exposed to various hazards in the course of their duties. It's the responsibility of the client to register the place as a 'work place' and make to protect the workers as they carry out their activities.

Recommended Mitigation measures

- Provide adequate and appropriate Personal Protective Equipment (PPE) including safety shoes, helmets, gloves, overalls etc.
- Employees to be given the correct tools and equipment for the jobs assigned and trained on their use
- First aid services and an emergency vehicle to be readily available at site
- Clear signposting and warning signs on site.
- Accidents will be investigated and appropriate measure to prevent recurrence.
- Demarcate routes and designate adequate parking with appropriate signage.
- Moving parts of machines and sharp surfaces to be securely protected with guards to avoid unnecessary contacts and injuries during construction phase
- The contractor to implement the provisions of the Occupational Safety and Health Act, No. 15 of 2007

NEGATIVE IMPACTS AND MITIGATION MEASURES AT CONSTRUCTION PHASE

Continued sourcing of raw materials

The project will source for raw materials from the environment including sand, ballast, building blocks, cement, steel, wood etc. These materials will have an impact on the environment at their point of origin either through extraction or industrial pollution associated with their production.

Recommended mitigation measures

- The contractor will obtain raw materials for the construction from sources that are compliant with NEMA Regulations.
- The contractor will procure quantities that are sufficient for the intended works only and recycle as far as practical to curtail wastage.
- The contractor will commit to extensive use of recycled raw materials as will be appropriate and in a manner that does not compromise the safety of the development.

Destruction of the physical environment

The construction process will involve excavation of foundation walls and bases for the columns. This will interfere with the structural orientation of the soils. Movement of machines and people will also lead to soil compaction. While excavations will lead to mixing of soil parts that may contain toxins, compaction may lead to lack of soil aeration. Its important that the compacted parts are ripped off/landscaped after construction and that the mixed soil parts do not contain toxic materials that may transfer pollutants especially during dumping of tailings.

Solid wastes

These activities undertaken during the construction phase are expected to generate considerable quantities of solid wastes such as cuttings, rejected materials, plastic materials, paper, wood etc. These will need to be managed appropriately

Recommended management measures

- Installation of litter bins and a receptacle that encourage separation of wastes at source to promote re-use and re-cycling,
- Recycle and reuse as much as practical within the construction site
- Procure the services of a NEMA licensed waste handler to manage solid wastes from the construction site
- All recyclable materials should be collected and sent to NEMA licensed recyclers

Safety of visitors, neighbors and general public

The proponent and the contractor will have an obligation to put in place measures that will protect the visitors to the construction site, neighbors, and the general public.

Recommended mitigation measures

- Visitors to the project site must be provided with PPE at all times,
- Inform all neighbors in writing on the commencement of the project at least two weeks in advance,
- Restrict access to the site by the public by fencing off the construction site,
- Vehicles accessing the site to deliver construction materials must maintain slow speeds,
- Conspicuously display safety signs and warning posters visible to the public
- Provide for security services at the site

Noise Pollution

Noise from the trucks and other machinery may be a concern during the operations on the site. However, the impact of the noise is expected to be minimal since the proposed site is next the road and about 10m radius is available to the existing neighbours.

Recommended mitigation measures

- Operations to be restricted to daytime only to minimize disturbance to neighbors residing near the site
- Use equipment indicated, by the various manufacturers/suppliers, as having low noise emissions.
- Employees using equipment that produce peak sounds shall be provided with earmuffs,
- The proponent will comply with Noise Regulations (Legal Notice No. 61 of 2009)

- Use equipment that is properly fitted with noise reduction devices (i.e. mufflers, silencers etc.).
- Sensitize truck drivers to avoid running of vehicle engines or hooting unnecessarily

Wastewater and effluent generation

Various activities will generate wastewater from cleaning among other activities involved with the use of water whereas effluent will be generated by the site workforce and hence will need proper handling

Recommended mitigation measures

- The workforce will to be provided with sanitary facilities
- Contract a NEMA licensed effluent handler to periodically de-sludge the septic tank
- Consider conducting an effluent analysis in liaison with a NEMA licensed laboratory.

Traffic issues

The construction works are expected to increase the traffic, along Mombasa Malindi road, by trucks ferrying the construction materials and people nucleating around the site. This is likely to cause traffic snarl-up especially during busy days at the site. The impact of traffic is however expected to be minimal since the area is residential in character.

Recommended mitigation measures

- Heavy commercial vehicles ferrying material to the construction site shall maintain slow speeds when traversing the area
- Proper signage and warnings shall be placed on the road to forewarn other motorists on the use of the road by construction machinery.
- Deploy flagmen and spotters to guide traffic as the HCVs and earthmovers call at the site and turn
- All machinery utilized at the construction site will be accommodated within the site and the road reserve kept clear
- Only allow the number of vehicles that can be accommodated at time

NEGATIVE IMPACTS AND MITIGATION MEASURES AT OPERATIONAL PHASE

Waste water generation and possible water quality degradation

The operational stage of the project will generate wastewater. The waste water will emanate from:

- The sanitary facilities used by the workers.
- Contaminated water bath during deoderization using vacuum system

- Contaminated water during soap drying process in the vacuum system.
- Waste water after steam generation in the boilers
- Clean-ups within the production area

Recommended mitigation measures

- Install a bio-digester to effectively manage effluent generated from the sanitary facilities and engage NEMA licensed contractors to manage the resultant sludge
- Conduct quarterly monitoring of the effluent discharged from the bio-digester against standards set out in schedule III of Water Quality Regulations, 2006
- Apply for and obtain an Effluent Discharge License from NEMA
- Explore technological options that promote usage of less water to reduce waste water generation at source.
- Install water saving systems e.g. self-closing taps and deploy water conservation signage

Noise generation

Noise is expected to arise from movement of vehicles into and out of the facility especially from workforce and Heavy Commercial Vehicles (HCVs). Noise would further be expected from the industrial nature of the facility owing to the day-to-day operations. The source of noise from the refinery will be from:

- The boilers
- Stand-by generator
- Pumps within the production system e.g at the deodorizer system.
- Operations of the Reverse Osmosis Plant

The impact of noise from the proposed facility is expected to be low due to the nature of activities to be conducted within the facility and the wider neighborhood.

Recommended mitigation measures

- Deploy acoustic screens around noisy areas
- Locate the plant far away from the neighbours
- Provide appropriate PPE to workers exposed to high noise levels
- Deploy only muffled machinery for use at the facility/noise cabins
- Monitor noise levels at the facility and fully comply with the permissible noise limits as specified in L.N. 61, Noise regulations
- Consult the neighbours frequently on their views of noise of the facility and correct accordingly.

Air pollution and Dust

Air pollution and dust emissions will occur during production process of heating of crude edible oil to liquid by use Heavy Fuel Oil (HFO) of firewood. The ferrying of goods by HCVs to and from the facility will also generate dust. Other particulates may also present hazards to the workers at the facility; these may be from sources such as stored materials like grains, teas and floor sweepings

Recommended mitigation measures

- Regular air quality monitoring through sampling and analysis of stack air emissions by a NEMA designated laboratory in compliance with Legal Notice No. 31-Air Quality Regulations,2014
- Only serviceable machinery which meets emission standards under the Air Quality Regulations should be used at the site
- Use only low Sulphur and unleaded fuels to curtail emission of GHGs
- Provide PPE such as respirators to workers exposed to dust during operations

Increased water demand

The facility will exert an extra demand on water, as it would be required for sanitation purposes, general cleaning among other uses. This causes strain on the water resources. According to planned operation water requirements, boilers will require 25m^3 of water per day, while deodorizer will require 3m^3 of water per week.

The development will primarily rely on water supplied by KIMAWASCO and existing boreholes at the site. The proponent will liaise with WRA to ascertain the yield and quality of water discharged from the borehole for its continued use.

Recommended mitigation measures

- The proponent will Install water saving systems e.g. self-closing taps and deploy water conservation signage
- Make structural provisions within the development plan to harness rain water.
- Water use will be metered for monitoring of usage and identifying wastage incidents.
- Recycle the treated water from the bio-digester for re-use in external cleaning and fire-fighting
- Register the existing borehole and obtain a water abstraction permit from WRA and abide by the abstraction limits
- Conduct quarterly monitoring of the quality of water discharged from the borehole against standards set out in schedule I of LN 120 of 2006 (Water Quality regulations)

Increased demand for electricity

Operation of the development will require use of electric energy in lighting and powering electrical appliances that will be

deployed in the facility. Since electric energy in Kenya is generated mainly through natural resources, namely water and geothermal resources, increased use of electricity have adverse impacts on these natural resources base due to accelerated depletion. The facility is already connected to mains supply from the national grid supplied by KPC and backup generators will be used to meet the energy demand

Recommended mitigation measures

- Exploit renewable energy sources e.g solar to supplement mains supply.
- Electricity use will be metered for monitoring of usage and identifying wastage incidents
- Install compact fluorescent lights in high use areas – they last longer and use 75% less energy than normal light bulbs.
- The proponent will monitor energy use during operations and maintain records
- The proponent will conduct energy auditing at least once every three years implement corrective measures

Solid waste

Waste is expected to result from the operations of the development. The wastes will be in the form of waste wrappings, boxes, straps, broken pallets plastic wastes, e-wastes, primary polythene packaging and office wastes.

The waste requires to be handled appropriately in order to maintain a clean environment for all. Among the effects associated with solid waste includes; Injuries, generation of odours and public hazards

The solid waste management plan for the proposed facility will focus on the storing, collection, and disposal of all the solid waste that is produced. This program will implement and develop waste minimization strategies designed to maximize the use of recyclable and reusable materials as well as to report the generated volumes and its reduction schemes. Both construction and operational phase wastes will be treated according to the Waste Management Regulations (Legal Notice No. 121 of 2006).

With this in mind, the solid waste produced by the facility will be separated into organic and inorganic with the inorganic being further separated into combustible and non-combustible.

Recommended mitigation measures

- The proponent shall provide waste segregation bins strategically designed to encourage the separation of wastes at source to promote re-use and re-cycling,
- Designate a dedicated waste collection area sheltered away from scavengers and wind action

- Contract a NEMA licensed waste handler to manage the wastes
- Comply with Legal Notice No.121 Waste Management Regulations, 2006 and Gazette Notice No. 2356 banning the manufacture, importation sale and use plastics bags as secondary packaging material

Fire hazards

Fire hazards are real threats to godowns and refinery storage facilities. Threats of fire must be accorded adequate attention and swift action in case of a break out. Fire hazards at the proposed facility may be due to spillage/leakage of flammable liquids such as fuels, electrical faults, operational negligence etc. these may result losses in terms of injury to persons and damage to property.

Recommended mitigation measures

- The proponent will develop and implement a tailor made fire action plan for the facility
- Firefighting equipment such as extinguishers and fire hydrants will be provided
- Contract a reputable fire company to periodically maintain the fire-fighting equipment
- Fire training and drills will conducted on a scheduled interval
- Provide for dedicated fire exits and a strategically situated fire assembly point
- Fire assembly point to be designated within the site
- Fire emergency telephone numbers to be displaced in each room

Structural safety and insecurity

Cases of insecurity may increase in the area once the development is open for use. Increased commercial and industrial activity will result into an influx of people seeking job opportunities. This influx also invites burglars who are attracted by the goods stored within the godown

Recommended mitigation measures

- The proponent will hire adequate security personnel from a reputable company
- Installation of CCTV cameras and alarms on and along the entrance and exit from the development
- The proponent shall ensure that construction is done as per the approved drawings in adherence to the building code 1968 and the provisions of the National Construction Act, 2011
- The building will be constructed strictly to engineers' details and prescriptions in terms of materials quality and time frame to ensure no risk of building collapsing.

Occupational Safety and Health

Occupational hazards associated with the operations of the facility include but are not limited to injury to workers from movement of machinery, accidental falls and trips, injuries from falling objects and stacked goods, accidents caused by the moving trucks.

Recommended mitigation measures

- Train workers in the facility and conduct constant awareness programme concerning workplace hazards
- The operators should be provided with full safety gear (PPE) and trained on occupational health and safety in line with the Occupational Safety and Health Act No. 15 of 2007.
- Fire-fighting equipment should be provided at strategic points and First aid kits should be provided.
- Provide documentation of all incidences and accidents occurring on the site including near misses.
- Develop an effective Emergency Response Plan (ERP) and enlighten the staff on safety measures and procedures through training.
- Register the facility with DOSHS as a workplace in line with the Occupational Safety and Health Act No. 15 of 2007.
- Conduct annual health and safety audits and implement recommendations
- Clear signage will be posted alerting of possible danger situations.

Traffic increase

Traffic to and from the facility will increase once it commences operations. This will be attributed to the use of vehicles by staff working at the facility as well as the general public. The impact of traffic is however expected to be minimal since the area is industrial in character and the reads area already in use by HCVs, the following measures will be put in place notwithstanding.

Recommended mitigation measures

- Adequate parking and loading/offloading space has been provided for in the design of the development
- Trucks will only be parked loaded/offloaded at designated parking areas
- Erect speed limit signage and hazard demarcations along the access road
- Compel drivers to comply with recommended speeds. This should be monitored by the proponent in collaboration with the County Traffic Units

Possible decommissioning phase

A third phase of the project i.e. decommissioning is possible. A number of factors may contribute to the need for decommissioning including;

- End of project life,

- An order by a court of law due to non-compliance with existing regulations,
- Change of user, and
- Natural calamities.

Negative impacts at decommissioning phase may be in form of socio-economic decline, solid wastes, insecurity, safety risks etc.

At the decommissioning stage, the proponent will prepare a due diligence decommissioning audit report in line with Legal Notice No. 101 of 2003 and submit it to NEMA for approval at least three months in advance.

Public consultation process and results

Environmental Monitoring Programme (EMP)

In order to sustain a healthy and safe environment for the proposed development, a plan for environmental monitoring is proposed. Monitoring will involve measurements, observations, evaluations, assessment and reporting on various environmental attributes including, waste management environmental quality.

The monitoring programme will involve the following parameters.

- Water Quality & Quantity monitoring
- Effluent monitoring
- Air quality monitoring
- Water and power usage
- Solid waste management
- Socio economic issues especially concerns from third parties

Conclusion and recommendations

The proposed edible oil refinery, godowns and soap plant project is considered important and beneficial to both the proponent and the general public. The negative impacts expected to arise during all the phases of the project can be managed to satisfactory levels that do not warrant significant environmental degradation. Additionally, the proposed development is located in an industrial/ commercial area and is well accommodated within Gorofani- Kikambala area. The foreseen environmental impacts are all mitigatable, through the proposed measures, to levels of low significance environmental damage and socially tolerable impacts.

It is therefore the recommendation of this report that the project be allowed to proceed on the basis that the environmental management plans EMP) for the project is fully implemented, monitored and that follow-up is made to ensure compliance as may be directed by NEMA and relevant lead agencies.

TABLE OF CONTENTS

ACRONYMS

AEZ	Agro-ecological zones
CDA	Coast Development Authority **CGM**
	County Government of Mombasa **CL**
	Coastal Lowlands
DOSHS	Directorate of Occupational Safety and Health Services **DWD**
	Department of Water Development
EA	Environmental Audit
EHS	Environmental Health and safety
EIA	Environmental Impact Assessment
EMAP	Environmental Management and Action Plan **EMCA**
	Environmental Management and Coordination Act **GoK**
	Government of Kenya
HCVs	Heavy Commercial Vehicles
KIMAWASCO	Kilifi-Mariakani Water and Sewerage Company **NEC**
	National Environmental Council
NEMA	National Environment Management Authority **NWSS**
	National Water Services Strategy
PPE	Personal Protective Equipment
UNEP	United Nations Environment Programme **VAT**
	Value Added Tax
WRA	Water Resources Authority

1 PROJECT BACKGROUND

1.1 Introduction

For a long time, the world over, policy makers have been directing all their efforts in economic development without due regard to the nature of the resource base on which the economic development depend on. As a result, there has been unprecedented environmental degradation, during project implementation and operation stages, due to lack of integration of environmental concerns into the project design, planning and management, thereby resulting into unsustainable development. Some of the Environmental Management tools used to achieve this is the Environmental Impact Assessment (EIA) study, done before the implementation of a new project and an Environmental Audit (EA) done on existing projects.

In regard of this, the proponent, Mvita Oils Limited with their offices in Mombasa commissioned Environmental Consultants to prepare an Environmental Impact Assessment study report for proposed godowns at Kikambala, Kilifi County. The main aim of this report is for the client to comply with the Environmental Management and Coordination (Amendment) Act, 2015 section 42 of EMCA and Legal Notice No.101 of 2003 (Rev 2016).

The assessment examined the potential impact of the proposed project on the immediate surroundings with due regard to all the phases of demolition, construction through to operation and decommissioning. It encompassed all aspects pertaining to the physical, ecological, socio-cultural, health and safety conditions at the site and its environs. The assessment was based on laid down scientific qualitative procedures with the most recent methodologies and analysis required in EIA and, strictly adheres to the relevant legislative framework governing the construction and industrial operations.

1.2 EIA proposal objectives

The EIA process purposes to ensure that environmental concerns are integrated in all phases of the project cycle in order to contribute to sustainable development. The specific objectives were as follows;

I. To identify and assess the potential environmental, health and safety impacts of the proposed project.

II. To propose appropriate mitigation measures for the management of environmental, health and safety impacts emanating from the project.

III. To make appropriate recommendations for environmental management organization and legislative compliance for the project.

IV. To ensure that issues raised by neighbors and project stakeholders are mainstreamed into the environmental management plan proposed for the project cycle.

V. To generate baseline data for monitoring and evaluation of how well the mitigation measures are being implemented during the project cycle,

VI. To present results of the EIA in such a way that they can guide informed decision making by NEMA.

1.3 scope and criteria of EIA study process

The study has been conducted to evaluate the environmental impacts of the edible oil refinery, godowns and soap plant for Mvita Oils Limited. Upon evaluation, recommendations are made on the accentuation of positive impacts and the mitigation of negative ones. The scope for the assessment dwelled on impacts the project will have on the following:

a) Physical environment;
b) Flora and fauna ;
c) Land use;
d) Socio-economic aspects;
e) Health and safety issues;
f) Archaeological/historical/cultural sites;
g) Fire response preparedness; and
h) Effluent containment.

The study was commissioned principally to comply with provisions of the Environmental Management and Coordination Act cap 387 and the Environmental (Impact Assessment and Audit) Regulations 2003. However, due to the sensitivity of environmental issues both locally and internationally, the expert has also taken into due consideration World Bank Guidelines and common international best practices in Environmental Impact Assessment studies.

1.3.1 Results of the screening process

After an initial evaluation on secondary data, it emerged that the following environmental aspects would **NOT** be affected by the proposed edible oil refinery, godown and soap making plant:

- **Archaeology and heritage –** since no known archaeological sites or historical buildings would be affected and the site has not been gazetted as such under the National Museums and Heritage Act, 2006.
- **Soils –** the risk of soil contamination is negligible as no chemical effluents will be discharged from the proposed development into the environment.
- The area is adjacent to the road hence the community roads will not be affected with **traffic congestion** during project operations.
- **The area** is designated as a light industrial zone and hence the project is rightly located.
- **No person** will be relocated to pave way for the project.
- There is no unique **plant or animal species** that inhabit the area that the proposed project will affect.

1.4 The scope of EIA study proposal

1.4.1 Geographical scope

The geographical scope of the EIA study focused on the project site area within Kikambala area and the immediate surroundings.

1.4.2 Technical scope

- The technical scope of the proposal considered all the environmental concerns of the project at operation and possible decommissioning. Therefore the scope of this EIA study proposal covered the following aspects;
- The nature and character of activities and processes at the site
- The baseline environmental and physical conditions of the project area,
- Detailed description of the project,
- Provisions of the relevant environmental, health and safety laws,
- Identification and analysis of any adverse impacts to the environment and neighboring communities likely to emanate from the project,
- Consultation with the immediate neighbors and key lead agencies on their opinion about the project,
- Development of proposals for implementation and monitoring of mitigation measures, and
- Provision of an outline of a detailed environmental management plan.

1.5 Assessment methodologies and materials

An extensively participatory methodology was applied in the study. This involved consultations with a wide spectrum of stakeholders. The study has benefited immensely from and was made relevant by observations accruing from these consultations. The tools employed for the study included:

1. Desktop review pertaining to project activities and salient environmental, socio-economic and other features of the project area.
2. Analysis of Topographical and GIS maps and other relevant demographic documentation.
3. On site reconnaissance surveys to interrogate the various impacts on the ground.
4. Structured interviews with key project stakeholders. This included the administering of questionnaires, copies of which are appended to this report.
5. Geological observation and analysis of the suitability of the site for the project.

1.6 Reporting and documentation

The reporting and documentation follows on the format provided by NEMA through both EMCA, (Amendment) Act, 2015 and the Environmental Impact Assessment and Audit Regulations- Legal Notice No.101 of 2003 (Rev. 2016). The proponent was continually informed throughout the period of report preparation to ensure that he was aware of the issues raised and the recommendations that were likely to be made regarding the best practices to mitigate environmental impacts.

2 PROJECT DESCRIPTION

2.1 Project location

The proposed project site is situated on Plot No. 1313/III/MN, Kikambala, approximately 200 Metres off Mombasa-Malindi road, Gorofani area, Kilifi County. The geo-reference points are

Latitude 3⁰54'22.20'' South and Longitude 39 ⁰46'14.56'' East at an elevation is 76Ft. above sea level.

The site is currently occupied with old structures which were previously used for poultry farming. The site is enclosed by meshed wire with an access gate. The neighborhood is predominantly a mix of residential, industrial and agricultural establishments, and is generally consistent with the ongoing development. Among the several developments neighboring the site include the Anwar

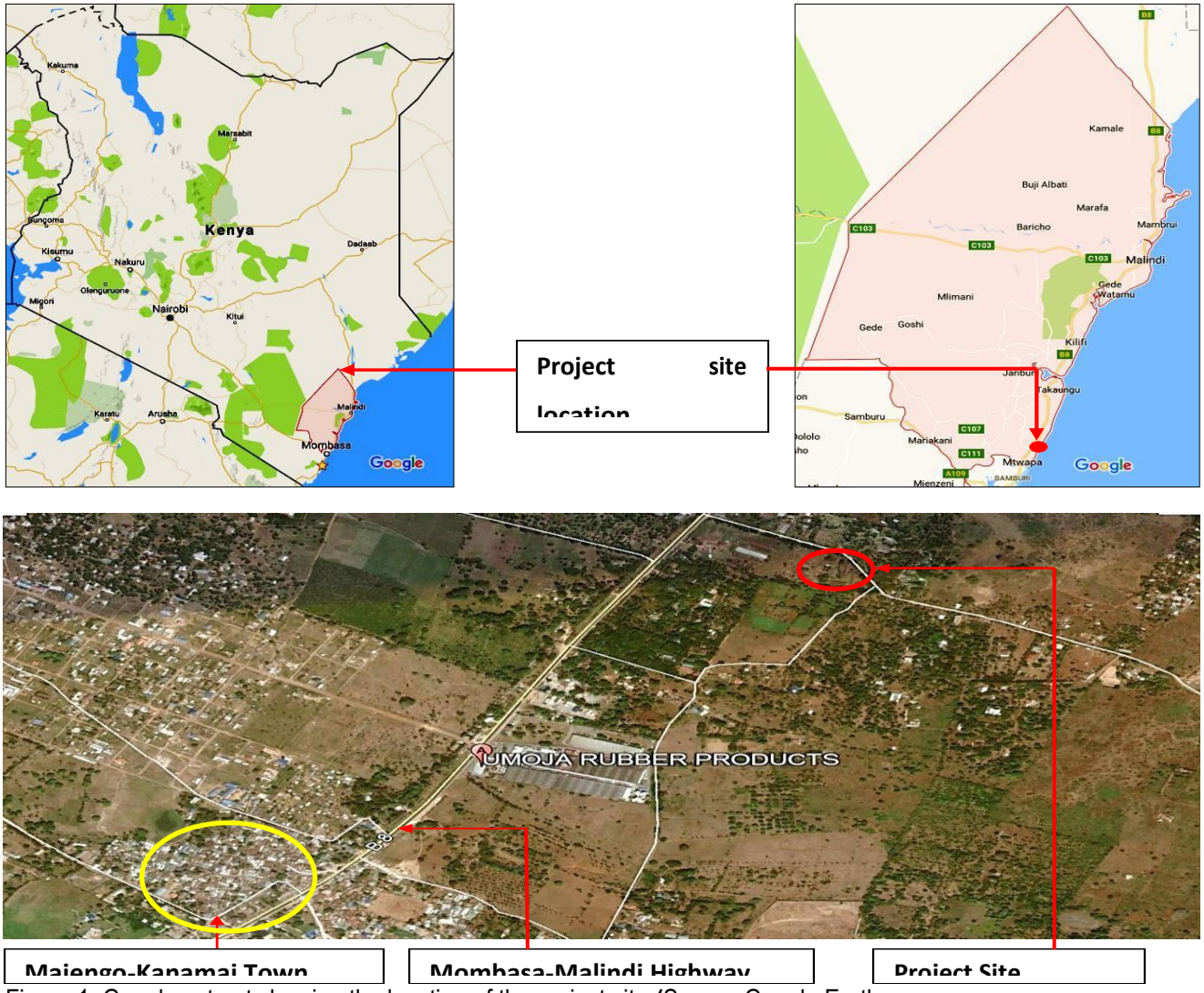

Figure 1: Google extract showing the location of the project site (Source-Google Earth

Figure 2: A section of the project site depicting its current status (Source: Site visit November, 2018)

Figure 3: A section of existing structure at the site to be demolished (Source: Site visit Nov, 2018

Plate 4. The site and materials to be used for construction works(site visit November 2018)

2.2 Project design and description

The proposed project will involve construction of Four godowns and operations of edible oil refinery and soap making plant. The edible oil refinery, will have several accessories for efficient operations. This will include: boilers, generators, Reverse osmosis plant and Effluent treatment plant.

The complete project will comprise of a typical ground and first floor plan to by a way of construction. It shall consist of the following sections:

- Refinery on the ground and first floor
- Four godowns
- Office block ground floor and first floor
- Store blocks on the ground and first floor

Other installations include:

- Kitchen
- Dining area
- changing rooms/washrooms
- Bedroom

2.3 Project descriptions and activities

The project activities include;

- Acquisition of pertinent approvals from relevant government agencies
- Site preparation activities
- Actual construction of the godown
- Operation of the godown
- Possible decommissioning of the project

2.4 Construction technology

The preparatory activities to be undertaken at the site will include excavation to create trenches for use in laying footings for the development. Foundations will then be laid, and eventually the construction works will follow. There will be use of machinery mainly for concrete mixing and lifting installations during the construction. This requires the contractor to undertake the use appropriate technology that will reduce the impact of both noise and dust at the site.

2.4.1 Dust management

The contractor will deploy dust control screens to mitigate the impact of dust during the construction activities. The effectiveness of the screens will mainly depend on their sizes since fine screens are more effective compared to course ones. Their effectiveness will also be a function of how well the site is covered. Worn out screens will need to be replaced on a regular basis and the contractor will ensure that the site is secured with screens throughout.

2.4.2 Noise pollution and management

Use of machinery at the site will be a source of noise. The contractor will therefore have an obligation to use suitable noise reduction strategies such as fitting silencers to noisy machines, deployment of acoustic screens etc. However due to the background activities, the noise levels at the construction site are expected to have minimal impact.

2.4.3 Construction material

Structural construction of the site will largely apply ordinary materials that are not expected to have significant impact on the environment. Among the material to be used include:

- Mined sand and building blocks- to be obtained from quarries which are mainly located within the county,
- Cement-manufactured locally - to be obtained mainly from local suppliers,
- Steel beams sourced from local steel millers
- Water fittings (pipes, valves and joineries) and other secondary materials such as, papers, polythene materials, and fabrics will be obtained locally,
- Electrical cables, lifts and other machinery will be sourced from Mombasa town,

2.5 Edible oil refinery

2.5.1 Refining Process

Refining is the process of making something pure or improving it by removing unwanted material Refining of vegetable oils is essential to ensure removal of gums, waxes, Phosphatides and free fatty acids from the oils. The Proponent intends to use Continuous Refining Line which is recommended for capacities higher than 30 tonnes per 24 hours. The continuous refining process entails the following steps

- Pretreatment/Degumming
- Neutralizing
- Bleaching
- Deodorization

2.5.2 Pre-treatment/Degumming

In this stage the oils are given acidic treatment where by gums are precipitated and separated out by centrifugal separation or only gum conditioning is carried out (when gum content is low)and gums are separated in subsequent neutralizing process.

2.5.3 Neutralizing

In this process the pre-treated oil is subjected to Alkali refining whereby the caustic soda reacts with free fatty acids present in the oil and forms a soap stock. The soap stock is separated out by centrifugal separator and the oil is washed with water to ensure complete removal of the soap stock. Wash water is separated out by centrifugal separators. The feedstock is heated up in the Crude/Neutral Oil Economiser or Crude/Neutral Oil Heater to degumming or bleaching temperature. When there is a need for acid pre-treatment, phosphoric acid is mixed vigorously with the oil in an Acid Mixer to ensure efficient mixing. The resultant mixture is then held in a Retention Tank to allow for the precipitation of gums before going to the Bleacher through the cascade vacuum dryer.

2.5.4 Bleaching

At the bleacher, the already neutralized oils are then treated with bleaching earth/activated carbon for removal of colouring pigments. The bleaching agent is filtered out in vertical pressureleaf filters. The bleaching line is versatile and adoptable for all varieties of vegetable oils. When acid pre-treatment is not required, the feed stock is fed directly to the Bleacher after heating through the cascade vacuum dryer. Bleaching Earth and Activated carbon is added to the oil through a dosing unit which is controlled by (Programmable Logic Controller) PLC. The Bleacher is proprietary designed with internal partitions and set of high efficiency turbine agitators to avoid short cycling and provide necessary retention time before filtration.

2.5.5 Deodorization

During neutralization and bleaching process, unpleasant odor is imparted to the oil, it is therefore essential to remove this odor. The deodorization is a process of removal of odiferous matter. The operation will be carried out at high temperature by injecting open steam and maintaining high vacuum at which time all odiferous matter is distilled of and carried away to barometric condensers through vacuum system. The resultant oil is odorless – deodorized oil. Vegetable oils like sunflower

and corn have wax present in them. At low temperature these waxes gives hazy appearance to oil. It is therefore crucial to remove these waxes prior to bottling and marketing of oil.

2.5.6 Packaging

This is the final stage of production whereby a coordinated system is employed in readiness for transportation, warehousing, logistics, sale, and end use.

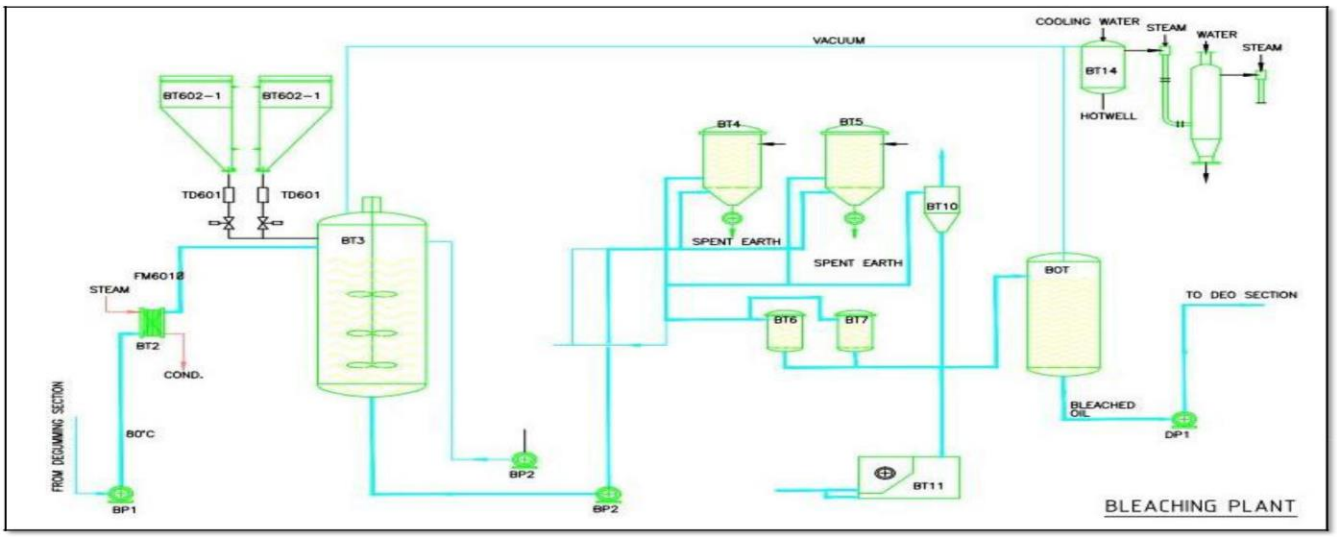

Figure 1: Proposed vegetable oils bleaching process (Source: Project Engineer)

2.6 Soap making process

The production process will require:

- Clutcher
- Vacuum drier
- Plodder
- Soap cutting machine

N.B The set up will be in one of the godowns away from the edible oil production.

Production process:

The PFAD a fatty oil generated as waste during the edible oil refinery is mixed with caustic soda. The process generates water and liquid soap. This is taken to the vacuum drier. The resultant product is taken to the plodder for shaping the soap. After this the soap is taken for cutting into various shapes and automatic wrapping of soap.

Wastes from the process

- Waste water will be generated during vacuum drying. This water will be directed to ETP for recycling.
- Waste boxes
- Plastic bags
- Badly shaped soaps

2.7 Water and Electricity resource

Water will be sourced form an existing borehole already in use at the site. The existing facility is not connected to reticulate water supply thus fresh water will be supplied by water bowsers. Bottled drinking water will be sourced from local suppliers

2.8 Electricity

The facility is already connected to mains supply from the national grid supplied by KPLC. The existing connection is considered adequate to meet the demand of the proposed godown.

3 BASELINE INFORMATION FOR THE PROJECT SITE

3.1 Introduction

The following baseline information details on environmental, socio-economic and bio-physical characteristics of the site. It is meant to provide for a benchmark for continued monitoring and assessment of the impact of implementing the proposal on the environment.

3.2 Climate

Generally, a tropical and monsoon climate characterizes the Kenyan coastline with temperatures high throughout the year. Maximum and minimum temperatures range between 26.5-34 and 22.5-24.5 respectively. The coastline experiences more than 6hours of sunshine daily exceeding 8hours between October and March. The rainfall pattern is bimodal with rainfall averaging at between 900-1300mm annually. The long rains come between March and July while the short rains are experienced between November and December.

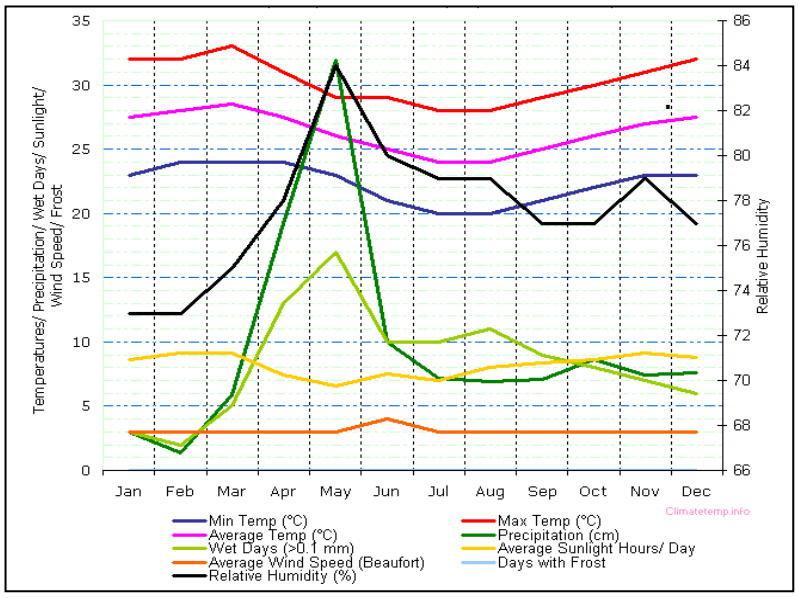

Figure 7: The climatic regime of Kilifi County

3.3 Topography, geology and soils

The project site area is characterized by a slightly undulating terrain and is typically between 0-50m above the sea level.

The soils on much of the project site area were observed to be mainly composed of rock outcrop with patches of brown loamy soil. In general, however, the lithology of Kilifi County is composed of sedimentary rocks of

the Mesozoic and Cenozoic eras. The sedimentary rocks consist of a variety of sandstones, siltstones, shale and limestone.

3.4 Land use

Agriculture, mostly of subsistence nature, is the main land use in the County. Tourism is also conspicuously present with tourism supporting facilities concentrated in the creeks, (Mida, Kilifi and Mtwapa). A vast number of EPZ facilities have also set base in a sector of the County. The main commercial centres in Kilifi County are Kilifi, Mtwapa and Mariakani towns.

3.5 Environmental quality

3.5.1 Water and sanitation

Major water sources in the area include piped water supplied by the Kilifi Mariakani Water and Sewerage Company, rain water harvesting, wells, boreholes as well as water vendors. KIMAWASCO sources its water from the Baricho water works located about 50 kilometers North of Malindi, and pumps about 2,000 cubic meters of water to the area per day. However, approximately 50% of this water constitutes unaccounted for water lost through illegal connections and broken pipes among other ways.

3.5.2 Waste water management

The Kilifi Mariakani Water and Sewerage Company has the responsibility of providing Kikambala residents with waste water management services. However the entire Kilifi County has no sewerage infrastructure hence the common methods for disposal of human wastes is through pit latrines and septic tank and soak pit systems which are later emptied by private waste handlers and transported to the municipal waste water treatment plant in neighboring Mombasa County

3.5.3 Solid waste

The main waste generation sources in the County are domestic, commercial ventures, hotels, markets, industries and institutions including health facilities.

The types of waste that are generated can be classified as follows.

- **Mixed heavy plastics** -Soft drink bottles, detergent bottles, cooking oil/fat bottles, household plastics etc
- **Mixed light plastics** - Shopping bags, wrapping films, waste collection bags
- **Rubber** - Old tires, shoe soles etc
- **Mixed paper** - Books, office paper, newspapers carton pieces etc
- **Metals** -Pieces and sheets of aluminum, steel and other metals
- **Mixed glass** - Colored and non-colored, broken or whole glass bottles, panes, household glass items etc
- **Organics** - Food remnants, wooden debris, yard waste etc
- **Biomedical waste-** waste from hospitals, medical research centers, dispensaries and medical clinics.

The County Government has a waste collection and disposal system that mainly targets the towns. The private sector has initiated ways to address the problem of waste management through construction of compost pits in areas where collection is limited and providing waste disposal services to complement those provided by the County Government.

3.6 Protected areas

Gazetted forests, kayas, ruins and marine parks constitute the protected areas in Kilifi County. The gazetted forests include a section of the Arabuko Sokoke forest situated between Kilifi creek and The Sabaki River and mangrove forests mainly found at Takaungu, Kilifi creek, Mtwapa creek and part of the Mida creek in Uyombo, with an area of approximately 880 Ha. The marine parks and reserves include, part of the Mombasa marine and National Reserve, Watamu- Malindi Marine National park and Reserve (coral gardens) and part of the Malindi Marine and National Reserve. Six of the bird species listed as rare in the ICBP/IUCN Bird red data book occur in this forest. Two of these bird species, the Sokoke Owl (*Otus arena*) and the clerk's weaver (*Ploceus golandi*) are found nowhere else in the world except in this forest. The ruins include the Mtwapa ruins and Gede ruins.

There are no sensitive ecosystems or sites of cultural significance within or near the project site.

3.7 Flora and Fauna

Human interference and particularly agriculture have greatly modified the original floral and faunal status of the County. Several vegetation types including coastal dunes, woodlands, bushlands and savannas are encountered within different parts of the County. No endangered or endemic floral or faunal species were found in the vicinity.

3.8 Infrastructure

3.8.1 Roads

Most rural areas at the coast are served with a dilapidated and narrow road network contrary to most urban centers such as Mombasa, Kilifi and Kwale which are well served by both classified and non-classified roads. The road networks are greatly influenced by existence of important industrial, tourism and commercial centers. Except for the Mombasa-Malindi highway most of the roads in Kikambala are murram although the town is important as a tourism and commercial hub.

The proposed site is served by murram access road branching off the Mombasa-Malindi Highway

3.8.2 Telecommunications

The site area is served by all types of telecommunication facilities. All mobile networks are available

3.8.3 Energy supply

The main source of energy supply in the area is electricity from the Kenya Power. However, this is mostly supplemented with diesel powered generators in times of power blackouts. A number of facilities have also ventured into harnessing solar energy by use of solar panels and accumulators in the rural areas, main energy sources are fuel wood, charcoal and paraffin.

3.9 Land use

Agriculture, mostly of subsistence nature, is the main land use in the County. Tourism is also conspicuously present with tourism supporting facilities concentrated in the creeks, (Mida, Kilifi and Mtwapa). The main commercial centres in the Kilifi County are Malindi, Kilifi, Mtwapa and Mariakani towns.

The neighbourhood displays predominant mix of residential, agricultural and industrial land use.

3.10 Demographic characteristics

3.10.1 Introduction

The population of Kilifi especially in its urban centers has been on the rise mainly due to rural urban migration, tourism and the influx of foreigners. In the Kenyan Coast as a whole, population distribution in the hinterlands is mainly affected by rainfall distribution, altitude, agro- ecological zones and administrative policy through which a number of settlement schemes have been created.

The Coastal population in Kenya is typically culturally heterogeneous. The largest indigenous ethnic group being the Mijikenda. Other indigenous Coastal ethnic groups are: Taita, Pokomo, Bajuni, Orma, Sagala, and Swahili. Due to its socio-economic dynamics which offer great opportunities for livelihoods and leisure, the Kenyan Coast and the towns in particular has over the years attracted a multiplicity of ethnic and racial groups.

3.10.2 Energy supply

The main source of energy supply in the area is electricity from the Kenya Power. However, this is mostly supplemented with diesel powered generators in times of power blackouts. A number of facilities have also ventured into harnessing solar energy by use of solar panels and accumulators. Wind energy has also been sparsely used especially in pumping water from boreholes in the remote parts of the County. In the rural areas, main energy sources are fuel wood, charcoal and paraffin.

4 LEGAL AND INSTITUTIONAL FRAMEWORK

4.1 Introduction

In Kenya the requirement for development and existing projects to undergo EIA and EA respectively follows the enactment by the Kenya parliament of the Environmental Management and Coordination Act cap 387 and

section 3 of the Environment (Impact and Assessment) regulation No. 101 of 2003. Under this legal provision development projects are required to undergo the EIA process whose report is later submitted to NEMA for approval and awarding of a license after demonstrating that the possible negative environmental impacts of a given project will be effectively mitigated. Similarly existing projects with a potential to impact on the environment, health and safety of communities are required to undergo an initial environmental audit and later annual self-audits to determine compliance with environmental management plan.

4.2 Institutional arrangements relevant to the project

The main institutions relevant to the proposed development and operation of the edible oil refinery, soap making plant and godown are summarized in the table below. The summary includes the name of the institution, envisioned role (s) in the project cycle and the project phase required.

Table 2: Key institutional arrangements relevant to the proposed project

Institution	Role in proposed project	Project cycle stage required
NEMA	– Issuance of EIA license – Inspections and monitoring compliance with license and approvals conditions – Protect public interests	– Throughout the project cycle
Directorate of Occupational Health and Safety	– Registration of the facility as a work place – Enforce compliance with OSHA No. 15 of 2007	– Entire project cycle
County Government	– Approval of development plans – Licensing of the operations of the site – Revenue payable for the project	– Prior to commencement of the project
Water Resources Management Authority	– Permit for extraction of water resources	– Upon commencement of the project

4.3 Legal framework

The legal provisions on environmental protection have been discussed in several statutes, which touch on various aspects of the environment. In 1999, Kenya consolidated legislation for the protection and management of the environment in what is referred to as the Environmental Management and Coordination (Amendment) Act, No. 8. The following legislative provisions and regulations are considered key to management of the environmental, health and safety aspects related to the proposed development.

4.3.1 The Constitution of Kenya, 2010

The Constitution of Kenya 2010 is the supreme law of the land. Any other law that is inconsistent with the

Constitution is null and void to the extent of its inconsistency. Under Chapter IV, article 42 provides for the right to a clean and healthy environment for all. Further, Chapter V of the Constitution deals with Land and Environment. Specifically, Part 2 elaborates on the following components regarding the protection of the environment.

- Obligations in respect of the environment
- Enforcement of environmental rights
- Agreements relating to natural resources
- Legislation relating to the environment

Relevance to the proposed project

- The proponent should ensure that the activities and operations of the proposed development do not infringe on the right to a clean and healthy environment for all.
- The proponent must ensure that all the activities are carried out in an ecologically, economically and socially sustainable manner.
- The proponent is entitled to a fair administrative decision making process by NEMA and other State organs.

4.3.2 The Environmental Management and Co-ordination (Amendment)Act cap 387, 2015

This Act aims to improve the legal and administrative co-ordination of the diverse sectoral initiatives in the field of environment so as to enhance the national capacity for its effective management. It harmonizes the sector specific legislations touching on the environment in a manner designed to ensure greater protection of the environment in line with national objectives and the sustainable development goals enunciated in Agenda 21 of the Earth Summit held in Rio de Janeiro in 1992. The ultimate objective is to provide a framework for integrating environmental considerations into the country's overall economic and social development. It was revised in year 2015 to align it to the Constitution of Kenya 2010.

Relevance to the proposed project

- Part V recognizes the importance of protection and conservation of the environment. This environmental impact assessment project report is prepared in compliance with Part VII Section 68 of the Act.

4.3.3 EMCA Regulations

A number of regulations have been formulated and gazetted over the years to enable NEMA implement No. 8 of the Environmental Management and Coordination (Amendment) Act cap 387 2015 as discussed below.

4.3.3.1 The Environment Impact (Assessment and Auditing) Regulations, (Rev. 2016)

The EIA/EA Regulations came into force in 2003 through Legal Notice No. 101. Under Regulation 31, Environmental audits are used as a tool for compliance monitoring and evaluation to determine how on-going projects conform to environmental protection and conservation measures. The regulations require that on-going projects with a potential to impact negatively on the environment to undertake an initial environmental audit and thereafter annual self audits for the lifetime of the project.

The regulations stipulate the ways in which environmental experts should conduct environmental audits and content reporting in conformity to the requirement stated.

After NEMA receives an environmental audit report, it will generally review it and subsequently issue improvement orders targeting to enhance the environmental performance of the facility. The regulations are concise in their reporting, content requirements, processes of public participation, licensing procedures, and inspections and any possible offences and penalties under the Act.

Relevance to the proposed project

- Acquisition of EIA license to commence project development. The operations of the project are similarly licensed since the EIA report contains an Environmental Management Plan which forms the basis for approval of the project by NEMA and imposition of conditions to safeguard the environment.

4.3.3.2 Water quality Regulations, 2006

Water quality regulations were gazetted in 2006 as legislative supplement to mainly address the challenges of pollution of water resources as well as their conservation. It consists of VI parts and eleven schedules dealing with protection of sources of water to miscellaneous provision. Effluent discharge and water for industrial use are dealt with under part III which sets out the following among others.

- Discharge into the aquatic environment
- Discharge into the environment
- Discharge monitoring
- Review of records
- Application for effluent discharge license

Part II, 6, (a) specifies the need for an effluent discharge license. It states in part that "No person shall discharge any effluent from sewage treatment works, industry or other point sources without a valid effluent discharge license issued in accordance with the provisions of the Act. Part III, 12 (1 & 2), 13 and 14 sets out the need for adherence to the discharge standards specified in the third, fifth and sixth schedules. The monitoring guides for discharge into the environment are provided under Schedule IV.

Application to the proposed project

- The proponent should ensure that effluent meets the standards set out under Schedule III of Legal Notice No. 120 of 2006. Monitoring activities will follow the guide values provided under schedule IV.
- Fully adhere to the provisions of Water Quality Regulations (Legal Notice No. 120 of 2006)

4.3.3.3 Waste Management Regulations, 2006

In pursuit of the provisions of the Environmental Management and Coordination Act (Rev. 2015), NEMA, in 2006 gazetted the waste management regulations focusing on management of solid wastes, industrial wastes, hazardous wastes, pesticides and toxic substances and radioactive substances. The Regulations are aimed at addressing the following concerns;

- Reduction of waste through adoption of cleaner methods of production
- Responsibilities for waste generators and obligations for disposal
- Proper transportation and disposal of wastes
- Management of waste disposal sites
- Waste treatment requirements
- Application of existing regulations in relation to waste management
- Licensing of waste handlers and disposal sites
- Licensing fees and procedures for waste handlers and pollution penalties

Relevance to the proposed project

- Provide mechanisms for the separation of wastes
- Ensure there exists proper contractual agreement with NEMA licensed solid waste handlers and that solid wastes are collected in a timely manner and disposed responsibly
- The proponent should ensure strict adherence to Gazette Notice No. 2356 banning the manufacture, importation sale and use plastics bags as secondary packaging material

4.3.3.4 Noise and Excessive Vibration Regulations, 2009

These Regulations were gazetted to manage noise levels to levels that do not cause a disturbance to the public. The operations at the site especially transportation by trucks is likely to generate noise above the acceptable limits within the neighborhood.

Relevance to the proposed project

- Ensure compliance with the set noise level limits for the site especially during construction.
- Ensure that employees are not exposed to noise levels above 85 dB(A)

- Provide suitable personnel protection equipment (ear protective devices).

4.3.3.5 Air Quality Regulations, 2014

These regulations were aimed at controlling, preventing and abating air pollution to ensure clean and healthy ambient air.

Relevance to the proposed project

- The proponent will ensure that all operations at the site do not generate dust and other emissions beyond the allowable limits.
- Provide suitable personnel protection equipment such as dust masks
- Continuous analysis/monitoring of stack emissions.

4.3.4 The Water Act, 2016

The Water Act was gazetted in October 2002 as the Water Act, 2002 and went into effect in 2003 when effective implementation of its provisions commenced. It was later revised in 2014 to align it with the Kenya Constitution, 2010. The legal framework under the Water Act has created four key institutions with separate functions and decentralized decision making systems. These institutions are summarized in table 1 below.

Table 3: Water Resources Management Institutions and their roles as established under the Water Act

Institution	Role under the Water Act
Water Service Boards (WSBs)	Development and maintenance of regional water provision infrastructure
Water Service Providers (WSPs)	Provision of water to households
Water Resources Authority (WRA)	The Authority is responsible, among other things, for the issuance of reclamation permits and diversion of river courses.
Water Services Regulatory Board (WSRB)	The Regulatory Board is mandated to license all providers of water and sewerage services who supply water services to more than twenty households

In furtherance to the Water Act 2002, the Ministry of Water and Irrigation and Water resources Authority (WRA) in collaboration with other stakeholders has prepared a set of Regulations which have now been gazetted under the Legal Notice No. 171 of 28th September 2007 to give guidelines on water permit acquisition and adherence to conditions attached and also enforcement of the user fee charges.

Relevance to the facility and compliance

- The Water Act provides for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water, to provide for the regulation and management of water supply and sewerage services.
- The proponent will ensure that the operations of the facility do not in any way contaminate ground water resources.

- Acquisition of a water abstract permit.

4.3.5 The Public Health Act, Chapter 242

The Act prohibits activities that may be injurious to health. It then becomes the responsibility of the local authority to maintain clean and sanitary conditions. This affects the cleanliness of a premise, the quality of water supplied for drinking purposes, the types of wastes discharged and possible air emissions that may be injurious to health. Under this act the proposed facility must be kept clean, daily removal of accumulated dust from floors, free from effluvia arising from any drain, sanitary convenience or nuisance and without prejudice to the generality of the foregoing provisions.

Relevance to the proposed project

- Applicable during the entire project cycle in ensuring that proper and hygienic methods are used.
- Maintain the site according to standards, ensure access to safe drinking water and put measures to prevent activities that would be a nuisance to the public.

4.3.6 The Occupational Safety and Health Act, 2007

The Occupational Health and Safety Act (OSHA) No. 15 of 2007 repealed the Factories Act, Cap 514 Laws of Kenya. The provisions of OSHA have far reaching implications on safety and health at the work place. The OSHA sets out to make provisions that aim to eradicate or minimize accidents at the work place.

Relevance to the proposed project:

- The proponent should put in place measures for the prevention of accidents during construction and operation of the facility and make provisions for quick response to accidents in case they occur.
- The proponent should register the place as a work place.

4.3.7 County Government Act 2012

Prescribes the necessary easements required for the establishment of any project within Kilifi County

Relevance to the project

- This Act is useful during the entire project cycle. The proponent should ensure that none of the operations of the facility contravene provisions of this Act.

4.3.8 The Physical Planning Act, Cap. 286

The local authorities are mandated under section 29 of the Act to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section therefore allows for the prohibition or control of the use and development of land and buildings in the interests of proper and orderly forms of development in the area.

Section 36 of the Act allows local authorities to order for the project to comply with NEMA regulations i.e. EIA

reports if the authority deems that the project has injurious impacts on the environment.

Relevance to the proposed project

- Applicable during the entire project cycle. The proponent will obtain development approvals and requisite operational licenses from the County Government of Kilifi.

4.3.9 Occupiers Liability Act Cap 34

An act of parliament to amend the law as to liability of occupiers and others for injury or damage resulting to persons or goods lawfully on land or property from dangers due to the state of the property or to things done or omitted to be done there.

Relevance to the proposed project

- Ensure safety of workers during construction and possible decommissioning phases and occupants upon occupation on development.

4.3.10 Energy Act (Cap 314) of 2006

The Act establishes the Energy Regulatory Commission (ERC) with a mandate for the management of energy issues in Kenya. Part III of this Act is dedicated to Electricity energy. Section 30 of this part stipulates that any electrical installation work should be conducted by such a person as one licensed by the ERC as an electrician or an electrical contractor. The Energy Act repealed The Electric Power Act No. 11 enacted in 1997 which dealt with the generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated with these purposes.

Relevance to the proposed project:

- Electricity power installation and usage should be done in a manner that seeks to protect the health and safety of the project employees; the local and other potentially affected communities as well as the environment.
- Electrical installation to service the facility should be done by a licensed electrician under ERC.
- Liaison with relevant agencies such as KPLC should be sought where necessary.
- Proponent should adhere to provisions of this Act in all phases of the project.

5 PUBLIC CONSULTATIVE PROCESS AND RESULTS

5.1 Consultations strategy

We relied on two strategies to obtain the views and comments of neighbors regarding the development. These were;

- Administration of semi-structured questionnaires with major headings on the environmental impacts of the development on neighbors. The questionnaires also collected information on the profile of neighbors including proximity to the site and whether there were any benefits associated with the development. The questionnaires were distributed on a door to door basis by personnel employed by the consultants.
- Informal discussions with neighbors to the project site

5.2 Issues raised by the project site neighbors

Table 4 below provides a summary of the responses and concerns raised by neighbors during the public consultative process.

Table 4: Summary of comments and issues raised by neighbours through the administered questionnaires.

Respondents profile				Comments
	Name	**Tel contact**	**ID No:**	
1.	**Anwar's Farm**	**0723355751**	**35070779**	– Job creation – Business promotion – Development in the area – Traffic increase – No objection to the proposed project
2.	**Saifuddin Fidahussein**	**-**	**2149550**	– No impact – Be good neighbours – No objection to the proposed project
3.	**Baya John Baya**	**0792432720**	**11265523**	– No impact – Job opportunity – Good project – Be good neighbours – No objection to the proposed project
4.	**Maluki Mutisya**	**-**	**11375157**	– Job opportunities – Development in the area
5.	**Hamisi Yusuf**	**-**	**11812382**	– Employment opportunities – No objection to the proposed project
6.	**Dama Bao**	**-**	**30917363**	– No objection to the proposed project – Job opportunity – Provide jobs to the locals – Dust – Noise
7.	**Moses Ndoro**	**0795558714**	**26403675**	– Job creation – Development in our area – Noise pollution

				– No objection to the proposed project – Be good neighbours
8.	**Abdulkadir Adamjee**	**0722757833**	**23935243**	– Promote business – Development in our area – Job availability – No objection to the proposed project – Safety first – Be good neighbours
9.	**Jumwa Kadenge**	**0729866803**	**-**	– I will get my job back – Development in the area – Job opportunity – Dust pollution – Be good neighbours

Further consultation on 25th November 2018

1	Name	Telephone number	Identity card number	Issues raised
	Samson Karisa Katana	0725094380	100093455	The project is good It will create employment -make sure waste water is well managed
2	Daniel Ngale Kenge	0748027816	24757087	-no issues of concern concerining the proposed project
3	Matheka Kioko Nyami	0728908352	28858267	-the proposed project will create jobs to the local community -manage dust from the project -Manage noise from the project
4	Naran Pindoria	0722410199	10305938	-the proposed project will bring development to the area
5	Yusuf Mohammed	0721383832	8372906	-the project will create employment, it will open up the area.

6 ENVIRONMENTAL IMPACTS IDENTIFICATION AND MITIGATION MEASURES

6.1 Introduction

The proposed project is expected to have both positive and negative impacts on both the environment and the public, during its establishment, operation and decommissioning phases. This chapter analyses the possible impacts in all the phases.

6.2 Positive impacts-construction phase

The following are the positive impacts expected in all phases of the proposed project.

6.2.1 Employment

During the project planning and design, the project proponent has already employed consultants including Architects, Quantity Surveyors, Engineers and EIA consultants. At reinforcement stage the contractor will deploy workers to help in the construction activities. This will include both skilled and unskilled personnel especially from the local population. The income obtained from the employment will help be better the lives of the persons engaged.

Enhancement

-provide onsite training for local population

6.2.2 Income to other businesses

Transporters, suppliers of raw materials and other related service providers are expected to benefit from the proposed development.

6.2.3 Income to the local population

If the economic labor policy is focused on the local community, unskilled labor from the neighborhood will earn them income. The income will boost the economic power of the residents of the area therefore bettering their lives.

6.2.4 Income to the government in terms of taxes

The government intends to get income/revenue in terms of taxes generated during the acquisition of licenses. The construction material to be used will also be taxable (16% VAT). Through the revenues generated, the government will be capable of financing its obligations to her citizens.

6.3 Negative Impacts during demolition phase

6.3.1 Noise pollution

Noise is expected from movement of vehicles, demolition vibrations and construction equipment. It would also arise from construction activities at the site such loading and offloading of material, carpentry, masonry and partial demolition activities.

Recommended mitigation measures

- Restricting demolition to day time only.
- Using well-conditioned demolition machines.
- Providing those working at the site with PEE such as ear muffs and earplugs to reduce the levels of noise reaching the inner ear.
- Apply for a demolition Permit from the County Government of Kilifi.
- Ensure compliance with the set noise level limits in line with schedule I of LN. 61 of 2009
- Employees using equipment that produce peak sounds shall be provided with PPE such as earmuffs,

6.3.2 Impact on air quality

Air quality is anticipated to deteriorate as a result of SPM, noxious fumes and GHGs. At this phase, SPM (dust) would be the primary cause of air pollution expected from the removal of the roofing materials, cement and applications of backing and facing whereas noxious fumes and GHGs will be expected from petroleum powered equipment, paints etc. These if generated in large quantities may present a respiratory hazard and also cause visual intrusion hence presenting health risks.

Recommended mitigation measures

- Dust producing materials will be sprinkled with water.
- Demolition will be conducted within the shortest time possible
- Restricting demolition to daytime at times when the wind intensity is low.
- The site will be sheltered to minimize exposure to the neighbours
- Workers on site will be provided with the necessary PPE such as dust masks.
- The contractor will deploy dust control screens.

6.3.3 Demolition waste

Solid wastes generated during this demolition phase will result from discarded materials which include; roofing waste, metal and wood cuttings, rejected materials and paints.

If not properly managed, these generated wastes will add to risks on health, safety and environment such as

water pollution,

Recommended mitigation measures

- Comply with the Waste Management Regulations, 2006
- Recyclable waste to be collected and sent to NEMA licensed recyclers
- Woods from the roofing to be reused for fueling
- Hand over all 'unusable' solid wastes to the contracted NEMA licensed waste handler
- All recyclable materials should be collected and sent to NEMA licensed recyclers
- Recover the reusable and recyclable components of the waste either for use in the new construction or for sale to other constructors/ recyclers

6.3.4 Occupational health and safety hazards

Workers undertaking the works at the site will be exposed to health and safety risks from the use of machinery, accidental falls and accidental injuries with a potential to cause injury, permanent disability or even death. The movement of materials into the site, and the actual demolition activities by workers may cause these accidents. The responsible contractor must ensure that all the site workers are briefed about the potential risks of injuries on site and psychologically prepared on how to handle them.

Recommended Mitigation measures

- Provide adequate and appropriate Personal Protective Equipment (PPE) including safety shoes, helmets, gloves, overalls etc.
- Employees to be given the correct tools and equipment for the jobs assigned and trained on their use
- First aid services and an emergency vehicle to be readily available at site
- Clear signposting and warning signs on site.
- Accidents will be investigated and appropriate measure to prevent recurrence.
- Demarcate routes and designate adequate parking with appropriate signage.
- Moving parts of machines and sharp surfaces to be securely protected with guards to avoid unnecessary contacts and injuries during construction phase
- The contractor to implement the provisions of the Occupational Safety and Health Act, No. 15 of 2007

6.4 Negative impacts and mitigation measures at construction phase

6.4.1 Continued sourcing of raw materials

The project will source for raw materials from the environment including sand, ballast, building blocks, cement, steel, wood etc. These materials will have an impact on the environment at their point of origin either through extraction or industrial pollution associated with their production.

Recommended mitigation measures

- The contractor will obtain raw materials for the construction from sources that are compliant with NEMA Regulations.
- The contractor will procure quantities that are sufficient for the intended works only and recycle as far as practical to curtail wastage.
- The contractor will commit to extensive use of recycled raw materials as will be appropriate and in a manner that does not compromise the safety of the development.

6.4.2 Destruction of the physical environment

Destruction to the physical environment during this stage is inevitable. Excavation, for the godown foundation will create loose soil that may easily be carried away by water or wind. This causes soil erosion and disturbance in soil quality.

Soil compaction, a characteristic of construction activities, seals the soil on the surface hence hindering the penetration of air or water beneath the surface. This limits the aerobic activities of the organisms underneath the soil, hence affecting soil productivity. Compaction also hinders the infiltration of water into the surface hence increasing the surface run-off increasing the possibility of flooding downstream of the site.

Recommended mitigation measures

- Compacted areas to be ripped to prevent runoff
- Restore degraded areas through landscaping using trees and sediment binding grasses

6.4.3 Solid wastes

These activities undertaken during the construction phase are expected to generate considerable quantities of solid wastes such as cuttings, rejected materials, plastic materials, paper, wood etc. These will need to be managed appropriately

Recommended management measures

- Installation of litter bins and a receptacle that encourage separation of wastes at source to promote re-use and re-cycling,
- Recycle and reuse as much as practical within the construction site
- Procure the services of a NEMA licensed waste handler to manage solid wastes from the construction site
- All recyclable materials should be collected by NEMA licensed recyclers

6.4.4 Health and safety of the workers

Workers undertaking construction at the site will be exposed to health and safety risks from the use of machinery, accidental falls and accidental injuries with a potential to cause injury, permanent disability or even death. The health and safety of neighbors and motorists using the access road is also paramount and will also need to be taken into consideration.

Recommended mitigation measures

- Provide adequate and appropriate Personal Protective Equipment (PPE) including safety shoes, helmets, gloves, overalls etc.
- Employees to be given the correct tools and equipment for the jobs assigned and trained on their use
- First aid services and an emergency vehicle to be readily available at site
- Moving parts of machines and sharp surfaces to be securely protected with guards to avoid unnecessary contacts and injuries during construction phase
- The contractor to implement the provisions of the Occupational Safety and Health Act, No. 15 of 2007

6.4.5 Safety of visitors, neighbors and general public

The proponent and the contractor will have an obligation to put in place measures that will protect the visitors to the construction site, neighbors, and the general public.

Recommended mitigation measures

- Visitors to the project site must be provided with PPE at all times,
- Inform all neighbors in writing on the commencement of the project at least two weeks in advance,
- Restrict access to the site by the public by fencing off the construction site,
- Vehicles accessing the site to deliver construction materials must maintain slow speeds,
- Conspicuously display safety signs and warning posters visible to the public
- Provide for security services at the site.

6.4.6 Impact on air quality

During the construction phase dust will be expected from excavation of soil and movement of vehicles. If generated in large quantities dust may present a respiratory hazard and also cause visual intrusion. Dust is also a mechanical irritant to the eye.

Air emissions would also be expected from exhausts of vehicles delivering construction material. Stand-by generators that may be brought in to serve during power outages are likely to release some emissions to the atmosphere.

Recommended mitigation measures

- Contractor to deploy fine dust screens at the site during construction
- Sprinkle dust producing materials such as ballast with water during offloading on site
- Use low Suplhur and unleaded fuels to power delivery vehicles and site machinery
- Provided employees with dust masks and goggles.

6.4.7 Noise Pollution

Noise from the trucks and other machinery may be a concern during the operations on the site. However, the impact of the noise is expected to be minimal since the project will be set in an area with high background noises.

Recommended mitigation measures

- Operations to be restricted to daytime only to minimize disturbance to neighbors residing near the site
- Use equipment indicated, by the various manufacturers/suppliers, as having low noise emissions.
- Employees using equipment that produce peak sounds shall be provided with earmuffs,
- The proponent will comply with Noise Regulations (Legal Notice No. 61 of 2009)
- Use equipment that is properly fitted with noise reduction devices (i.e. mufflers, etc.).
- Sensitize truck drivers to avoid running of vehicle engines or hooting unnecessarily

6.4.8 Waste water and Effluent generation

Various activities will generate wastewater from cleaning among other activities involved with the use of water whereas effluent will be generated by the site workforce and hence will need proper handling

Recommended mitigation measures

- The workforce will to be provided with sanitary facilities
- Contract a NEMA licensed effluent handler to periodically de-sludge the septic tank
- Consider conducting an effluent analysis in liaison with a NEMA licensed laboratory.

6.4.9 Traffic issues

The construction works are expected to increase the traffic, along Mombasa-Malindi road, by trucks ferrying the construction materials and people nucleating around the site. This is likely to cause traffic snarl-up especially during busy days at the site.

Recommended mitigation measures

- Heavy commercial vehicles ferrying material to the construction site shall maintain slow speeds when

traversing the area

- Proper signage and warnings shall be placed on the road to forewarn other motorists on the use of the road by construction machinery.
- Deploy flagmen and spotters to guide traffic as the HCVs and earthmovers call at the site and turn
- All machinery utilized at the construction site will be accommodated within the site and the road reserve kept clear
- Only allow the number of vehicles that can be accommodated at time

6.5 Negative impacts and mitigation measures at Operational phase

6.5.1 Effluent generation and possible water quality degradation

The operational stage of the project will generate wastewater. Being a commercial facility, the wastewater will typically be industrial and domestic. It will constitute a combination of flows from the sanitary facilities, industrial operations and general cleaning. Its estimated that the edible oil refinery will require 25000 litres for boilers per day and 3000 litres of water for deodorizer, while this water will reticulated, finally there is need to dispose it off. Waste water will also be released during soap making. Ground water sources may be polluted if effluent generated at the facility is not managed in an appropriate manner.

Recommended mitigation measures

- Install a bio-digester to effectively manage effluent generated from the sanitary facilities
- Install Effluent Treatment Plant (ETP) for industrial wastes.
- Engage NEMA licensed contractors to manage the resultant sludge from the bio-digester
- Conduct quarterly monitoring of the effluent discharged from the bio-digester against standards set out in schedule III of Water Quality Regulations, 2006
- Apply for and obtain an Effluent Discharge License from NEMA
- Explore technological options that promote usage of less water to reduce waste water generation at source.
- Contract reputable professionals to conduct regular inspections and maintenance works on the bio-digester
- Install water saving systems e.g. self-closing taps and deploy water conservation signage

6.5.2 Noise generation

Noise is expected to arise from movement of vehicles into and out of the facility especially from workforce and HCVs. Noise would further be expected from the industrial nature of the facility owing to the day-to-day operations. The impact of noise from the proposed facility is expected to be low due to the nature of activities to be conducted within the facility and the wider neighborhood.

Recommended mitigation measures

- Deploy acoustic screens around noisy areas
- Provide appropriate PPE to workers exposed to high noise levels
- Deploy only muffled machinery for use at the facility
- Monitor noise levels at the facility and fully comply with the permissible noise limits as specified in L.N. 61, Noise regulations

6.5.3 Air pollution

Air pollution and emissions will occur during the ferrying of goods by HCVs to and from the facility stack emissions. Other particulates may also present hazards to the workers at the facility; these may be from sources such as stored materials.

Without proper precautions, the dust particles are susceptible to wind and may be blown by fast moving wind creating a hazard and nuisance. Generally the impacts of dust diminish as distance from the source increases and the most acute impacts are likely to occur in enclosed spaces or those in close proximity to the site. Impacts resulting from air quality degradation can include those related to health (although these are typically linked to occupational rather than environmental exposure), visual intrusion and, most commonly, nuisance for surrounding communities.

Recommended mitigation measures

- Only serviceable machinery which meets emission standards under the Air Quality Regulations should be used at the site
- Monitor stack emissions
- Use only low Sulphur and unleaded fuels to curtail emission of GHGs

6.5.4 Increased water demand

The facility will exert an extra demand on water, as it would be required for sanitation purposes, general cleaning among other uses. This causes strain on the water resources. From the operations, its projected that the edible oil plant will require 25,000 litres per day for the boilers and further 3000 litres per week for the deodorizer.

The development will primarily rely on water supplied by KIMAWASCO and existing boreholes at the site. The proponent will liaise with WRA to ascertain the yield and quality of water discharged from the borehole for its continued use.

Recommended mitigation measures

- The proponent will Install water saving systems e.g. self-closing taps and deploy water conservation signage
- Make structural provisions within the development plan to harness rain water.
- Water use will be metered for monitoring of usage and identifying wastage incidents.
- Recycle the treated water from the bio-digester for re-use in external cleaning and fire- fighting
- Register the existing borehole and obtain a water abstraction permit from WRA and abide by the abstraction limits
- Conduct quarterly monitoring of the quality of water discharged from the borehole against standards set out in schedule I of LN 120 of 2006 (Water Quality regulations)

6.5.5 Increased demand for electricity

Operation of the development will require use of electric energy in lighting and powering electrical appliances that will be installed in the facility. Since electric energy in Kenya is generated mainly through natural resources, namely water and geothermal resources, increased use of electricity have adverse impacts on these natural resources base due to accelerated depletion. The facility is already connected to mains supply from the national grid supplied by KPC and backup generators will be used to meet the energy demand

Recommended mitigation measures

- Exploit renewable energy sources e.g solar to supplement mains supply.
- Electricity use will be metered for monitoring of usage and identifying wastage incidents
- Install compact fluorescent lights in high use areas – they last longer and use 75% less energy than normal light bulbs.
- The proponent will monitor energy use during operations and maintain records
- The proponent will conduct energy auditing at least once every three years implement corrective measures

6.5.6 Solid waste

Waste is expected to result from the operations of the development. The wastes will be in the form of straps, broken pallets plastic wastes, e-wastes, primary polythene packaging and office wastes.

The waste requires to be handled appropriately in order to maintain a clean environment for all. Among the effects associated with solid waste includes; Injuries, generation of odours and public hazards

The solid waste management plan for the proposed facility will focus on the storing, collection, and disposal of all the solid waste that is produced. This program will implement and develop waste minimization strategies designed to maximize the use of recyclable and reusable materials as well as to report the generated volumes and its reduction schemes. Waste will be treated according to the Waste Management Regulations (Legal Notice No. 121 of 2006).

With this in mind, the solid waste produced by the facility will be separated into organic and inorganic with the inorganic being further separated into combustible and non-combustible.

Recommended mitigation measures

- The proponent shall provide waste segregation bins strategically designed to encourage the separation of wastes at source to promote re-use and re-cycling,
- Designate a dedicated waste collection area sheltered away from scavengers and wind action
- Contract a NEMA licensed waste handler to manage the wastes
- Comply with Legal Notice No.121 Waste Management Regulations, 2006 and Gazette Notice No. 2356 banning the manufacture, importation sale and use plastics bags as secondary packaging material

6.5.7 Fire hazards

Fire hazards are real threats to godown and refinery storage facilities. Threats of fire must be accorded adequate attention and swift action in case of a break out. Fire hazards at the proposed facility may be due to spillage/leakage of flammable liquids such as fuels, electrical faults, operational negligence etc. these may result to losses in terms of injury to persons and damage to property.

Recommended mitigation measures

- The proponent will develop and implement a tailor made fire action plan for the facility
- Firefighting equipment such as extinguishers and fire hydrants will be provided
- Contract a reputable fire company to periodically maintain the fire-fighting equipment
- Fire training and drills will conducted on a scheduled interval
- Provide for dedicated fire exits and a strategically situated fire assembly point
- Fire emergency telephone numbers and fire alarms to be displayed in each room

6.5.8 Structural safety and insecurity

Cases of insecurity may increase in the area once the development is open for use. Increased commercial and industrial activity will result into an influx of people seeking job opportunities. This influx also invites burglars who are attracted by the goods stored within the godown

Recommended mitigation measures

- The proponent will hire adequate security personnel from a reputable company
- Installation of CCTV cameras and alarms on and along the entrance and exit from the development
- The proponent shall consider building of a boundary wall to ensure security of the facility.
- The proponent shall ensure that construction is done as per the approved drawings in adherence to the building code 1968 and the provisions of the National Construction Act, 2011
- The building will be constructed strictly to engineers' details and prescriptions in terms of materials quality and time frame to ensure no risk of building collapsing.

6.5.9 Occupational Safety and Health

Occupational hazards associated with the operations of the facility include but are not limited to injury to workers from movement of machinery, fire, accidental falls and trips, injuries from falling objects and stacked goods, accidents caused by the moving trucks.

Recommended mitigation measures

- Train workers in the facility and conduct constant awareness programme concerning workplace hazards
- The operators should be provided with full safety gear (PPE) and trained on occupational health and safety in line with the Occupational Safety and Health Act No. 15 of 2007.
- Fire-fighting equipment should be provided at strategic points and First aid kits should be provided.
- Provide documentation of all incidences and accidents occurring on the site including near misses.
- Develop an effective Emergency Response Plan (ERP) and enlighten the staff on safety measures and procedures through training.
- Register the facility with DOSHS as a workplace in line with the Occupational Safety and Health Act No. 15 of 2007.
- Conduct annual health and safety audits and implement recommendations
- Clear signage will be posted alerting possible danger situations.

6.5.10 Traffic increase

Traffic to and from the facility will increase once it commences operations. This will be attributed to the use of

vehicles by staff working at the facility as well as the general public. The impact of traffic is however expected to be minimal since the area is industrial in character and the area already in use by HCVs, the following measures will be put in place notwithstanding.

Recommended mitigation measures

- Adequate parking and loading/offloading space has been provided for in the design of the development
- Trucks will only be parked loaded/offloaded at designated parking areas
- Erect speed limit signage and hazard demarcations along the access road
- Compel drivers to comply with recommended speeds. This should be monitored by the proponent in collaboration with the County Traffic Units

6.6 Possible decommissioning phase

Mitigation measures for the decommissioning phase can only be provided for actions that will be deliberate on the part of the proponent such as closure by government agencies due to non- compliance with environmental and health regulations. Other factors that may contribute to the need for decommissioning including end of project life, an order by a court of law due to non- compliance with existing Regulations, Change of User, and Natural calamities etc. The proponent will have a responsibility to ensure that the facility is licensed at all times as required by law and that it conforms to environmental standards.

6.6.1 Environmental management at decommissioning phase

At the decommissioning stage, the proponent will prepare a due diligence decommissioning audit report in line with Legal Notice No. 101 of 2003 and submit it to NEMA for approval at least three months in advance

7 PROJECT ALTERNATIVES

7.1 Overview

This chapter presents an analysis of the project alternatives and provides an opportunity to examine other options for the project that have a potential to contribute to mitigating the negative impacts associated with the proposal.

7.2 The 'No Project 'alternative

Though this alternative presents no additional environmental impacts, it does not add value to the status of the piece of the land. This alternative will in addition to denying the Proponent, contractors, and other workers a reliable income, deny the government revenue from the tax obtained on materials and licenses related to construction of the building. This alternative will also deny the people more decent housing units.

7.3 The "Yes Project" alternative

This option was considered as the most viable because of the following reasons;

- There will be employment creation,
- It will contribute to accessible health facility in the area,

- The proposal is consistent with the existing land use character of the area,
- It will provide income to the government and other business ventures,
- It will improve the development ranking of the area.

7.4 Alternative site

An alternative site could be considered for the development if site suitability presents serious environmental challenges that cannot reasonably be effectively mitigated. The proposed site is however considered suitable.

7.5 Alternative production process

7.5.1 Use of batch production

The crude edible oil will be mixed with caustic soda for neutralization. This will lead to build up soap stock, a lot of waste water will be generated and need to be disposed off

7.5.2 Continuous production process

No need to add caustic soda, its pure distillation process. The crude edible palm oil is heated using steam from the boilers so that it vapourizes. There is no generation of soap stock

Comment

The proponent therefore preferred the use of continuous process to the Batch process because of environmental concerns

8 ENVIRONMENTAL MANAGEMENT PLAN

8.1 Introduction

The project's environmental mitigation plan has been drawn in accordance with legislative and regulatory frameworks on environmental and socio-economic aspects. The plan covers all phases of the project and considers the following;

- Predicted environmental impact,
- Proposed mitigation measures,
- Responsible party / parties
- Timeframe, and
- Costs estimates.

8.2 Demolition phase Environmental Management Plan

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
Noise pollution	- Restricting demolition activities to day time only	Contractor	Throughout demolition phase	Nil
	- Using well-conditioned demolition machines	Contractor	Throughout demolition phase	Market costs
	- Providing those working at the site with PEE such as ear muffs and earplugs to reduce the levels of noise reaching the inner ear	Contractor	Throughout demolition phase	50,000
	- Apply for a demolition Permit from the County Government of Kilifi	Proponent	Prior to demolition	5,500
	- Ensure compliance with the set noise level limits in line with schedule I of LN. 61 of 2009	Contractor	Throughout demolition phase	
Impact on air quality	– The rubble will be sprinkled with water.	Contractor	Throughout demolition phase	Internal costs
	– Demolition will be conducted within the shortest time possible	Management/Contractor	Throughout demolition phase	Nil
	- Restricting demolition activities to daytime at times when the wind intensity is low	Contractor	Throughout demolition phase	Nil
	– The site will be sheltered to minimize exposure to the neighbors	Contractor	Throughout demolition phase	Market prices
	– Workers on site will be provided with the necessary PPE such as dust masks	Contractor	Throughout demolition phase	100,000
	– The contractor will deploy dust control screens.	Contractor	Throughout demolition phase	Market Prices
Demolition	– Comply with the Waste Management Regulations, 2006	Contractor	Throughout demolition phase	Nil

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
Waste	– Recyclable waste to be collected and sent to NEMA licensed recyclers	Contractor	Throughout demolition phase	Nil
	– Recover the reusable and recyclable components of the waste either for use in the new construction or for sale to other constructors/ recyclers	Contractor	Throughout demolition phase	Nil
	– Woods from the roofing to be reused for fueling	Contractor	Throughout demolition phase	Nil
	– Hand over all 'unusable' solid wastes to the contracted NEMA licensed waste handler	contractor/NEM A licensed waste handler	Throughout demolition phase	15,000 Monthly
Occupational health and safety hazards	– Provide adequate and appropriate Personal Protective Equipment (PPE) including safety shoes, helmets, gloves, overalls etc.	Management & HSE officer	Throughout demolition phase	100,000
	– Employees to be given the correct tools and equipment for the jobs assigned and trained on their use	Contractor	Throughout demolition phase	Internal costs
Traffic management	– First aid services and an emergency vehicle to be readily available at site	Contractor	Throughout demolition phase	60,000
	- Demarcate routes and designate adequate parking with appropriate signage.	Contractor	Throughout demolition phase	Nil
	– Moving parts of machines and sharp surfaces to be securely protected with guards to avoid unnecessary contacts and injuries during construction phase	Management	Throughout demolition phase	Nil
	– The contractor to implement the provisions of the Occupational Safety and Health Act, No. 15 of 2007	Contractor	Throughout demolition phase	Nil

8.3 Construction phase Environmental Management Plan

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
Continued sourcing of raw materials	– sourcing raw materials from NEMA licensed and compliant sources	Contractor	Throughout construction phase	1,500,000
	– Procurement of only sufficient quantities of material for the intended works only and recycling to curtail wastage.	Contractor	Throughout construction phase	Nil
	– Recycling and use of recycled raw materials without compromising integrity of development	Contractor & workers	Throughout construction phase	Nil
Destruction of the physical environment	– Compacted areas to be ripped to prevent runoff	Contractor	Throughout construction phase	120000
	– Restore degraded areas through landscaping using trees and sediment binding grasses	Contractor	Throughout construction phase	150000
Solid waste	– Install and use litter bins that encourage separation of wastes at source to promote re-use and re-cycling,	Contractor & workers	Throughout construction phase	100,000
	– Recycle and reuse as much as practical within the construction site	Contractor & workers	Throughout construction phase	Nil
	– Procure the services of a NEMA licensed waste handler to manage solid wastes from the construction site	NEMA Licensed waste handler	Throughout construction phase	15,000 monthly
	– All recyclable materials should be collected and sent to NEMA licensed recyclers	Contractor & NEMA licensed recyclers	Throughout construction phase	Nil
Health and safety of the workers	– Provide adequate and appropriate Personal Protective Equipment (PPE)	Contractor and HSE officer	Throughout construction phase	100,000
	– Employees to be given the correct tools and equipment for the jobs assigned and trained on their use	Contractor and HSE officer	Throughout construction phase	1000 per person

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
	– First aid services and an emergency vehicle to be readily available at site	HSE officer and licensed trainers	Throughout construction phase	Internal project costs
	– Moving parts of machines and sharp surfaces to be securely protected with guards	Site engineer & HSE officer	Throughout construction phase	Nil
	– The contractor to implement the provisions of the Occupational Safety and Health Act, No. 15 of 2007	Contractor and HSE officer	Throughout construction phase	Administrative
Safety of visitors, neighbors and general public	– Visitors to the project site must be provided with PPE at all times,	HSE officer	Throughout construction phase	Nil
	– Inform all neighbors in writing on the commencement of the project at least two weeks in advance,	Project manager / Contractor	Throughout construction phase	1000
	– Restrict access to the site by the public by fencing off the construction site,	Contractor	Throughout construction phase	At market cost
	– Vehicles accessing the site to deliver construction materials must maintain slow speeds,	Drivers	Throughout construction phase	Nil
	– Display safety signs and warning posters visible to the public	HSE officer	Throughout construction phase	20,000 for signage
	– Provide for security services at the site.	Contractor/ Security company	Throughout construction phase	44,000 monthly
Impact on air quality	– Deploy fine dust screens at the site during construction	Contractor	Throughout construction phase	100,000
	– Sprinkle dust producing materials such as ballast with water during offloading on site	Contractor & workers	Throughout construction phase	Internal project costs
	– Use low Suplhur and unleaded fuels to power delivery vehicles and site machinery	Contractor & machine operators	Throughout construction phase	Market costs apply

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
	– Provided employees with dust masks and goggles.	Contractor & HSE officer	Throughout construction phase	Internal costs
Noise pollution	– Operations to be restricted to daytime only to minimize disturbance to neighbors residing near the site	Contractor	During noisy operations	200,000
	– Use equipment indicated, by the various manufacturers/suppliers, as having low noise emissions.	Contractor & project manager	Throughout construction phase	Nil
	– Employees using equipment that produce peak sounds shall be provided with earmuffs,	Contractor & HSE officer	Throughout construction phase	Cost already factored
	– Use equipment that is properly fitted with noise reduction devices such as silencers	Contractor	Throughout construction phase	Nil
	– Sensitize truck drivers to avoid running of vehicle engines or hooting unnecessarily	Contractor & HSE officer	Throughout construction phase	Nil
	– The proponent will comply with Noise Regulations (Legal Notice No. 61 of 2009)	Contractor & project manager	Throughout construction phase	Administrative
Waste water and Effluent generation	– The workforce will be provided with sanitary facilities	Workers	Throughout construction phase	Nil
	– Contract a NEMA licensed effluent handler to periodically de- sludge the septic tank	HSE officer & NEMA licensed effluent handler	Throughout construction phase	15,000 periodically
Traffic management	– Heavy commercial vehicles shall maintain slow speeds when traversing the area	Drivers	Throughout construction phase	Nil
	– Display of proper signage and warnings to forewarn other motorists.	HSE officer	Throughout construction phase	Cost already factored
	– Deploy flagmen at the highway turn off to guide traffic joining and leaving the highway from the site access road	Contractor & HSE officer	Throughout construction phase	Internal project costs

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
	– All machinery and vehicles utilized at the construction site will be accommodated within the site	Contractor and drivers	Throughout construction phase	Nil
Increased water demand	– The proponent will Install water saving systems e.g. self- closing taps and deploy water conservation signage		Throughout construction phase	15,000
	– Register the existing borehole and obtain a water abstraction permit from WRA and abide by the abstraction Limits		prior to construction activities	12,500

8.4 Operation phase Environmental Management Plan

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
Effluent generation and possible water quality degradation	– Install a bio-digester to effectively manage effluent generated at the facility	Proponent & Engineers	Prior to commissioning	500,000
	– Engage NEMA licensed contractors to the from resultant sludge the bio-digester	Proponent & NEMA licensed effluent handler	Periodically	30,000
	– Monitoring of the effluent discharged from the bio-digester against schedule III of Water Quality Regulations, 2006	Proponent & NEMA designated laboratory	Quarterly	14,000 per sample
	– Apply for and obtain an Effluent Discharge License from NEMA	Proponent & NEMA	Annually	75,000
	– Explore technological options that promote usage of less water to reduce waste water generation at source.	Proponent	Throughout operation phase	Internal costs
	– Contract reputable professionals to conduct regular inspections and maintenance works on the bio-digester	Proponent and consultants	Periodically	Quotation

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
	– Install water saving systems e.g. self-closing taps and deploy water conservation signage	Proponent	During operation phase	50,000
Noise generation	– Provide appropriate PPE to workers exposed to high noise levels	Management & HSE officer	During operation phase	100,000
	– Deploy only muffled machinery for use at the facility	Management & HSE officer	During operation phase	Nil
	– Monitor noise levels at the facility and fully comply with the permissible noise limits as specified in L.N. 61, Noise Regulations	HSE officer & NEMA designated laboratory	Throughout operation phase	5,000 per measurement
Air pollution and dust	– Regular air quality monitoring through sampling and analysis by a NEMA designated laboratory	HSE officer & NEMA designated laboratory	Continuous	30,000 per sampling point
	– Only serviceable machinery which meets emission standards under the Air Quality Regulations should be used at the site	Management	Continuous	Nil
	– Use only low sulphur and unleaded fuels to curtail emission of GHGs	Management	Continuous	Nil
	– Provide PPE such as respirators to workers exposed to dust during operations	Proponent & HSE officer	Continuous	Quotation
Increased water demand	– Make structural provisions within the development plan to harness rain water.	Proponent & project engineer	Prior to commencement of operations	Internal project costs
	– Install water saving systems e.g. self-closing taps and deploy water conservation signage	Proponent & Management	During operation phase	50,000

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
	– Water use will be metered for monitoring of usage and identifying wastage incidents.	Proponent & HSE officer	During operation phase	7,000 for meter installation
	– Recycling the treated water from the bio-digester for re-use in landscaping and fire-fighting	Proponent	During operation phase	Nil
	– Register the existing borehole and obtain a water abstraction permit from WRA and abide by the abstraction limits	Proponent & HSE officer	Prior to operation	12,500
	– Quarterly monitoring of the quality of water discharged from the borehole against standards set out in schedule I of Water Quality regulations	Proponent & NEMA designated laboratory	Upon detection of shortfalls	14,000
Increased demand for electricity	– Install compact fluorescent lights instead of conventional incandescent bulbs	Proponent & management	Prior to commencement of operations	300 per fluorescent
	– Exploit renewable energy sources eg solar to supplement mains supply.	Management & ERC licensed experts	During operation phase	150,000
	– Monitor energy use during operations and maintain records	Management	Throughout operation phase	Nil
	– The proponent will conduct energy auditing and implement corrective measures	ERC licensed energy audit firms	At least once every three years	At consultancy costs
Solid waste	– Designate a dedicated waste collection area sheltered away from scavengers and wind action	Management	Throughout operation phase	Internal costs
	– Provide litter bins strategically designed to encourage the separation of wastes to promote re-use and re-cycling	Management & HSE officer	Throughout operation phase	100,000
	– Contract a NEMA licensed waste handler to empty the central bin on a weekly basis,	NEMA licensed waste handler	Throughout operation phase	30,000 monthly
	– Comply with Legal Notice No.121 Waste Management Regulations, 2006 and Gazette Notice No. 2356 banning the manufacture, importation sale and use plastics bags as	Proponent, management & workers	Throughout operation phase	Varied costs

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
	secondary packaging material			
Fire hazards	– Develop and implement a tailor made fire action plan for the facility	Management & HSE officer	Throughout operation phase	Internal costs
	– Firefighting equipment such as extinguishers and water will be provided	Management & HSE officer	Throughout operation phase	7,000 per extinguisher
	– Contract a reputable fire company to periodically maintain the fire-fighting equipment	Proponent and fire company	Throughout operation phase	250,000
	– Fire training and drills will conducted on a scheduled interval	Management & HSE officer	Throughout operation phase	1000 per person
	– Provide for dedicated fire exits and a strategically situated fire assembly point	Management	Prior to commencement of operations	Internal project costs
Insecurity	– Hire adequate security personnel from a reputable company	Management	Throughout operation phase	40,000 monthly
	– The facility will be fenced off and only accessed via a dedicated access point	Proponent & management	Throughout operation phase	1,500,000
	– Installation of CCTV cameras and alarms on and along the entrance and exit from the development	Proponent & management	Throughout operation phase	150,000
Occupational safety & Health	– Train workers in the facility and conduct constant awareness programme concerning workplace hazards	HSE officer and licensed trainers	Continuous	100,000
	– The operators should be provided with full safety gear	Management & HSE officer	Continuous	1,000,000
	– Fire-fighting equipment and First aid kits should be provided at strategic points.	HSE officer & fire company	Continuous	250,000
	– Provide documentation of all incidences and accidents occurring on the site including near misses.	HSE officer & workers	Continuous	Nil

Environmental impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (KShs)
	– Develop an effective Emergency Response Plan (ERP) and enlighten the staff on safety measures and procedures through training.	Contracted fire safety consultants	Prior to commencement of operations	professional costs
	– Register the facility with DOSHS as a workplace in line with the Occupational Safety and Health Act No. 15 of 2007.	HSE officer & DOSHS	Annually	15,000
	– Conduct annual health and safety audits and implement recommendations	HSE officer & Contracted auditors	Annually	120,000
	– Clear signage will be posted alerting of possible danger situations.	HSE officer	Continuous	20,000
Traffic increase	– Adequate parking facility will be provided for in the design of the development	Proponent	Continuous	internal
	– Trucks and other vehicles will only be parked at designated parking areas and zones	Fleet manager & drivers	Continuous	Nil
	– Erect speed limit signage and hazard demarcations along the access road	Management & HSE officer	Continuous	10,000
	– Compel drivers to comply with recommended speeds. and monitor in collaboration with the County Traffic Units	Management County Government of Mombasa	Continuous	Nil

9 ENVIRONMENTAL MONITORING PROGRAMME

9.1 Overview of the monitoring programme

A monitoring plan is essential to assess the impact of the development on the environmental setting of the area. The principles underlying an environmental monitoring plan as it relates to any given development is to document, track and report any changes in environmental parameters over time that would be associated with the project. These changes would in principle vary over time in both magnitude and direction. In the case of the latter it is important to bear in mind that changes in environmental parameters may be positive or negative.

Thus in principle a monitoring program for the project would not necessarily focus only on the perceived or anticipated negative changes precipitated by a given development activity, but also on the positive or beneficial changes. The parameter chosen are those that have been identified in the analytical process as being affected in the most significant way by the proposed development.

9.2 Specific monitoring issues

The proposed monitoring plan for the project will entail those parameters and environmental issues that have been identified through the mitigation matrix and other mitigation components. A number of these issues have also been highlighted in the mitigation plans and matrices associated with the previous sections. These issues include:

- Water quality and quantity monitoring
- Wastewater Monitoring Program
- Solid waste monitoring plan
- Environmental audits
- Energy Auditing
- Social Monitoring Plan

The proposed monitoring program has been developed not only in relation to satisfying the statutory requirements of the EIA process, but also as a proactive tool for the proper

implementation of the proposed development, within the context of its relationship to the integrity of the environment as well as the stakeholders in the area.

9.2.1 Water quality and quantity monitoring

The proponent will have a water monitoring programme that examines

- The quality of the water discharging from the borehole
- The quantity of water (yields) from the borehole
- Quantity of water consumed by the establishment

Pollution from all the different sources can pose a serious threat to the water resources in the area and therefore considering the negative impacts, the proposed development will have to incorporate a complete water quality monitoring program. This program, which will further be developed by the proponent and WRMA in collaboration with accredited laboratories.

Water samples will be collected and analyzed on a quarterly basis for the following parameters using the recommended protocol required by Water Quality Regulations (Legal Notice No. 120 of 2006).

9.2.1.1 In situ Measurements

In situ measurements will include;

- Salinity
- Turbidity
- Temperature
- Total Dissolved Solids
- Dissolved Oxygen
- Conductivity
- pH

9.2.1.2 Laboratory Analysis

This will include the determination of the following effluent characteristics.

- BOD
- COD
- Total Suspended Solids
- Total Nitrate
- E. Coli
- Total Phosphate
- Total and Fecal Coliform

9.2.2 Wastewater Monitoring Program

Just as with the water resources monitoring program the proposed development intends to develop a wastewater monitoring program. This program among others will monitor the quantity and quality of treated effluent (wastewater) discharged into the sewer system or generated by the treatment plant.

In addition, the program will also develop a maintenance plan encompassing structural failures, inspections, monitoring of equipment (sewer conveyance pipes, treatment plant, grease traps, oil/water separators, etc.) short and long term repairs as well as training for new employees in charge of supervising the plant.

Samples of the treated wastewater will be collected and sent to a NEMA designated laboratory for testing. In any event, the proponent will comply with all applicable laws relating to this matter. The parameters (BOD, COD, TSS, Nitrates, and E. Coli etc) to be incorporated in the monitoring programme are those included under Schedule III of Legal Notice No. 120 of 2006. The only addition to the monitoring template will be the date that the sample was taken.

9.2.3 Solid waste monitoring plan

As part of the overall management structure, the proposed development plans to undertake an intensive solid waste monitoring plan in order to address all the relevant issues that can arise from the collection, storage and disposal of garbage. Table 5 describes the outline for which the activity will be monitored.

Indicators will be developed to keep track of this activity and report to the apartments property managers on a monthly basis.

Table 5 Outline for solid waste monitoring plan

Parameter	Frequency
Collection	Daily
Disposal	Weekly
Storage	Daily
Management	Daily

The plan can become more dynamic if columns on critical levels and targets as well as responsible persons are added. This can be done once the development is at full operations.

9.2.4 Environmental audits

The proponent will undertake annual environmental audits aimed at;

- Complying with Legal Notice No. 101 of 2003
- Testing the efficacy of the EMP
- Addressing neighborhood concerns on environmental performance of the development

9.2.5 Energy Auditing

Energy auditing provides a clear understanding of energy consumption in buildings, machinery, appliance and other facilities within the premises. Quantitative audit findings aim to inform substantial practical guidelines for:

- Continuous improvement of consumption efficiency
- Identifying cost saving opportunities in energy efficiency

9.2.6 Social Monitoring Plan

The proponent will have a social monitoring plan that targets to ensure compliance with the environmental mitigation measures that address neighborhood concerns. In this regard, the proponent will keep a record of all complaints and comments coming from third parties and action taken to remedy the situation.

10 CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusion

The proposed project (edible oil refinery, soap plant and godowns) is considered important and beneficial to both the proponent and the general public. The negative impacts expected to arise during all the phases of the project can be managed to satisfactory levels that do not warrant significant environmental degradation. Additionally, the proposed development is located in an industrial/ commercial area and is well accommodated within Gorofani area

The foreseen environmental impacts are all mitigatable, through the proposed measures, to levels of low significance environmental damage and socially tolerable impacts.

10.2 Recommendations

It is therefore the recommendation of this report that the project be allowed to proceed on the basis that the environmental management plans for the project is fully implemented, monitored and that follow-up is made to ensure compliance as may be directed by NEMA and relevant lead agencies.

11 REFERENCES

1. Government of Kenya, 1996. Environmental Impact Assessment (EIA) (Guidelines and Administrative Procedures) Draft report, National Environment Action Plan (NEAP) Secretariat. Ministry of Environment and Natural Resources, Nairobi, Kenya

2. Ledgerwood, G., 1994. Implementing an Environmental Audit : How to Gain Competitive Advantage

Using Quality and Environmental Responsibility (Financial Times Series)

3. Republic of Kenya Statutes:

- The Constitution of Kenya (2010)
- No. 8 of The Environmental Management and Coordination (Amendment)Act, 2015
- Legal Notice No. 101 of 2003, Environmental Impact Assessment and Audit Regulations.
- Legal Notice No. 120 of 2006, Water Quality Regulations
- Legal Notice No. 121 of 2006, Waste Management Regulations
- Legal Notice No. 61 of 2009, Noise and Excessive Vibrations, Regulations
- Occupational Safety and Health Act (OSHA) No. 15 of 2007
- Public Health Act Cap 242
- The Water Act, 2002
- Special Economic Zone Act,2015

4. Documents provided by the proponent

12 APPENDICES

1. Copy of Certificate of Incorporation
2. Copy of KRA PIN
3. Copy of Title Deed
4. Evidence of Public Consultation-Questionnaires appended.
5. Copies of Development plans.
6. Practicing Licenses of Lead experts & Firm.