

**INTEGRATED ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR
THE PROPOSED COMMERCIAL DEVELOPMENT INCLUDING A FILLING STATION ON PLOT LR.
NO. 5025/97 IN VIPINGO, ALONG MOMBASA-MALINDI HIGHWAY, KILIFI COUNTY**

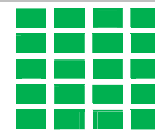


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SUBMISION OF DOCUMENTATION

ENVIRONMENTAL CONSULTANT

I, **Prof. Jacob K. Kibwage**, on behalf of Africa Waste and Environment Management Centre, submit this Integrated Environmental and Social Impact Assessment study report for the proposed commercial development including a filling station on Plot LR. NO. 5025/97 in Vipingo, along Mombasa-Malindi Highway, Kilifi County. To the best of my knowledge, all information contained in this report is an accurate and truthful representation of all findings as relating to the proposed project as per project information provided by proponent.

*Signed at Nairobi on this day of **February, 2019***

Signature:

*Designation: **Lead Environmental Consultant. NEMA Firm Reg. No. 0527***

PROJECT PROPONENT

I,, on behalf of Vipingo Development Limited, submit this Integrated Environmental and Social Impact Assessment study report for the proposed commercial development including a filling station on Plot LR. NO. 5025/97 in Vipingo, along Mombasa Malindi Highway, Kilifi County. To my knowledge, all information contained in this report is an accurate and truthful representation of all findings as relating to the proposed project.

*Signed at on this..... day of **February, 2019***

Signature:

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ACRONYMS

AWEMAC	Africa Waste Environment Management Centre
CBO	Community Based Organisation
CCTV	Closed-Circuit Television
CDA	Coast Development Authority
CPP	Consultation and Public Participation
EA	Environmental Audit
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act
EMS	Environmental Management System
ESMP	Environmental and Social Management Plan
ESIA	Environment & Social Impact Assessment
F&B	Food and Beverage
FDGs	Focused Group Discussions
GDP	Gross Domestic Product
GHG	Green-house Gas
GLA	Gross Leasable Area
GPA	Global Programme of Action
GPS	Global Positioning System
ILO	International Labour Organisation
KFS	Kenya Forest Service
KIMAWASCO	Kilifi-Mariakani Water and Sewerage Company
KPH	Kilometers Per Hour
LBSA	Land Based Sources and Activities
NEC	National Environmental Council
NEMA	National Environment Management Authority
NET	National Environment Tribunal
NGO	Non-Governmental Organisation
NPEP	National Poverty Eradication Plan
OSHA	Occupational Safety and Health Act
PADH	Physical Alterations and Destruction of Habitats
PEC	Poverty Eradication Commission
POP	Persistent Organic Pollutants
PPE & C	Personal Protective Equipment & Clothing
PRSP	Poverty Reduction Strategy Paper
Q&A	Question and Answer
SDGs	Sustainable Development Goals
TOR	Terms of Reference
UNCED	United Nations Conference on the Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

VAT	Value Added Tax
WRA	Water Resources Authority
WSSD	World Summit for Sustainable Development

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EXECUTIVE SUMMARY

Vipingo Development Limited proposes to develop a commercial centre comprising of retail outlets, a hotel, offices, car park and a filling station on Plot L.R. No. 5025/97 located in Vipingo area along Mombasa-Malindi Highway in Kilifi County. The proposed development's tenant will be Anvil Equatorial Development Limited. The site measuring 10.13 acres lies approximately 40km northeast of Mombasa CBD along the Mombasa Malindi Highway, 12km northeast of Mtwapa and 20 km southeast of Kilifi town. The site is located approximately 1.11Km East of Vipingo Ridge main entrance. Currently the proposed project area is used for large-scale sisal farming. The proposed site lies between Global Positioning System (GPS) coordinates -3.811240 39.810530, -3.809263 39.8029677, -3.809615 39.808225, -3.810432 39.810849 and at a general elevation of about 15 meters above the sea level.

Objective of the Environmental and Social Impact Assessment (ESIA)

The major objective of this EIA study report is to evaluate the effects/impacts of the proposed project in relation to the environment i.e. physical, biological, and social-economic environments. It aims at assessing and prediction of all the positive and negative impacts of the project on the environment and recommends measures to reinforce the positive and reduce the negative impacts of the project.

Scope and Criteria of the ESIA

Africa Waste Environment Management Centre (AWEMAC) licensed environmental experts in Environmental Impact Assessment and Auditing were appointed as Consultants to conduct the ESIA of the proposed project.

The scope of the assessment covered the pre-construction, construction, operation and decommissioning of the proposed commercial development including a filling station. The consultants will use both conventional and participatory approaches in identifying the potential environmental impact and mitigating measures for the proposed project.

Methodology Outline

The general steps followed during the assessment were as follows:

- Environmental screening, in which the project was identified as among those requiring environmental impact assessment under schedule 2 of EMCA CAP 387,
- Environmental scoping that provided the key environmental issues,
- Desktop studies and interviews,
- Physical inspection of the site and surrounding areas,
- ESIA Public participation,
- Reporting.

Baseline

The proposed site is located within Kilifi County which has two rainy seasons with a mean annual rainfall of about 900mm to 1,100mm with marked decrease in intensity to the hinterland. The annual temperature ranges between 21°C and 30°C in the coastal belt. The geology and the various geological structures found in the area and immediate neighbourhood were focused on. The proposed site and its immediate surrounding is characterized by large scale sisal farming.

Policy Legal and Institutional Framework

Some the Policies reviewed include the Kenya Vision 2030, Sessional Paper No. 10 of 2014 on the National Environment Policy, National Water Policy, 2012, the National Climate Change Response Strategy (NCCRS), 2010, Kenya National Policy on Gender and Development, 2000 and the draft National Land Use Policy, 2016.

Legal framework reviewed that apply to the proposed commercial development including a filling station include, but not limited to, the following; Environmental Management and Coordination Act CAP 387, the Environment and Land Court Act, 2011, the Water Act, 2016, The land Act, 2012, the Energy Act 2006, Penal Code Act CAP 63, County Government Act 2012, Occupational Health and Safety Act 2007, Public Health Act CAP 242, and the Physical Planning Act 1996.

International conventions and treaties were also reviewed.

Impacts and Mitigation Measures

The proposed project will come along with numerous positive impacts including: Employment opportunities, gains in the local and national economy, increased efficiency in services provided to the people, optimal use of land, increased emergence of social amenities and services in the area, use of best technologies that will ensure environmental and social sustainability in the project area among others.

The proposed project will undoubtedly have some negative impacts which include land quality degradation, noise pollution, dust and exhaust emissions, solid waste generation, increased water demand, increased energy consumption, increased storm water flow among others. Pressure on social amenities may also result from the increased number of visitors to the proposed commercial development. Occupational safety risks associated with the development include accidents, risks of fire out-breaks.

Mitigation measures to address identified negative impacts include landscaping; sprinkling the soils with water if ground clearance is undertaken during the dry season; provision of appropriate Personal Protective Equipment (PPE) to the workers during construction; and, sealing of the area during construction for the safety of passers-by have been provided. During the operational phase, both solid and liquid wastes will be generated. Therefore, there should be proper strategic management of both solid and liquid wastes to avoid the pollution to the environment.

An Environmental and Social Management Plan (ESMP) has also been developed for the proposed commercial development including a filling station. It will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response programme to ensure quick and safe clean-up of accidental spills. The plan will identify areas where refuelling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted.

Special programmes will also be put up by the contractor to ensure the elderly (between ages 35-60), women and the physically challenged are involved in the proposed development so as to ensure it benefits the local community without any bias.

Conclusion

Considering the immense positive socio-economic and environmental benefits to accrue as a result of the development, and the ESIA study having found no major impacts to arise from the development, it is our recommendation that the project be allowed to proceed on the understanding that the proponent will adhere to the mitigative measures recommended herein.

1 INTRODUCTION

1.1 Background and Rationale for an ESIA

The proponent, Vipingo Development Limited, proposes to develop a commercial center including a filling station and leisure amenities on Plot LR. No.5025/97 in Vipingo, along Mombasa Malindi Highway, Kilifi County. The proposed development's tenant will be Anvil Equatorial Development Limited. The site measuring 10.13 acres is located 35km northeast of Mombasa CBD along the Mombasa Malindi Highway, it lies about 18km northeast of Mtwapa and 20 km southeast of Kilifi town. Administratively the proposed site lies in Kilifi County. Kilifi is located about 420km southeast of Nairobi and 60km north of Mombasa. It covers an area of 12,609.74 square kilometers and shares its borders with four other counties including; Mombasa and Kwale to the south, Tana River to the north, and Taita Taveta to the west. The proposed site lies between GPS Coordinates -3.811240 39.810530, -3.809263 39.8029677, -3.809615 39.808225, -3.810432 39.810849 and at a general elevation of 15 metres above sea level.

It was recognised that any form of development such as the proposed project is likely to impact the site and the surrounding environment hence, before any commencement of any work, there was an urgent need to carry out an ESIA for the Commercial Development in compliance with the Environmental Management and Coordination Act (EMCA) Cap 387 and the Environmental (Impact Assessment and Audit) Regulations 2003.

The Kenya Government policy on projects of such nature and scale requires that an Environmental and Social Impact Assessment Study be carried out at the planning stages of the proposed undertaking to ensure that significant impacts on the environment are taken into consideration during the design, construction, operation and decommissioning of such projects. Therefore, in compliance with the law, and to avoid unnecessary conflicts that may retard development in the country, the proponent undertook this ESIA and incorporated environmental concerns as required.

1.2 Scope and Criteria of the ESIA

The government policy on all new development projects requires that an environmental impact assessment be carried out at the design stage of the proposed undertaking to ensure that significant impacts on the environment are taken into consideration during the construction, operation and decommissioning of the facility. The scope of this ESIA, therefore, covered:

- The baseline environmental conditions of the project area,
- Description of the proposed project,
- Provisions of the environmental laws pertinent to the project,
- Identification and discussion of any adverse negative impacts to the environment anticipated from the proposed project,
- Appropriate mitigation measures,
- Provision of an environmental management plan outline.

The scope of the assessment covered the project site, area in close proximity to the proposed site, construction & operation works and the utilities under the project. The output of this work was a comprehensive ESIA study report for the purposes of applying for an EIA licence.

1.3 ESIA Objectives

There is a growing concern in Kenya and at global level that many forms of development activities cause damage to the environment. Development activities have the potential to damage the natural resources upon which the economy is based. Environmental Impact Assessment is a useful tool for protection of the environment from the negative effects of developmental activities. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound.

The main objective of the assignment was to assist Vipingo Development Limited to prepare a study report after carrying out an ESIA of the proposed Commercial Centre including a Filling Station so as to ensure they take into consideration appropriate measures to mitigate any adverse impacts and amplify positive impacts to the environment. The study identified existing and potential environmental impacts and possible concerns that interested and/or affected parties have with the development, as well as the associated prevention and mitigation measures for the negative impacts as stipulated in the proposed ESMP.

Environmental Impact Assessment (EIA) is a critical examination of the effects of a project on the environment. The goal of an EIA is to ensure that decisions on proposed projects and activities are environmentally sustainable.

1.4 Terms of Reference (TOR) for the ESIA Process

AWEMAC, a NEMA registered and licensed Firm of Experts in Environmental Impact Assessment and Auditing was appointed by Vipingo Development Limited as a Consultant firm to conduct the ESIA for the proposed Commercial Centre including a Filling Station.

The ESIA included the necessary specialist studies to determine the environmental impacts relating to the biophysical and socio-economic aspects and to determine the issues or concerns from the relevant authorities and interested and/or affected parties. The appropriate measures to ensure co-existence of the proposed development with other social and economic activities in the area are provided as part of ESMP.

The consultant on behalf of the proponent conducted the study by incorporating the following terms of reference inter alia: -

- The objectives of the project,
- A description of the location of the proposed project,
- The technology, procedures and processes used, in the implementation of the project,
- The materials used in the construction and implementation of the project,

- The products, by-products and waste generated by the project,
- A concise description of the national and county environmental legislative and regulatory framework,
- Baseline information, and any other relevant information related to the project,
- The environmental effects of the project including the social, archeological, health and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects,
- To recommend a specific environmentally sound and affordable waste management system,
- An environmental and social management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures,
- Propose measures to prevent health hazards and to ensure security in the working environment for the employees, customers and for the management in case of emergencies,
- Identification of gaps in knowledge and uncertainties which were encountered in compiling the information.

1.5 ESIA Organization and Structure

The ESIA was carried out to full completion within a period of one month from the date of undertaking. The Consultant (Lead Expert) coordinated the day-to-day functions and any related institutional support matters. Otherwise, all formal communications were directed to National Environment Management Authority (NEMA) through Vipingo Development Limited.

1.5.1 Responsibilities and Undertaking

The Consultant, AWEMAC, undertook to meet all logistical costs relating to the assignment, including those of production of the report and any other relevant material. The consultant arranged for own transport and travels during the exercise. On the site of the proposed development project, Vipingo Development Limited provided a contact person(s) to provide information required by the Consultant. The proponent also provided site plan(s) showing roads, service lines, buildings layout and the actual sizes of the sites, details of raw materials, proposed process outline and anticipated by-products, future development plans, operation permits and conditions, land-ownership documents and site history, and estimated investment costs. The output from the consultants includes the following:

- An Environmental and Social Impact Assessment report comprising of an executive summary, assessment approach, baseline conditions, anticipated impacts and proposed mitigation measures,

- An Environmental and Social Management Plan outline, which also forms part of the report recommendations.

1.6 Methodology Outline

Due to the scale of the proposed project and in line with guidelines issued by NEMA, an ESIA Study report was seen to be adequate to draw attention to the potential positive and negative environmental impacts; provide mitigation measures for negative ones and enhance the positive impacts. The general steps followed during the assessment were as follows:

- Environment screening, in which the project was identified as among those requiring Environmental Impact Assessment under schedule 2 of EMCA, CAP 387
- Environmental scoping that identified the pertinent environmental issues
- Desktop studies and interviews
- Physical inspection of the site and surrounding areas
- ESIA Public Participation including a public meeting and
- Reporting.

1.6.1 Environmental Screening

This step was applied to determine whether an ESIA was required and what level of assessment was necessary. Issues considered included the physical location, sensitive receptors in close proximity to the site and the nature of anticipated impacts. It was concluded that the proposed project falls within the category of projects under the second schedule of EMCA CAP 387 that requires an Environmental Impact Assessment to be carried out before implementation.

1.6.2 Environmental Scoping

The scoping process helped narrow down onto the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, natural/ecological and social, economic and cultural aspects. The site history and the facilities in close proximity to the site were considered during this stage.

1.6.3 Desktop Study

This included documentary review on the nature of the proposed activities, project documents, designs, policy and legislative framework as well as the environmental setting of the area among others.

1.6.4 Site Assessment

Field visits meant for physical inspections of the site characteristics and the environmental status of the surrounding areas to determine the anticipated impacts were conducted. It also included further interviews with neighbors, surrounding enterprises and key stakeholders.

1.6.5 ESIA Public Participation

The residents/ property owners surrounding the project site were interviewed and they expressed their views towards the upcoming project. In addition to that, questionnaires were administered to solicit for more details and views from the surrounding community. A public meeting was held on 14th January, 2019 near the proposed site from 10:30am to 12:30pm where attendants further aired their views and concerns, which were addressed by the consultants and the client's representative present. The public notice, minutes of this meeting and attendance sheets are appended to this report.

1.6.6 Reporting and Documentation

The Environmental and Social Impacts Assessment Project Report was compiled in accordance with the guidelines issued by NEMA for such works and was prepared and submitted by the proponent for review and approval by NEMA prior to commencing any work. The Consultant took into consideration all the views and concerns that had been raised by interested and/or affected parties and recommended appropriate mitigation measures. The Consultant also ensured constant briefing of the client during the exercise. Architectural drawings and Acacia Holdings Limited Certificate of Incorporation are appended to this report.

2 DESCRIPTION OF THE PROPOSED PROJECT

2.1 Project Background

Vipingo Development Limited intends to embark on developing a Commercial Centre comprising of a filling station, hotel, offices, retail outlets and a car park. The proposed parcel of land on which the development will be done is relatively flat and is currently used for large-scale sisal farming for export purposes. The proponent seeks to develop this property by constructing a centre that will be an everyday shopping, fuelling, meeting and entertainment location for residents and visitors of Vipingo environs and North Coast.

2.2 Project Location

The proposed project site is located on Plot L.R. No. 5025/97 located in Vipingo area along Mombasa Malindi Highway in Kilifi County. The site measuring 10.13 acres lies approximately 1.11Km East of Vipingo Ridge main entrance, 1Km North of Vipingo Trading Centre, 0.77Km North West of Kikambala, 2.5Km South West of Kibaoni and approximately 2.4Km North East of Rea Vipingo Head Quarters. Administratively the proposed site lies in Kilifi County which shares its borders with four other counties including; Mombasa and Kwale to the south, Tana River to the north, and Taita Taveta to the west. The proposed site lies between GPS coordinates -3.811240 39.810530, -3.809263 39.8029677, -3.809615 39.808225, -3.810432 39.810849 and at a general elevation of about 15 meters above the sea level.

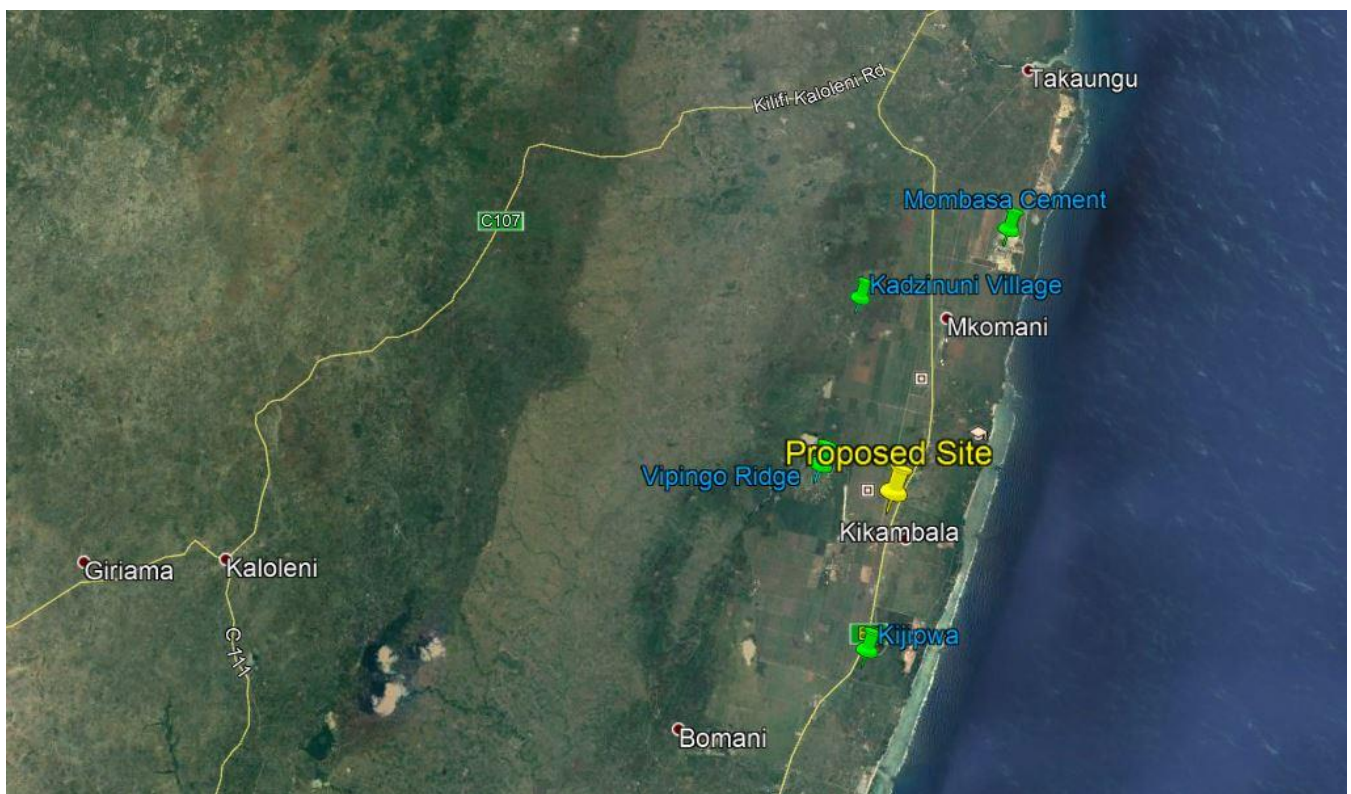


Figure 1: Location of the proposed project site

Source: Google Earth

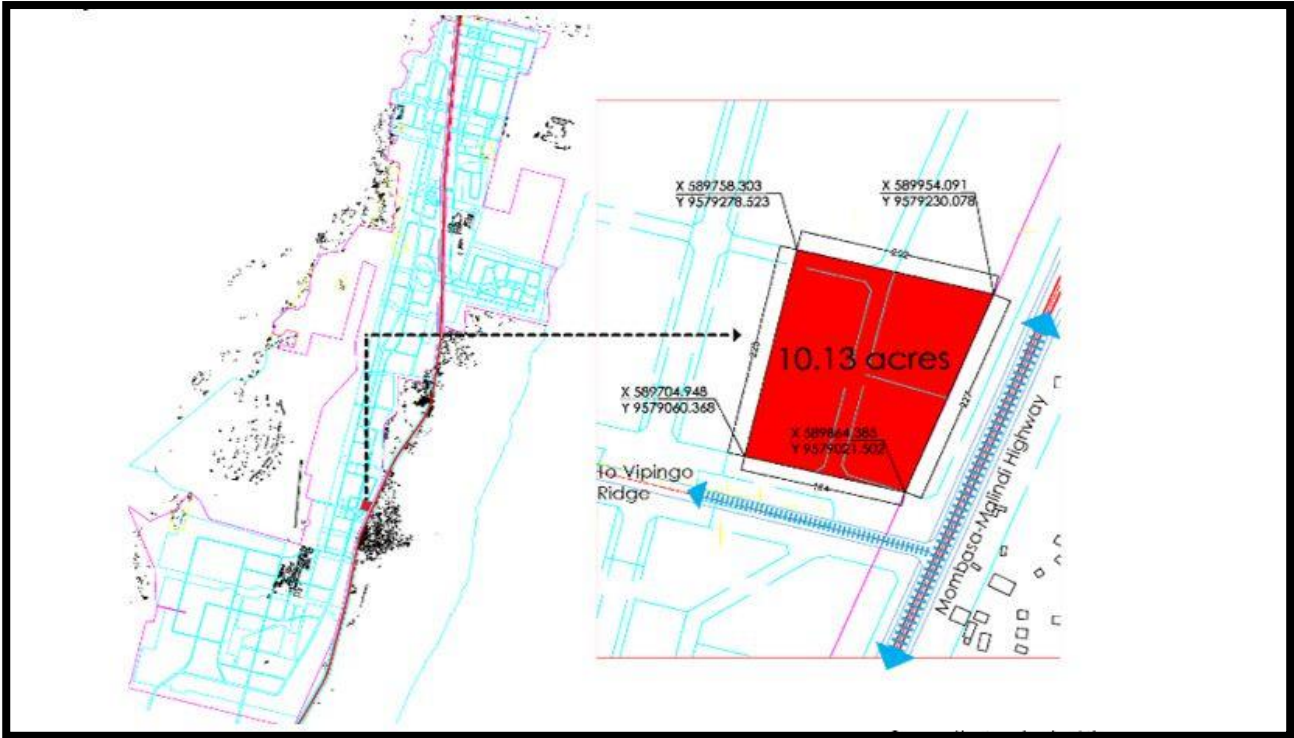


Figure 2: Project Location

Source: Vipingo development Ltd

2.3 Project Proponent

The proposed development proponent is Vipingo Development Limited, a duly registered company in the Republic of Kenya (*See annex for certificate of incorporation*). Vipingo Development Limited are also the rightful owners of the proposed project site. This is to clarify the variance in this proposed project's ToR that was earlier submitted to NEMA on 13th December, 2018. On the other hand, Anvil Equatorial Development Limited are going to be tenants of this proposed development.

2.4 Project Specifications and Design

The proposed development will comprise of a supermarket, restaurant, banking services, medical facilities, gym, bar, play area, hotel, office building, car park, filling station and a car wash. The proposed center will have a total retail gross leasable area (GLA) of 6567 square metres (sqm) and office space GLA OF 2130 sqm. The lower level of retail includes a supermarket anchor, a sub-anchor, and a restaurant piazza with outdoor play area. Total retail GLA for the lower level plan is 4352 m². An upper level of retail will be created to include; a gym, some banking facilities, service and medical facilities, and an upper level bar. An office building is also positioned from first to third floor. The total retail GLA for the upper level will be 2215m². Offices will take up approximately 2130m² of GLA.



Figure 3: Site Plan

Source: Vipingo development Ltd

Development of the proposed commercial center including a filling station is scheduled to take place in phases. Phase 1 will comprise of a retail centre, office space and a filling station. Phase 1 retail and office facility will be set on 3 acres to allow for scale and expansion. The petrol station will be on 1 acre. The petrol station will also provide truck stop for trucks ferrying goods between Mombasa and Nairobi. To differentiate the centre, it will:

- Have unique mix of retailers local and international especially food and beverage (F&B).
- Have beautifully landscaped environment including water features.
- Have properly planned accessibility, circulation, traffic management and parking.
- Be differentiated by a variety of F&B and entertainment outlets.



Figure 4: Architectural Design of the proposed commercial centre

Source: Vipingo development Ltd

2.5 Project Vision, Goal, Principles and Objectives

The objects of the proposed project will be to reinforce and strengthen existing population growth patterns to create a new development that will spur economic growth and improve living standards both locally and at regional level. This development will take into consideration both social and environmental aspects and create a serene environment for all. The goal of the proposed development is to enhance sustainability and quality of the built and landscaped environment capturing land value for investors and to provide both commercial and leisure facilities.

2.6 Description of the project's construction activities

2.6.1 Site preparations

The project site is currently used for large scale farming of sisal for export purposes. In order to pave way for the proposed development, the sisal plants will be harvested in phases as they reach maturity, once harvested the area will then be cleared of existing vegetation excluding any trees that might be on site.



Plate 1: Proposed site for development

2.6.2 Excavation and foundation works

Excavation will be carried out to prepare the site for construction of foundations, pavements and drainage systems. The excavation will involve the use of heavy earthmoving machinery such as excavators, pile drivers and bulldozers.

2.6.3 Storage of materials

Building materials will be stored on site. Bulky materials such as rough stones, ballast, sand and steel will be carefully piled on site. To avoid piling large quantities of materials on site, the proponent will order bulky materials such as sand, gravel and stones in quotas. Materials such as cement, paints and glass among others will be stored in temporary storage structures built for this purpose.

2.6.4 Masonry, concrete work and related activities

The construction of the building walls, foundations, floors, pavements, drainage systems, perimeter fence landscaping among other components of the project involves a lot of masonry work and related activities. General masonry and related activities include stone shaping, concrete mixing, plastering, slab construction, construction of foundations, and erection of building walls and curing of fresh concrete surfaces. These activities are known to be labour intensive and are supplemented by machinery such as concrete mixers, cranes etc.

2.6.5 Structural steel works

The development will be reinforced with structural steel for stability. Structural steel works involve steel cutting, welding and erection of framework.

2.6.6 Roofing works

Roofing activities will include raising the roofing materials such as tiles and structural steel to the roof and fastening the roofing materials to the roof.

2.6.7 Electrical work

Electrical work during construction of the premises will include earthing/grounding, electrical wiring, installation of lighting fixtures etc. In addition, there will be other activities involving the use of electricity such as welding and metal cutting.

2.6.8 Plumbing

Installation of pipe-work will be done to connect the development to an onsite sewerage treatment plant. Plumbing will also be done for drainage of storm water from the rooftop into collection tanks and storm water drainage. Plumbing activities will include metal and plastic pipe cuttings, the use of adhesives, metal grinding and wall drilling among others.

2.7 Description of Project's operational activities

2.7.1 The facility uses

Upon completion of the project, the facility will provide an urban commercial centre, high quality infrastructure, amenities and services.

2.7.2 Landscaping

The site will be landscaped after construction, using existing and locally available plant species. This will include, tree-planting, establishment of flower gardens and grass lawns to improve the visual quality of the site. The proponent and his contractors will preserve the existing trees on the proposed site as part of green areas and aesthetic value.



Figure 5: Architectural impression of part of the landscaped areas

Source: Vipingo development Ltd

2.7.3 Electrical system

The proposed development will be connected to the Kenya Power Company electricity main line that will be used in all phases of the project. The necessary guidelines and precautionary measures relating to the use of electricity shall be adhered to. In addition, alternative sources of power for the project e.g. solar, wind power; generators etc. will also be utilized. Solar heating provision for all units and backup generator for common areas.

2.7.4 Water reticulation system

Water from a borehole will be used during the construction phase of the project while water sourced from a proposed desalination plant will be used during the operation phases of the project. There will be water storage tanks to increase water capacity at the project site to the required amount.

2.7.5 Solid Waste Management

Solid waste management will consist of segregation of waste by type from the various sources and these will be collected at designated points. The waste will later be collected for disposal by a NEMA registered refuse collector.

2.7.6 General repairs and maintenance

The proposed development and associated facilities will be repaired and maintained regularly during the operational phase of the project. Such activities will include repair of building walls and floors, repair and maintenance of electrical gadgets, painting and replacement of worn out materials among others.

2.8 Proposed sustainability features

Sustainability features for the proposed residential apartments development include the following:

a) Natural Ventilation

The project is designed to encourage and maximize the use of natural ventilation by providing good internal comfort conditions throughout the year. Even where supplementary comfort cooling is installed in some areas, to save energy the buildings will be designed for 'mixed-mode' so that the cooling can be implemented only under very warm external conditions with natural ventilation for the remainder of the year.

b) Water Services

To ensure continuous supply of water the proponent plans to construct a modern seawater desalination plant that will be used to supply water during the operation phase of the project. The total water storage capacity for the proposed project will be 500,000 Litres/day. The desalination plant capacity is estimated to be 3,000,000 litres/day- (phase 1: 1,500,000 litres/day). Water from a borehole will be used during the construction phase of the project. WRA requirements and the provisions of the development design plan will be complied with when establishing these facilities.

c) Lighting Systems

The proponent proposes to maximise the use of natural light in the general design of the commercial centre and install energy saving lights in all rooms.

d) Back-up Power Supply

Whereas the proponent primary electricity supply will be from the Kenya Power Company main line, provisions will be made for alternative sources of power for the project e.g. solar power. Separate space has been provided for fuel storage and generator installation when there are power outages.

e) Sewerage system, treatment and recycling technology

Wastewater from the project site will be drained via uPVC underground drainage pipes and fittings (Heavy gauge to BS 4660 Class 41, ranging from 50mm to 225mm) to an onsite waste water treatment plant. The wastewater once treated, will be stored in irrigation tanks and the extra drained into soakage pits. The treated wastewater will be recycled for irrigation as well as landscaping. Liquid effluents may contain domestic

waste, organic matter, salts and detergents, oils and fats. The effluent may also contain some pathogens. The effluent will be treated according to the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006.

f) Storm Water Management

All storm water will also be intercepted and channeled into the storm water drains to be used for landscaping. This will be undertaken to check the runoff and soil erosion.

g) Roads and Traffic plan

In order to protect pedestrians and cyclists, it is recommended that barrier kerbing be installed for all roads within the site. The road surfacing for the roads will be asphalt, concrete/paving slabs or cabro paved. The main entrance to this site will be via the access road located along the Mombasa Malindi Highway. The proponent proposes to introduce deceleration and acceleration lanes at the entrance and exit points to deter disruption of traffic along the busy Mombasa Malindi Highway.

h) Solid Waste Management

The proponent takes cognizance of a significant volume of waste that will be generated during the land preparation, construction, and operation of the project. An integrated solid waste management system will be applied at all phases of the project. First, the proponent will give priority to:

Reduction at Source of the waste materials. Under this option, the proponent will implement a solid waste management awareness programme for the management and all the residents,

Recycling, Reuse and composting of the waste will be the second alternative in priority. Under these options, the proponent plans to use a management system of separating waste at the source. The recyclables will be sold to waste buyers. Finally,

sanitary landfilling in legally designated sites will be the last option for the proponent to consider.

i) Electricity Supply

The proposed development will be connected to the 11KV electricity overhead line along the Mombasa Malindi Road which will be used in all phases of the project. Low Voltage (LV) distribution shall be installed by armored cable direct buried to every individual utilization building. LV cables shall be armored XLPE insulated 0.6/1KV copper cables. Cable bury depth shall not be lesser than 700mm as per IEC standard, and shall be protected by C20 concrete encased PVC duct bank where crossing road. The voltage drop between the origin of projected substations and the equipment should not be greater than 4 % of the nominal voltage of the installation.

To ensure security of electrical supplies, the developer intends to have his own individual dedicated standby diesel generator. This generator shall be outdoor type, equipped with

silencer to minimize the noise, and the enclosure shall be IP44, with the same colour with the nearby prefabricated substation to ensure the aesthetic aspect.

j) ICT Infrastructure

ICT system infrastructures will be provided by the developer within the projected area, such as PVC duct bank, hand holes, etc. The bury depth of PVC duct bank shall not be lesser than 800mm, and shall be protected by C20 concrete encased where crossing road. The infrastructure will be utilized by communication and television service providers to install cables, optic fiber, etc. The ducting system shall be accessible to all individual buildings within the project area.

2.9 Description of the project's decommissioning activities

2.9.1 Demolition works

Upon decommissioning, the project components including buildings, pavements, drainage systems, parking areas and perimeter fence will be demolished. This will produce a lot of solid waste, which will be re-used for this or other construction works or if not re-usable, disposed of appropriately by a licensed waste disposal company.

2.9.2 Dismantling of equipment and fixtures

All equipment including electrical installations, furniture, finishing fixtures partitions, pipe-work and sinks among others will be dismantled and removed from the site on decommissioning of the project. Priority will be given to reuse of these equipment in other projects. This will be achieved through resale of equipment to other building owners or contractors or donation of these equipment to schools, churches and charitable institutions.

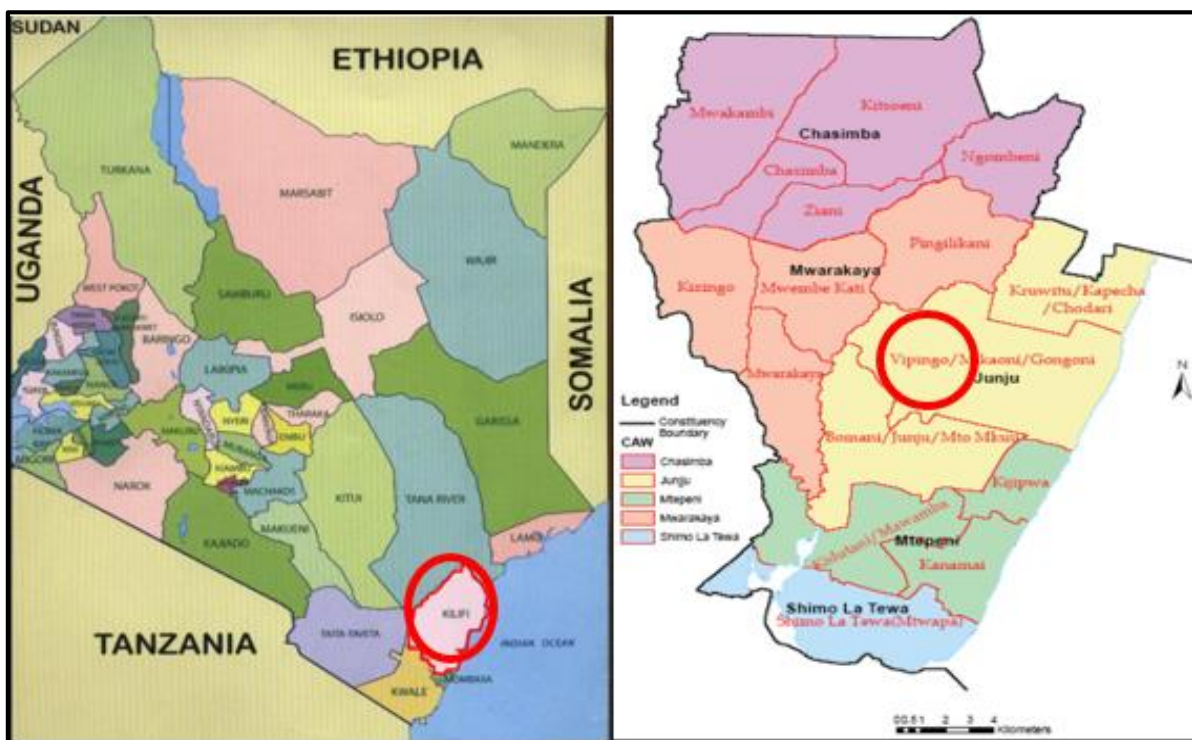
2.9.3 Site restoration

Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through replenishment of the top soil and re-vegetation using indigenous plant species.

3 BASELINE INFORMATION OF THE PROJECT AREA

3.1 Introduction

Vipingo is within Kilifi South Constituency in Kilifi County. Kilifi is one of the fast growing coastal regions in Kenya. Kilifi County is one of the 47 counties in the Republic of Kenya. It borders Mombasa County to the South, Kwale County to the South West, Taita Taveta County to the West, Tana River County to the North and the Indian Ocean to the East (Figure 1). Kilifi County covers a total surface area of 12,610 km² and accounts for 2.17 per cent of Kenya’s total surface area. It is located between longitudes 39.85 East and latitudes -3.6333333 South.



(Source: www.kilifi.go.ke)

Figure 6: Location of Kilifi County

3.2 Physiographic and Natural Conditions

3.2.1 Climate

The average annual rainfall ranges from 300mm in the hinterland to 1,300mm at the coastal belt. The coastal belt receives an average annual rainfall of about 900mm to 1,100mm with marked decrease in intensity to the hinterland. Areas with highest rainfall include Mtwapa and to the north of the coastal strip around the Arabuko Sokoke Forest. Evaporation ranges from 1800mm along the coastal strip to 2200mm in the Nyika plateau in the interior. The highest evaporation rate is experienced during the months of January to March in all parts of the county. The annual temperature ranges between 21°C and

30°C in the coastal belt and between 30°C and 34°C in the hinterland. The county experiences relatively low wind speeds ranging between 4.8 km/hr and 12 Km/hr.

3.2.2 Geology

The geology and the various geological structures found in the area and immediate neighbourhood were focused on. The rocks of this area are part of a system of sedimentary and basement rocks with a generally Northeast - Southwest strike parallel to the coastline (NESS, 1984). Specifically, the area consists of mainly rocks of sedimentary origin and ranging from recent sediments to the Pleistocene Pliocene and Jurassic small pockets of metamorphic basement rock types. The rocks are best described on the basis of age.

3.2.2.1 The Jurassic Sediments

Rocks of Jurassic and Cretaceous age occupy the foot plateau between the Coastal Tertiary series and the Duruma Sandstones. The outcrop can be traced to the west of the area around Colewa and river Mkuu and could be said to occupy most of the development area. The rocks consist of limestones, sandstones and shales. These include the Kambe Limestone Series, Kibiongoni Beds and the Upper Jurassic shales and Limestones.

3.2.2.2 The Kambe Limestone Series

They overlie the Duruma Sandstone Series. The Kambe Limestone consists of a series of limestones with inter-bedded calcareous shales. These rocks occur as a bluish-grey, compact, calcitic mudstone and contain thin partings of shale. This type may also occur with an abundant fauna, particularly corals. They may also occur as a lighter grey, oolitic limestone that is inter-bedded with the other two. The Kambe Limestones can best be seen from excavations done on deep shallow wells in the area.

3.2.2.3 The Kibiongoni Beds

The Kibiongoni Beds include a belt of shales, yellow micaceous sandstones, cherty mudstones, and shelly sandstones composed of sub-angular pebbles of limestone and quartz overlain by a series of thin, current-bedded, sandy shales with inter-bedded micaceous and ferruginous sandstones. Near the top is a fairly massive band of ochreous (brownish) sandstone which from the area of study can be seen in Bububu region brought up by burrowing animals.

3.2.2.4 The Upper Jurassic Shales and Limestones

The shales are generally dark grey to black (lower horizons) and greenish grey or yellowish, higher up; on weathering they frequently assume a lighter grey or brownish tinge. They are sandy, calcareous, sometimes ferruginous and more rarely micaceous, and contain bands of nodular clay ironstone and muddy limestone. Limestone bands can be observed at several localities.

3.2.2.5 The Cainozoic Rocks

The Cainozoic rocks are confined to the coastal strip and include representatives of the Pliocene, Pleistocene, and Recent periods. The succession is as follows: -

3.2.2.5.1 The Sands

These form a belt of low hills running parallel to the coast and at a distance of roughly 2 to 5 km from the coast. They rest with slight unconformity upon a planned surface of Jurassic and Cretaceous rocks and occasionally overlap on to the Duruma Sandstones. The deposition is generally poorly stratified, ill-sorted and unconsolidated, and varies in grade from silty clay to coarse boulder gravel. A bulk of the material comprising fragments of Jurassic shales, rounded fragments of silicified fossil wood, and well-rounded pebbles of gneiss from the Basement System can sometimes be seen.

The sediments outcrop to the near east of the area in Mkomani and Kibaoni within the project area. These rocks are fine grained and rounded an indication that they were deposited as river gravels and coastal dunes under conditions of intense erosion.

3.2.2.5.2 Coral Reefs

The formation of the coral-reef was followed by a marine regression with a subsequent rejuvenation of the river systems that cut their ways through the freshly-formed deposits. It consists of a tough white or yellowish-white coral limestone that weathers to a dirty whitish-gray or grayish-black. The reef is devoid of structure and its surface is so badly weathered that it is rarely possible to distinguish any fossil forms. The width varies from place to place according to the suitability of the local Pleistocene conditions for coral growth and according to the rate of rise of sea-level that prevailed in time of formation.

3.2.2.5.3 Wind-blown and Superficial sands

These cover the other older sediments occurring in the area. They are composed of fine sands and alluvium. These cover most of the study area. The deposits are thin reaching a maximum of 1m in thickness.

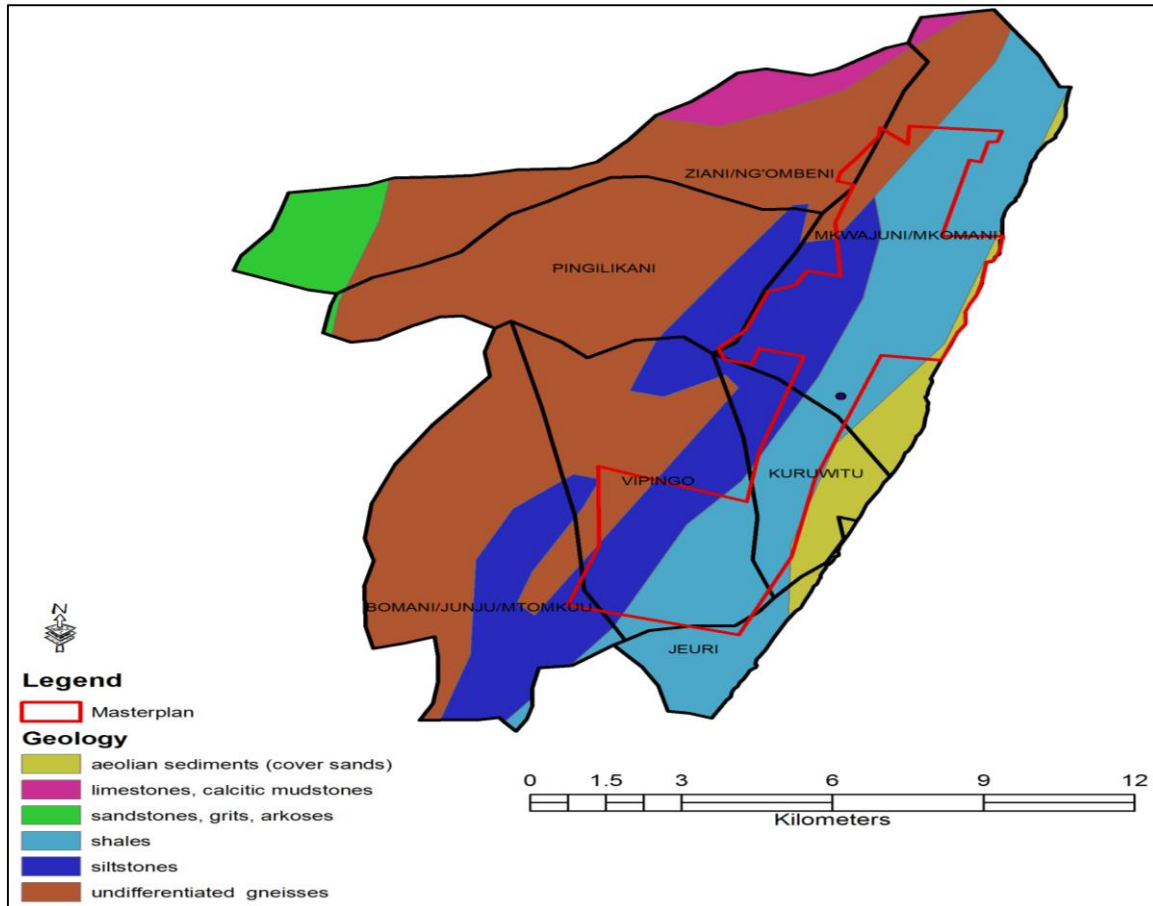


Figure 7: Geology of the Development Area

3.2.3 Structural geology

Both the Kilindini sands and the Magarini sands are highly permeable; the latter having both primary porosity and secondary permeability due to fracturing. There are two main fracture orientations: north-easterly and a north-westerly. This means that in some zones conjugate fracturing occurs, making such the most permeable, hence have the best possibilities for ground water abstraction. While the north-westerly fracturing tends to conduct groundwater from the recharge area to the discharge area, the north-easterly fractures tend to redistribute groundwater within the system. As such, targeting the north easterly fractures assures striking aquifers of more uniform transmissivity, while the north-westerly will give boreholes that have a more directional, but can sometimes be of very high, transmissivity.

3.2.4 Minerals and Geological Economic Resources

The entire area comprises of mainly sedimentary formations with limestone as the most important extractive geological material. There are also the natural sands used in construction. The excavated limestone is used for both construction and in the production of cement as is the case in the neighbouring Mombasa cement factory (9km NE from the proposed development site). There are no other mineral resources evident in the area. Quarrying of the limestone for cement production and construction is

therefore the main economic geological activities. The clay rich soils found in some parts of the area are also widely used to make houses for the local communities. Gypsum and salt have been reported in Ngomeni (NEHSS, 1984).

3.2.5 Soil Formations

The soils of the project area are shown in Figure 8. The soils differ widely in depth, texture and chemical properties mainly due to the local geology (Braun, 1980). The pattern of soils can be chiefly determined by the nature of bedrock, physiography and climate. The area is located in the Intertidal Coastal Plain and the belt extends from the coastline to 5-15 km width inland, rising gently (< 2% slopes). The soils of tidal plains are developed from unconsolidated recent marine alluvium over river terraces, floodplains, valleys, bottomlands, sandy beaches, coral ridges, tidal flats and swamps.

This is a zone where coastal salinization as defined by FAO (1990), takes place due to tidal marine water activity (D'Costa and Gachene, 1986). Soils of tidal flats, coastal swamps and bays are deep poorly drained, saline-alkali, mostly unripened clayey soils classifying as Eutric, thionic Fluvisols and Gleysols with saline-sodic phases, Gleyic Solonchaks and thionic Histosols. These areas abound in valuable mangrove and other natural forested woods, sedges, wildlife, fish and fauna, which need protection from overexploitation. The coral limestone ridges are mostly shallow and rocky Eutric and Lithic Leptosols and Cambisols. The sandy beaches are very deep Dystric Regosols/Arenosols which are well suited for coconut plantations. However, these beaches and ridges serve as most viable tourist resorts and recreational areas.

The soils of alluvial terraces, flood plains and upper valleys occupy small areas. The important soils are sandy Arenosols, Ferralsols and deep well drained Eutric and thionic Fluvisols, and imperfect to poorly drained Cambisols and Vertisols with saline-sodic phases.

The Soils developed on Plio-Pleistocene Sediments (Magarini Sands) are imperfectly drained to poorly drained, moderately deep to deep, dark yellowish brown to light olive brown, firm to very firm, moderately calcareous, sandy clay to clay, with humic topsoil; Predominantly, moderately sodic and in places saline (mollic Solonetz; with orthic Rendzinas and verto-luvic Phaeozems, which dominate most of the proposed site area)

Soils Developed on Pliocene Sandstones are the well-drained, extremely deep consisting of red to dusky red, very friable, sandy clay loam to clay (acric to rhodic Ferralsols)

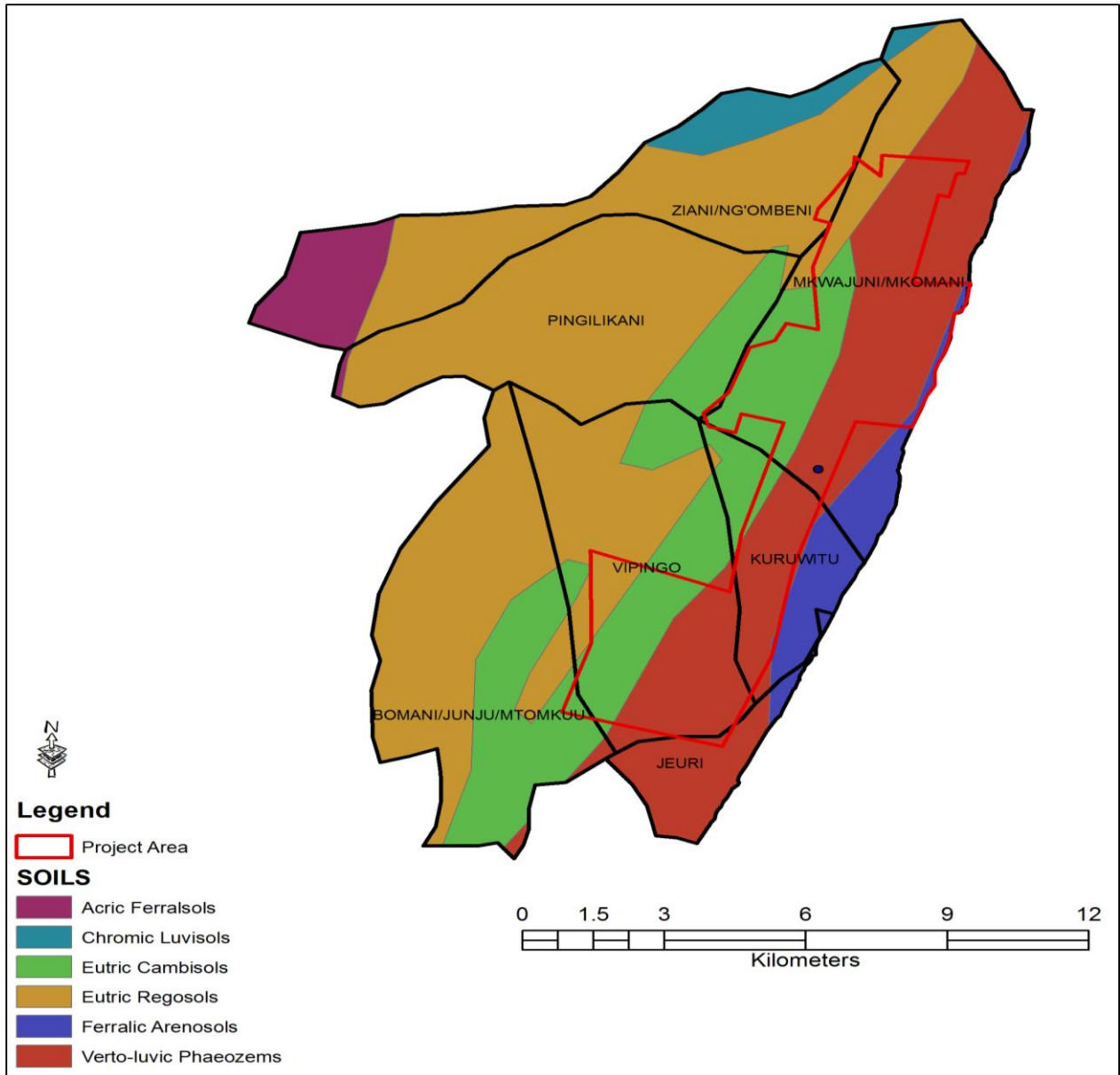


Figure 8: Soil Map of the Development Area

3.2.5.1 Wind-blown and Superficial Sands

These cover the other older sediments occurring in the area. They are composed of fine sands and alluvium. These cover most of the study area. The deposits are thin reaching a maximum of 1m in thickness. The proposed economic development will most likely affect the geology in terms of exaction and disposal of waste. This is due to the fact that most of the land for the proposed development site is in sedimentary formations. The Figure 7 above shows the geology of the area.

3.2.6 Hydrogeology

The hydrogeology of an area is intimately dependent upon the nature of the parent rock, structural features, weathering processes, recharge mechanism and the form and frequency of precipitation. Generally, the development area has medium to high groundwater potential as deduced from previous studies. Vast quantities of water are stored in sands and shales but production is low because of their low permeability. Much of the interstitial water is brackish or saline. Sands, sandstones, grits and gravels are generally both porous and permeable, while clay is porous, but impermeable. Permeability increases normally with an increasing particle size and a better rounding of the particles. Sandstones and conglomerates, therefore, are more permeable and better aquifers, than clays.

Shales, whose origin is clay through consolidation and compaction, have well marked bedding plane fissility, primarily due to the orientation of the clay mineral particles parallel to the bedding planes. As with clays, shales may be very porous, but the permeability is almost nil.

The limestones found in the area are of the detrital type, being made up of fragments of organic carbonate (coral, shells, algae etc.). The primary porosity of these limestones strongly depends on the grain size, the shape of the grains and the fissuring of the rock. The secondary porosity of limestones may result from fracturing and/or dissolution of the limestone leading to karstification and formation of sinkholes. An alignment of sinkholes may indicate major flow paths of the groundwater; such as fault zones. However, no sinkholes could be detected on the aerial photograph mosaic covering the Magarini area. Further, no evidence of karstification could be found in the field and the Jurassic limestone beds within the area seem to be of limited extent and thickness.

3.2.6.1 Shallow Wells

Shallow wells have been dug in the area to tap the top (perched) aquifer. Deeper wells penetrate into the main aquifer. The former usually are hand dug and normally penetrate to about 5 m in the perched aquifer in the aquitard clays and silts. Shallow wells normally dry up during the dry season or experience systematic decline in the water level. The shallow wells have fresh water though they are often bacteriologically contaminated

3.2.6.2 Upcoming Saline Interface and Safe Yield

If a well installed in fresh water overlying saline water is pumped, the saline water beneath the well starts moving upward, due to the upward pressure gradient below the well. If pumping is continued at a steady rate, one of the following situations may develop: The saline water below the well keeps upcoming until it reaches the well screen: the well will discharge a mixture of fresh and saline water. The upcoming of saline water reaches a certain equilibrium level at some distance below the well after a certain period. In this preferable situation, the well will continue to produce fresh water as it extracts.

The second scenario is mainly governed by high horizontal hydraulic conductivity and/or low pumping rates, assuring that the abstraction of fresh water is to a large extent compensated by horizontal inflow of fresh water and only marginally by upconing of the saline interface. Whether the first or second situation develops depends on both the well and the aquifer hydraulic properties, the densities of the saline and fresh water, and the discharge. Due to the lack of information regarding the vertical and lateral recharge and the nature, thickness, extent, distribution and hydraulic conductivity of the underlying saline/brackish water bearing formations, the actual values of upconing cannot be determined.

Key threats that have been facing the groundwater over the years include pollution through liquid wastes discharge to the ecosystem which is expected to increase with increased economic activities. It is expected that the proposed development will put in place all the necessary precautions to cushion the ecosystem from possible negative spill-over effects of the proposed development. Protection of the groundwater from negative impacts from development activities is very critical for a balance in supply of portable water.

3.2.7 Water sources

Vipingo area experiences water scarcity due to occasional continuous dry weather period of 5-6 months that occurs in some years. This impacts negatively on the water supply in the area. In addition, intrusion of saline water in some boreholes has been reported in the area (Caroline and Christopher, 2014). According to the Water Resources Authority (WRA), most of the coastal towns fall under the Athi sub-region, which include; Mombasa, Kwale, Kilifi (development area) and partly Taita Taveta. These areas have very few or no flowing streams and rivers, thus, they are served by piped water sourced from River Sabaki, bore holes and surrounding dams. The surface water supply from seasonal streams such as Junju, Mwamba, Mtwana, Lwandani, Mto Mkuu, Ngombeni and Mwakuhenga are largely unreliable (Figure 9). Therefore, the main sources of fresh water in the proposed development area, just like most parts in the coast region are River Sabaki, ground water and roof catchments (Odhengo *et al.*, 2012).

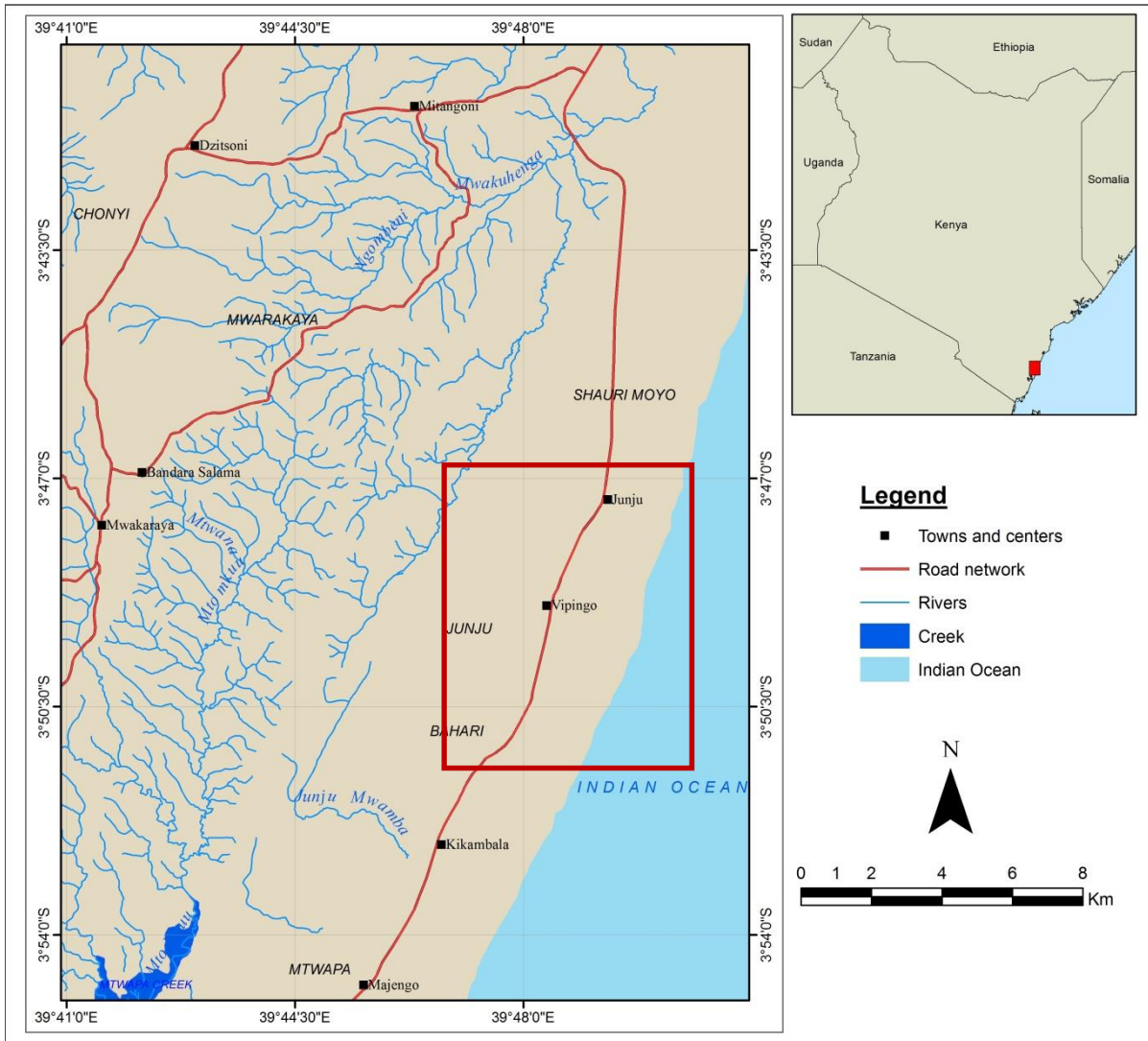


Figure 9: Water and Marine Resources Map for the Vipingo Area (Red Square Represents Proposed Development Area)

3.2.7.1 Water resources and supply scenario

Water supply system has been overtaken by demand, which has increased rapidly in concurrence with the growth of the tourism industry and irrigation schemes. The main uses of water are domestic (which accounts for 35% of the total water demand), livestock, irrigation and industry (*Odhiambo, 2014*). These water resources are important for local communities as the main water sources for their domestic use and for cattle. The small industries such as horticultural farms around the area rely on these sources of water to sustain their activities. The proposed development is likely to have low to moderate impacts on water resources as a result of their unavailability in the area. Moreover, the development proposes to utilise multiple water solutions for the general area including desalination of ocean waters, harvesting of rainwater and drilling of boreholes.

Scarcity and unpredictability of rainfall in Vipingo area is a major impediment to development. This has led to water scarcity, high cost of water and lack of reliable water supply to serve commercial developments. Although most of the residents rely on piped water supplied by Kilifi -Mariakani Water and Sewerage Company (KIMAWASCO) at Ksh. 227.5 per M³, it is the most expensive compared to other water companies in the country. In addition, the cost of water per cubic meter is Ksh. 163.5 per M³ more expensive compared to Nairobi Water and Sewerage Company. Therefore, providing cheaper and reliable water supply solution will attract residents to relocate to the proposed development.

3.2.7.2 Ground water resources

The groundwater in Vipingo area occurs in confined and unconfined aquifers in sedimentary formations of fluvial and lacustrine origin (*Caroline and Christopher, 2014*). Groundwater flow direction is generally eastward with recharge rate decreasing westward. Records of chemical analyses indicate that saline and brackish water has been encountered in more than a half of the boreholes. For the boreholes bordering the Indian Ocean, they have experienced minimal drawdown during dry weather months indicating the possibility of sea water intrusion.

3.2.8 Drainage

The drainage pattern for the county is formed by a permanent river (Sabaki) and seasonal rivers, which drain into Indian Ocean through the various creeks along the coastline. The seasonal rivers are Nzovuni, Rare, Goshi and Kombeni. There are also streams which include Wimbi, Muhomkulu and Mleji.

3.3 Biological Diversity

3.3.1 Vegetation

The proposed development will not affect extensive forested land directly. This is due to the fact that most of the land for the proposed development site is currently under extensive sisal plantation farming by Rea Vipingo. Most of the heavily forested areas are far from the site. However, sections of the mangrove forest are located at the views of Indian Ocean at Mwanamia Beach from the proposed development site (Approximately 7km NE away). As such, the mangrove forests and on-farm trees in the proposed development neighbourhood will be affected indirectly by spill-over effects of the proposed development. The small pockets of bushlands in the expansive land will also be affected by the proposed development. The sections under bushlands include areas where sisal harvesting has been done but replanting is yet to take place.

3.3.1.1 Sisal Plant, Harvesting and Fibre Extraction

The sisal plant is a member of the plant family of “agavaceae” which is indigenous to the arid zones of North and Central America. The plant is characterised by its leaves which grow to a length of over one metre and yield a long, creamy-white and very strong fibre.

Able to sustain quite extended periods of drought, sisal is a hardy plant that can prosper in areas of limited rainfall. Introduced to East Africa in the late nineteenth century, the species "*Agave sisalana*" formed the original basis for commercial production of sisal. This species is still grown in some parts but, the REA Vipingo estates almost entirely use a hybrid species that gives greater fibre yields over the life cycle which, typically, covers a period of about 10 years.

Sisal plants can be grown from seeds but the identical replication of planting material requires vegetative propagation. This occurs in two forms, suckers and bulbils, the latter being REA Vipingo's preferred method of nursery establishment. After twelve to eighteen months in nursery conditions, young plants are planted out in the field, usually at a density of approximately 3000 plants per hectare. A first "cut" or harvest is taken 24 to 36 months after field planting and harvesting then continues every six to nine months thereafter throughout the plants' remaining life. This is terminated by the plants' single flowering which sees the emergence, from the centre or "bole" of each plant, of a stalk, known as a "pole". Poles grow to a height of about six metres and, just before attaining their full height, put out branches which carry flowers and then produce bulbils, after which the poling plants die.

Harvesting is carried out by hand. All lower leaves, standing at an angle of more than 45 degrees to the vertical, are cut away from the bole of the plant with a sharp flexible knife. After harvesting, the leaves are transported to a central factory and decorticated to extract the cortex of ribbon fibres that run along the length of the leaves. Extracted fibres are extensively washed during decortication, sun dried, brushed to separate and align the individual strands of fibre, graded and packed into bales. The REA Vipingo group has been paying considerable attention to the decortication, brushing and grading processes and, as a result, produces some of the best quality fibre available in the market. However, sisal is currently facing a global competition from cheap synthetic products.

3.3.1.2 Indigenous vegetation

Indigenous vegetation within the sisal plantations and the rest in the neighbourhood of the proposed development area will be affected indirectly by the proposed development. Within the expansive sisal plantations, isolated and small pockets of *Adansonia digitata* (baobab trees) occur (Plate 2).

The proponent shall retain native/indigenous trees on the site for landscaping and aesthetic purposes and this will also go a long way in minimizing the impacts, it is important to note that it is difficult to grow the predominant species of baobab trees artificially. Further, forest parallel configuration processes to be affected include species diversity and composition while cyclic processes will entail nutrient cycling (Gaaf, 1986). Invasion of non-native plant species (Henderson, 2001) as gaps are opened may lead to a more or less individualistic succession pathway (Henderson, 2001; Mutiso *et al.* 2011).



Plate 2: *Adansonia digitata* dotting the area proposed for development

Other common indigenized species in the neighbourhood of the entire Vipingo land include the extensive coconut groves (*Cocos nucifera*) and the cashew nuts. 6km North West of the project site at Kadzinuni Village exists a plantation of *Cocos nucifera*. The two species are important cash crops not only in the Vipingo area but in the entire coast region. According to the Kenya Integrated Household Budget survey 2005/2006, the two indigenized species have been categorized as key cash crops in Kilifi region.

3.3.1.3 Bushlands

In the expansive Rea Vipingo land, pockets of bushlands amidst the sisal plantations do occur. Some of the bushlands are areas where sisal harvesting was done and replanting is yet to be done. According to Rea Vipingo, some of the areas under bushlands are in their replanting schedule. To this end, the long-term existence of the bushlands is at stake since they will either be cleared to pave way for the proposed development. This clearance will result to direct negative impact on vegetation cover in the area proposed for development. Bushlands play critical roles in providing a wide range benefits to the local people, acts as habitat to wildlife, and supports critical ecological processes such as water and nutrient cycling, soil decontamination among others.

As per the design plans, the proponent is proposing to have landscaped areas within the development. The existing trees and plant species that will be used for landscaping will greatly minimize the negative impacts that are expected to arise from the bushland loss. It is also advisable that the proponent considers incorporating the native bushland species in the landscaping process. Use of 100% exotic species in the proposed

landscaped areas is undesirable. Leaving some sections under bushland vegetation will go a long way in reducing loss of natural vegetation.

3.3.2 Agriculture (food/cash crops and livestock)

The main land use at the proposed development site is large scale agriculture i.e. sisal growing. The large scale agriculture is characterized by sisal plantations under Rea Vipingo and small scale livestock farming is undertaken by the neighbourhood communities (Ongugo *et al.* 2013).

3.3.2.1 Sisal plantations

The annual sisal fibre production of Vipingo is close to 5,000 tonnes. Over 3,000 people depend on the sisal estate for their livelihoods. At least 700 people have been employed on casual and permanent basis. Most of the people are housed in the estates which also have medical facilities for the employees and their dependants, as well as schools and other amenities. The proposed development will have direct impact on the existing sisal plantation at site. Before the development commences, the plantations will have been harvested to pave way for construction.



Plate 3: Sisal plants covering the proposed site

It is important to note that the proposed development will take place in phases. As such, the sisal plantations will not be cleared at the same time. Sisal farming will continue to take place and land conversion will only be taking place at the appropriate time of a specific development phase. By the time the entire development is complete, not all agricultural land will be lost to other land uses.

Smooth and gradual transition from agriculture to other land uses will minimize the impact and will create additional direct and indirect employment opportunities in construction and operation phases.

3.3.2.2 Subsistence farming

Though the Vipingo communities practice subsistence farming, land tenure is a major challenge. The community does not own land. According to Rea Vipingo, in the past, the company used to rent some of its land to the local community members to cultivate at a token rent (Harrison, 2005). However, this has since changed and only workers are given land to cultivate within the sisal plantations (Plate 4). The workers can only grow seasonal crops. The area they are allowed to cultivate is also, too small and there is lack of farming equipment. In the neighbourhood of Rea Vipingo sisal plantations, subsistence farming is practiced as observed at Makonde village (0590617, 9587778). According to Ongugo *et al* (2013), Cash crops grown in the neighbourhood of the sisal plantations include cashew nuts, coconut palms, pineapples and mangoes. Staples like banana, cassava, maize, green grams, cow peas, vegetables are also cultivated (Harrison, 2005). The proposed commercial centre development will however not affect subsistence farming as no subsistence farming is practiced on the proposed site.



Plate 4: Subsistence farming around the project area

3.3.2.3 Subsistence livestock keeping

Cases of small scale livestock keeping occur at the proposed development area and the larger Kilifi County (Ongugo *et al*. 2013). Keeping of some big livestock such as cattle,

goats, sheep, donkeys is prohibited within the sisal plantations. However, small stocks such as poultry, ducks among others do occur within the sisal plantations especially in the four estates occupied by the sisal workers. Guards patrolling the sisal plantations ensure livestock is kept off the plantations. Big stock such as cattle, however, occasionally stray and graze within the sisal plantations.

It is important to note that a lot of grasses occur within the sisal plantations and the young sisal plants are also palatable to livestock. However, given that grazing is not permitted in the sisal plantations, the negative impact will be negligible. Such livestock keeping activities in the neighbourhood of the proposed development area will not be affected directly by the proposed development and the spill-over negative impacts to subsistence livestock farming will be negligible.



Plate 5: small scale Livestock keeping within Vipingo area

3.3.2.4 Large scale dairy farming

Large scale dairy farming was only encountered near point (0588330, 9574324) off Mombasa-Malindi highway. The farm specializes in large scale free range (Plate 5) and zero grazing dairy farming. Milk processing and packaging is also done at the farm. Extensive livestock fodder farms lie side by side the sisal plantations. Though the farm will not be affected directly due to the distance from the proposed project site (6km SW), the spill-over effects of the proposed development will affect the farm positively. The proposed development may expand the market base for dairy products to the farm. Noise from construction phase activities will not affect the overall productivity of the dairy cows since the dairy farm is located a long distance away from the proposed project site. It is envisaged that the developer will put in place precautionary measures to minimize the negative impacts on small scale livestock that may be grazing around the vicinity of

the proposed project site. The magnitude of negative livestock impacts from the proposed project are expected to be very minimal.



Plate 6: Free Range Grazing on Fodder Farms at Sumra Dairy Farm in Vipingo Area

3.3.3 Wildlife

The proposed development area and the neighbourhood farms are rich in small fauna such as a wide range of rodents, reptiles and small insects. Mice and snakes are however the most common species of fauna within the project site. However, due to the proposed project site being located within sisal plantation and its proximity to the nearby Vipingo Ridge and Vipingo Trading Centre, a wide range of human modification and disturbances therefore characterizes the site; the abundance of the wildlife is therefore expected to be minimal. Other wildlife species existent within the proposed project site include bird species.



Plate 7: A grasshopper spotted at the proposed site



Plate 8: Human modification and disturbances characterizing the project area

3.4 Socio-Economic Characteristics

3.4.1 Infrastructure

The entire road network covers about 3000Kms. Of this 1,320 km is rural classified network, about 450kms is national classified network and the rest are unclassified. Approximate 30km of rural county roads are to bitumen standards, 220Km of rural county roads are gravelled and the rest are earth roads. The county is envisioned in the Vision 2030 to be a resort city, therefore there is need to expand Malindi airport, Kilifi and Kijipwa airstrips to cater for the expected increase of visitors and residents in the county. However, Vipingo Ridge residential golf development located 1.5km away from the project site has an airstrip (Vipingo Airstrip). The private Airstrip allows easy access to and from the development. It is around one hour's flight from Nairobi. Flying to Vipingo Ridge on the Safari link daily scheduled service from Nairobi's Wilson Airport avoids the inconvenience of Nairobi's Jomo Kenyatta International Airport (JKIA) and Mombasa Airports.



Plate 9: Air transport infrastructure within Vipingo area (Vipingo Ridge Airstrip)

The Private Airstrip provides hassle free air travel for homeowners and greater flexibility and accessibility for visitors. It is ideal for those wishing to fly in for a few rounds of weekend golf, to attend a conference or celebrate a wedding.

The county is covered by all the major mobile telephone service providers which include: Safaricom, Yu, Orange and Airtel. The county has 7 post offices and 5 sub post offices. The proportion of the population that has to travel 5km or more to the nearest post office is 78%. There are 70 cyber cafes mostly in the urban areas and thus there is need to prioritize the establishment of digital villages and more cyber cafes.



Plate 10: A communication amenity in the area proposed for development

Access to financial services is generally on the increase with the advent of mobile phone money transfer services and agency banking. However, the county has only 10 commercial banks, 17 micro finance institutions and 77 active Saccos. The financial institutions in the county target 1.2 million people; hence there is need for increased investment in this sector so as to tap the existing potential (*Republic of Kenya, First Kilifi County Integrated Development Plan 2013- 2017*).



Plate 11: Mombasa-Malindi Highway (B8) passing adjacent the proposed site

3.4.2 Population

The population of the county was estimated to be about 200,000 households and a population of 1,217,892 in 2012 as projected in the Kenya Population and Housing Census 2009, composed of 587,719 males and 630,172 females. This accounts for 2.9 % of the total Kenyan population. Kilifi County has a child rich population, where 0-14 year olds constitute 47% of the total population. This is due to high fertility rates among women as shown by the highest percentage household size of 7+ members at 36%. The population is projected to rise to 1,336,590 and 1,466,856 in 2015 and 2017 respectively at growth rate of 3.1 % per annum.

The main communities residing in Kilifi County include seven Mijikenda sub-groups (Giriama, Choy, Jicama, Kimber, Kama, Rabai and Robe), the Bakunin, Swahili, and people of Arab, Indian and European descent who have permanently settled in the county. There are other Kenyan communities who have also settled in the County because of their employment or for purposes of doing business. Over time, these people have had close interactions with each other, and fostered the Swahili culture and language. Most of the people in Kilifi County are either Christians or Muslims, though other smaller religious communities exist.

3.4.3 Economic activities

Vipingo area has a few economic activities going on such as Sisal plantations, real estate business, Cement manufacturing and transport activities such as *bodaboda* operators, Fishing, Subsistence farming and a few public service vehicles (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*). There is also large scale dairy farming at Sumra dairy farm located in Vipingo area.

The area has a potential for aquaculture with the swamp lands at Kijangwani already having several fish ponds. The fish farmers keep tilapia in their ponds. Other marine species can be grown including shrimps and crabs.



Plate 12: Business outlets opposite the proposed site on the other side of Highway B8

3.4.4 Employment

The 2009 population and housing census covered in brief the labour status as tabulated below. The main variable of interest for inequality discussed in the text is work for pay by level of education. In Kilifi County, 16% of the residents with no formal education, 23% of those with primary education and 39% of those with a secondary level of education or above are working for pay. Work for pay is highest in Nairobi at 49% and this is 10 percentage points above the level in Kilifi for those with secondary level of education or above (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*).

3.4.5 Education

Only 13% of Kilifi County residents have a secondary level of education or above. Malindi constituency has the highest share of residents with a secondary level of education or above at 18%. A total of 52% of Kilifi County residents have a primary level of education only. Kilifi North constituency has the highest share of residents with a primary level of education only at 54%. Junju ward has the highest share of residents with a primary level of education only at 57%. This is 11 percentage points above Kayafungo ward, which has the lowest share of residents with a primary level of education only. Junju ward is 5 percent points above the county average.

Some 36% of Kilifi County residents have no formal education. Ganze constituency has the highest share of residents with no formal education at 45%.

There is need to improve the physical conditions of the existing institutions and build more to ensure quality and access to education (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*).



Plate 13: A school in the area proposed for development

3.4.6 Sanitation

A total of 42% of residents in Kilifi County use improved sanitation, while the rest use unimproved sanitation. There is no significant gender differential in use of improved sanitation with 42% of male headed households and 41% in female headed households using it (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*).

3.4.7 Energy

Only 2% of residents in Kilifi County use liquefied petroleum gas (LPG), and 8% use paraffin. 67% use firewood and 21% use charcoal. Firewood is the most common cooking fuel by gender with 65% of male headed households and 73% in female headed households using it. The number of trading Centres connected with electricity is expected to increase as the county continues to implement the Rural Electrification Programme which is aimed at connecting rural Centres with electricity so as to promote wealth and employment creation (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*).



Plate 14: Power lines in Vipingo Area

3.4.8 Lighting

Some 17% of residents in Kilifi County use electricity as their main source of lighting. A further 17% use lanterns, and 63% use tin lamps. 2% use fuel wood. Electricity use is mostly common in male headed households at 18% as compared with female headed households at 14% (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*).

3.4.9 Housing

In Kilifi County, 32% of residents have homes with cement floors, while 65% have earth floors. Less than 1% has wood and just 1% has tile floors. 2% of residents have homes with clay and concrete tile roofs, while 42% have corrugated iron sheet roofs. Grass and makuti roofs constitute 52% of homes, and none have mud/dung roofs. 33% of homes have either brick or stone walls. 62% of homes have mud/wood or mud/cement walls. 2% have wood walls. Less than 1% has corrugated iron walls. 1% has grass/thatched walls. 1% has tin or other walls (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*).



Plate 15: Some of the residential houses within Rea Vipingo Sisal Plantation

3.4.10 Urban and market centres

There are a total of 78 trading Centres in the county with 3,809 registered traders in retail, wholesale and manufacturer. The major ones are; Kilifi, Mtwapa, Malindi, Mariakani and Watamu among others. The wholesalers mostly deal with consumer and hardware products while retail traders, who are in both rural and urban areas, deal mainly with food products. The manufacturers mostly deal in cement such as Rhino Cement Company in Rabai, Mombasa Cement Company in Vipingo, steel products in Mazeras, salt manufacturing by Kensalt and Krystalline Salt in Gongoni and Marereni, commercial starch in Mazeras, power generation in Rabai, soft drinks by Coca Cola and Picana in Mtwapa and Export Processing Zone (EPZ) in Mazeras and Mtwapa (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*).

3.4.11 Mining

The on-going mining activities in the county include cement production in Rabai and Vipingo, Salt extraction in Gongoni and Marereni and sand harvesting and quarrying in the entire county (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*).

3.4.12 Tourism

The county is endowed with many tourism attraction sites which includes: white sandy beaches in Malindi, Watamu, Kilifi and Mtwapa. Historical sites in Gede, Malindi, Takaungu, Mnarani and Rabai that date back to the slave trade period. Other tourist sites include Kaya forests, Marafa Hell kitchen, Bore Valley, Mekatilili Wa Menza, Kapangani

Rock and Sabaki Estuary in Magarini and mangrove swamps that attract both local and international tourists. The county provides good opportunities for sport fishing and marine research especially for rare breeding grounds of special fish like Tewa. The county also has the Arabuko Sokoke Forest reserve, Malindi Marine Park & reserve, Watamu Marine Park & Reserve and Kuruwitu Marine area as major attractions. The Vipingo Ridge airstrip and Malindi airport and Kijipwa airstrip are key components of tourism sub-sector (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*).

Currently in the area approximately 4.2km South East from the proposed site is an ongoing massive construction of Utalii College. This signifies tourism is prevalent in the area characterised with beach hotels and resorts along the coast line of the Indian Ocean.

3.4.13 Industry

The county has 17 manufacturing industries which include soft drink manufacturing industries in Mtwapa, Salt manufacturing industries in Gongoni and Marereni, Cement manufacturing industries in Rabai and Vipingo and Steel manufacturing industries in Mazeras and Mariakani among others (Republic of Kenya, *First Kilifi County Integrated Development Plan 2013- 2017*).



Plate 16: Mombasa Cement Limited in Vipingo area

4 RELEVANT LEGISLATIVE AND REGULATORY FRAMEWORK

4.1 Introduction

This chapter includes a summary of the laws, regulations and institutional setup relevant to environmental and social management in Kenya. A review of the most pertinent regulations and standards governing health and safety has been included. This section also includes a review of environmental quality standards relevant to the proposed project. Kenya has in place a wide range of policy, institutional and legislative framework to address the major causes of environmental degradation and negative impacts on ecosystems emanating from economic development programmes.

It is a legal obligation within the Laws of Kenya that a development of such magnitude adheres to certain legal parameters. This section therefore describes the Policy, Legal, and Institutional framework pertaining to the proposed commercial centre including a filling station. The policy, legal and institutional frameworks have been put in place to ensure that development projects adhere to environmental conservation at all times. As development activities have the potential to damage the environment, it is a challenge today to ensure that development efforts are sustainable.

The proposed development will change the landscape and among the environmental changes to be observed include exposure and compaction of the soils, loss of vegetation, waste generation etc. It is these issues amongst others that legislation sets to address. Through recognizing the importance of environmental conservation in all development endeavours, the Kenyan government put in place a wide range of policy, institutional and legislative frameworks to guide developments in Kenya in the process of minimizing environmental degradation.

4.2 The Constitution of Kenya, 2010

The Constitution of Kenya is the country's supreme legislation and has Environmental provisions in Chapter Four, under 'Rights and Fundamental Freedoms', Chapter Five, under 'Environment and Natural Resources', and Chapter Ten, under 'Judicial Authority and Legal System'. The Fourth Schedule also includes environmental provisions under 'Distribution of functions between National and County Governments' and the Fifth Schedule titled 'Legislation to be enacted by Parliament'.

Environmental rights and freedoms are presented in Article 42 of the new constitution, which states: Every person has the right to a clean and healthy environment, which includes the right –

- To have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and
- To have obligations relating to the environment fulfilled under Article 70.

The Kenyan constitution also gives prominence to public participation; as a general national value in environmental protection. Article 69(1) states that the State shall encourage public participation in the management, protection, and conservation of the environment.

4.3 Relevant Kenya Policies, Plans and Guidelines

The policies that are relevant to the proposed development project include the following:

4.3.1 National Environment Policy (Sessional Paper No. 10 of 2014)

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

- Optimal use of natural resources while improving environmental quality;
- To conserve resources such that the resources meet the needs of the present without jeopardizing future generations in enjoying the same;
- Develop awareness that inculcate environmental stewardship among the citizenship of the country;
- Integrate environmental conservation and economic activities in the development process;
- Ensure that national environmental goals contribute to international obligations on environmental management.

To achieve this, it is a policy direction that appropriate reviews and evaluations of developmental plans and operations are checked to ensure compliance with the environmental policy.

4.3.2 Physical Planning Policy

The current policy governs the development and approval of all building plans as provided for in the Physical Planning Act (Cap 286). The proposed commercial centre including a filling station will be subjected to the provisions of this policy and legislation.

4.3.3 Draft Integrated Coastal Zone Management Policy, 2013

The Integrated Coastal Zone management (ICZM) policy is rooted in the understanding that the coastal and marine environment is a limited spatial area and a distinctive system in which a range of environmental and socio-economic interest interconnect in a manner which requires a dedicated and integrated management approach.

The vision of the policy is “*A coastal zone with healthy ecosystems and resources that sustain the socio-economic development and well-being of the current and future generations*”. It seeks to promote sustainable development in the coastal zone in line with the principles of the new constitution and objectives of vision 2030. The Government is committed to the implementation of this policy to ensure sustained benefits to coastal communities and the national economy.

The objectives of the policy are to: -

- i) Promote integrated planning and coordination of coastal developments across the various sectors;
- ii) Promote sustainable economic development to secure livelihoods of coastal communities;
- iii) Conserve the coastal and marine resources and environment for sustainable development;
- iv) Manage environmental risks associated with changes in shoreline and climate;
- v) Develop capacity in research and education and enhance stakeholder awareness and participation in sustainable resource management;
- vi) Establish effective institutional and legal frameworks for implementation of the ICZM policy.

4.3.4 The Regional Development Authorities Policy, 2007

This policy calls for equitable socio-economic development through the sustainable use of natural resources by formulating integrated regional development plans in consultation with all those involved, closing gaps in regional resource mapping and attracting resource-based investment that benefit communities. The policy is the framework for streamlining and strengthening the Coast Development Authority (CDA) and Tana and Athi Rivers Development Authority (TARDA) in coastal zone development and management.

4.3.5 Occupational Health and Safety Policy of 2012

This policy is intended to protect safety and health of workers in work places. The proposed commercial centre including a filling station will provide employment opportunities to many workers at various categories. The contractor will be expected to comply with the requirements of this policy when engaging workers in various construction activities. The preliminary environmental management provides mitigation measures that can be undertaken to ensure compliance with the requirements of this policy.

4.3.6 Public Health Policy

The prevailing public health policy calls upon the project proponent to ensure that buildings are adequately provided with utilities so that they are fit for human habitation. The proposed commercial centre including a filling station has been designed by

competent professionals and as such will have all amenities/utilities that are essential for safeguarding public health for all people using the facilities.

4.3.7 National Water Policy, 2012

The National Water Policy, 2012 has been developed in line with the mandate, vision and mission of the Ministry responsible for water affairs in Kenya. This Policy is compliant with the Constitution of Kenya 2010 and the Vision 2030 besides taking into account the targets of Sustainable Development Goals (SDGs).

In essence the Policy is built on the premises of Integrated Water Resources Management (IWRM). The Policy aims at guiding the development of strategies for water management and utilization by water sector stakeholders. This policy recognizes the great expectation of population with regard to access to freshwater supplies and use for domestic, livestock, agriculture and other production purposes.

4.3.8 The Sessional Paper No.4 on Energy

The Sessional Paper No.4 on Energy of Kenya's vision is to promote equitable access to quality energy services at the least cost while protecting the environment and thus it does recognize the importance of harnessing and utilizing solar energy. Additionally, the Sessional Paper states that, The Government recognizes the great potential of this source of energy and will encourage the development and utilization of appropriate technologies in attaining its vision.

4.3.9 Kenya National Policy on Gender and Development (NPGD), 2000

The Policy spells out a policy approach of gender mainstreaming and empowerment of women and clearly states that it is the right of women, men, girls and boys to participate in and benefit equally from the development process. The NPGD provides a framework for mainstreaming gender in all policies, planning and programming in Kenya and puts in place institutional mechanisms to ensure effective implementation.

4.3.10 The Kenya National Climate Change Response Strategy (2010)

The purpose of this strategy is to put in place robust measures needed to address most of the challenges posed by climate variability and change through thorough impact assessments and monitoring of various projects. According to Climate Change Projections, in this country we are likely to experience hotter drier sunny seasons, warmer wetter rainy seasons, rise in sea levels and an increase in extreme weather events. These climatic changes will impact on our daily lives and the buildings that we work and live in must be adapted to cope with such changes. With time both existing buildings and the construction of new buildings will have to adapt to cope with the conditions climate change may produce. A range of new ways to design, construct, upgrade and occupy buildings so that they are more energy efficient as well as resilient to threats such as flooding and drought is proposed.

In the construction sector, priority inclusion areas should include energy efficient innovations and technologies, and utilization of low-carbon appliances and tools; the utilization of eco-friendly energy resources such as wind, solar, biogas, small hydros, etc.; as well as possible utilization of biofuels.

4.3.11 National Environmental Action Plan Preparation Guidelines, 2016-2022

These Environmental Action planning guidelines aim at guiding the development of the Environmental Action Plans at both the County level and the National level and subsequently helping integrate environmental concerns into development. Environmental Action planning involves assessment and profiling of environmental concerns and designing strategic interventions to address such concerns through planning.

4.3.12 The Poverty Reduction Strategy Paper (PRSP) of 2000

The Poverty Reduction Strategy Paper (PRSP) for Kenya has the broad objective of reducing poverty and promoting economic growth. This policy articulates Kenya's commitment and approach to tackling endemic poverty through involvement of the poor communities in both rural and urban areas in various socio-economic development activities. The proposed project, during and after implementation will offer various employment opportunities to Kenyans and will therefore contribute directly towards the realisation of the broad national goal of reducing poverty in the country. In addition, the project would stimulate economic development by creating an enabling environment for other key sectors of the economy to thrive.

4.3.13 The National Poverty Eradication Plan (NPEP) of 1999

The National Poverty Eradication Plan (NPEP) was formulated with an objective of reducing the high levels of poverty in Kenya by 50 percent by the year 2015, as well as to strengthen the capabilities of the poor and vulnerable groups to earn income. The plan also aimed at reducing gender and geographical disparities in order to create a healthy, better-educated and more productive population. The formulation of the plan was guided by the goals and commitments agreed during the World Summit for Sustainable Development (WSSD) of 1995. The plan therefore focuses on the delivery of four WSSD themes of poverty eradication; reduction of unemployment; social integration of the disadvantaged people and creation of an enabling economic, political, and cultural environment through development of transport and communication sector. The plan is implemented by the Poverty Eradication Commission (PEC) that was established in collaboration with various Government Ministries, bilateral and multilateral donors, the private sector, Community Based Organizations (CBOs) and Non-Governmental Organizations (NGOs). The NPEP is relevant since the proposed highway will create an enabling environment that will contribute immensely in the enhancement of economic growth in Kenya. The proposed project would also impact businesses, agricultural and tourism related activities that have great relevancy to poverty eradication in the country.

4.3.14 HIV/AIDS Policy of 2009

The policy identifies HIV/AIDS as a global crisis that constitutes one of the most formidable challenges to development and social progress. The Pandemic heavily affects the Kenyan economy through loss of skilled and experienced manpower due to deaths, loss of man hours due to prolonged illnesses, absenteeism, reduced performance, increased stress, stigma, discrimination and loss of institutional memories among others. Due to the large of number of workers who will be involved in the project and the associated social issues with projects of such a scale, HIV/AIDS has been considered as one of the proposed impacts, but adequate mitigation measures have also been proposed to that effect.

4.4 Institutional Arrangements

At present there are over twenty (20) institutions and departments which deal with environmental issues in Kenya. Some of the key institutions include the National, National Environmental Management Authority (NEMA), the Kenya Marine and Fisheries Research Institute (KMFRI), the Kenya Forestry Services (KFS), Kenya Wildlife Services (KWS), Water Resources Authority (WRA) and others. There are also local and international Non-Governmental Organisations (NGOs) involved in environmental issues in the country.

While implementing the project, both the proponent and the contractor will have to work in liaison with a number of these institutions when dealing with issues within the jurisdiction of the institutions.

4.4.1 National Environmental Management Authority (NEMA)

NEMA is a semi-autonomous agency under the Ministry of Environment, established to exercise general supervision and co-ordinate over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment. The Director General appointed by the president heads NEMA.

The objective and purpose for which NEMA is established is to exercise general supervision and co-ordinate over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment. The Authority shall:

- Co-ordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plan, programmes and projects with a view to ensuring the proper management and rational utilization of the environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya.
- Take stock of the natural resources in Kenya and their utilization and conservation, with the relevant lead agencies.

- Examine land use patterns to determine their impact on the quality and quantity of the natural resources.
- Carry out surveys, which will assist in the proper management and conservation of the environment.
- Advise the government on legislative and other measures for the management of the environment or the implementation of relevant international conservation treaties and agreements in the field of environment as the case may be.
- Advise the government on regional and international environmental convention treaties and agreements to which Kenya should be a party and follow up the implementation of such agreements where Kenya is a party.
- Undertake and co-ordinate research, investigation and surveys in the field of environment and collect and disseminate information about the findings of such research, investigation or survey.
- Mobilize and monitor the use of financial and human resources for environmental management.
- Identify projects and programmes or types of projects and programmes, plans and policies for which environmental audit or environmental monitoring must be conducted under EMCA.
- Initiate and evolve procedures and safeguards for the prevention of accidents, which may cause environmental degradation and evolve remedial measures where accidents occur.
- Monitor and assess activities, including activities being carried out by relevant lead agencies in order to ensure that the environment is not degraded by such activities, environmental management objectives are adhered to and adequate early warning on impending environmental emergencies is given.
- Undertake, in co-operation with relevant lead agencies programmes intended to enhance environmental education and public awareness about the need for sound environmental management as well as for enlisting public support and encouraging the effort made by other entities in that regard.
- Publish and disseminate manuals, codes or guidelines relating to environmental management and prevention or abatement of environmental degradation.
- Render advice and technical support, where possible to entities engaged in natural resources management and environmental protection so as to enable them to carry out their responsibilities satisfactorily.
- Prepare and issue an annual report on the state of the environment in Kenya and in this regard may direct any lead agency to prepare and submit to it a report on the state of the sector of the environment under the administration of that lead agency and,

- Perform such other functions as government may assign to the Authority or as are incidental or conducive to the exercise by the authority of any or all of the functions provided under EMCA CAP 387.

4.4.2 EMCA, Cap 387 Administrative Framework

4.4.2.1 National Environmental Tribunal

The National Environment Tribunal (NET) created under Section 125 of EMCA Cap 387 has the following functions:

- To hear and determine appeals from NEMA's decisions and other actions relating to issuance, revocation or denial of (EIA) licences or amount of money to be paid under the Act and imposition of restoration orders;
- To give direction to NEMA on any matter of complex nature referred to it by the Director General; and

If the proponent disagrees with NEMA decisions in exercising the above-mentioned functions, then they may lodge a case at the NET to seek to overturn the decision. Should this avenue not lead to a favourable ruling from the NET, an appeal may be lodged in the Environment and Land Court.

4.4.2.2 National Environmental Complaints Committee

The National Environmental Complaints Committee performs the following functions:

- Investigate any allegations or complaints against any person or against the authority in relation to the condition of the environment in Kenya and on its own motion, any suspected case of environmental degradation and to make a report of its findings together with its recommendations thereon to the Cabinet Secretary.
- Prepare and submit to the Cabinet Secretary periodic reports of its activities which shall form part of the annual report on the state of the environment under section 9 (3) and
- To undertake public interest litigation on behalf of the citizens in environmental matters.

This committee will act as a safeguard for members of the public who feel aggrieved by actions taken under the proposed project, and can exercise their constitutional rights to launch a complaint should they have exhausted all other grievance redress mechanisms available to them.

4.4.2.3 National Environment Action Plan Committee

The Authority is responsible for the development of a 6-year National Environment Action plan and shall ensure that it has undertaken public participation before the adoption of the plan. The National Environment Action Plan shall:

- Contain analysis of the Natural Resources of Kenya with an indication as to any pattern of change in their distribution and quantity over time.

- Contain analytical profile of the various uses and value of the natural resources incorporating
- Considerations of intergenerational and intra-generational equity.

4.4.2.4 County Environment Committees

Governors shall by notice in the gazette constitute a County Environment Committee that shall be responsible for the proper management of the environment within the County for which it is appointed. They should also perform such additional functions as prescribed by the Act or as may, from time to time be assigned by the Governor by notice in the gazette. The decisions of these committees are legal and it is an offence not to implement them.

4.4.2.5 National Environment Restoration Fund

The objective of the Restoration Fund shall be to serve as supplementary insurance for the mitigation of environmental degradation where the perpetrator is not identifiable or where exceptional circumstances require the Authority to intervene towards the control or mitigation of environmental degradation.

4.4.2.6 National Environment Trust Fund

The trust fund is vested in NEMA and subject to EMCA Cap 387. A board of five trustees appointed by the Cabinet Secretary administers it. These funds may be received from donations, endowments, grants and gifts from whatever source or sums of money or from monies designated by NEMA for this fund.

4.5 Legal Framework

There are several legal provisions on environmental protection, which touch on and regulate the development of a commercial centre like the one under this proposal. A summary of the various legislations and regulations relevant to the development is given hereunder.

4.5.1 The Environmental Management and Coordination Act (Cap 387)

The Act defines the legal and administrative co-ordination of the diverse sectorial initiatives in the field of environment. The Act harmonizes the sector specific legislations touching on the environment in a manner designed to ensure greater protection of the environment. This Act is guided Policy wise by the national environmental council, while the day-to-day enforcement falls under the Director General of the National Environmental Management Authority.

The Environmental Management and Coordination Act (EMCA) CAP 387 provides for the legal framework for the management of the Kenyan environment. Under the act, all proposed projects that are likely to have significant impact on the environment according to the Second Schedule will undergo an Environmental Impact Assessment (EIA) while

projects already in place will undertake annual Environmental Audits (EA). This Act came into force on 14th January 2000. It aims at coordinating environmental protection activities in the country. In its preamble, the Act states that every person in Kenya has a right to a clean and healthy environment. According to section 58 of the Act, second schedule 9 (i), and the environmental (Impact Assessment and Audit) Regulations, 2003, all new enterprises and projects must undergo EIA. The EIA study report is submitted to NEMA in the prescribed form, and seeks to ensure the following;

- The sustainable use of natural resources,
- The enhanced protection and conservation of biodiversity,
- Interlinkage of human settlement and cultural issues,
- Integration of socio-economic and environmental factors,
- The protection and conservation of natural physical surroundings of scenic beauty as well as protection and conservation of built environment of historic or cultural significance.

Part VI Section 58 requires a proponent of a project to carry out an Environmental Impact assessment for any undertaking as prescribed in the second schedule to this Act before commencing or financing such a project and submit a project report to the authority (NEMA).

Chapter 63 further states that the Authority may, after being satisfied as to the adequacy of an environmental impact assessment study, evaluation or review report, issue an environmental impact assessment licence on such terms and conditions as may be appropriate and necessary to facilitate sustainable development and sound environmental management.

Under EMCA CAP 387, there are a number of regulations geared towards sustainable development. The applicable regulation to the proposed development are discussed below;

4.5.1.1 The Environmental Impact (Assessment and Auditing) Regulations, 2003 and Amendment of 2016

Environmental Impact Assessment under the Act is guided by the Environmental Impact Assessment and Auditing Regulations of the year 2003 and amendment of 2016, which is given under legal notice no. 101. The regulations stipulate the ways in which environment impact assessment and audits should be conducted. The project falls under the second schedule of EMCA, Cap 387 Section 58 (1), (4) that require an Environmental Impact Assessment project report. As stipulated by the legal notice No. 101, 2003, PART V, Section 31 (3) (a) (i) and (ii) it is required that an environmental assessment be undertaken to provide baseline information upon which subsequent environmental control audits shall be based.

4.5.1.2 Environmental Management and Coordination (Waste Management Regulations of 2006)

The Minister for Environment and Natural Resources gazetted these regulations in 2006. These Regulations may be cited as the Environmental Management and Coordination (Waste Management) Regulations, 2006. Waste Management Regulations are meant to streamline the handling, transportation and disposal of various types of waste. The aim of the Waste Management Regulations is to protect human health and the environment. Currently, different types of waste are dumped haphazardly posing serious environmental and health concerns. The regulations place emphasis on waste minimization, cleaner production and segregation of waste at source.

4.5.1.3 Environmental Management and Coordination (Water Quality Regulations of 2006)

Water Quality Regulations apply to water used for domestic, industrial, agricultural, and recreational purposes; water used for fisheries and wildlife purposes, and water used for any other purposes. Different standards apply to different modes of usage. These regulations provide for the protection of lakes, rivers, streams, springs, wells and other water sources. The objective of the regulations is to protect human health and the environment. The effective enforcement of the water quality regulations will lead to a marked reduction of water-borne diseases and hence a reduction in the health budget.

The regulations also provide guidelines and standards for the discharge of poisons, toxins, noxious, radioactive waste or other pollutants into the aquatic environment in line with the Third Schedule of the regulations. The regulations have standards for discharge of effluent into the sewer and aquatic environment. While it is the responsibility of the sewerage service providers to regulate discharges into sewer lines based on the given specifications, NEMA regulates discharge of all effluent into the aquatic environment.

Everyone is required to refrain from any actions, which directly or indirectly cause water pollution, whether or not the water resource was polluted before the enactment of the Environmental Management and Coordination Act (EMCA) Gazetted in 1999. It is an offence to contravene the provisions of these regulations with a fine not exceeding five hundred thousand shillings.

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

These Regulations determine that no person or activity shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. In determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered:

- Time of the day;
- Proximity to residential area;

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

These regulations also relate noise to its vibration effects and seek to ensure no harmful vibrations are caused by controlling the level of noise. Any person(s) intending to undertake activities in which noise is suspected to be injurious or endangers the comfort, repose, health or safety of others and the environment, must make an application to NEMA and acquire a license subject to payment of requisite fees and meeting the license conditions. Failure to comply with these regulations attracts penalties as prescribed under these regulations.

4.5.1.5 Environmental Management and Coordination (Air Quality) Regulations, 2014

This regulation is referred to as “The Environmental Management and Coordination (Air Quality) Regulations, 2014”. The objective is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources, including as mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in the Environmental Management and Coordination Act, CAP 387. It also covers any other air pollution source as may be determined by the Minister in consultation with the Authority. Emission limits for various areas and facilities have been set. The regulations provide the procedure for designating controlled areas, and the objectives of air quality management plans for these areas. The following operations (provided they are not used for disposal of refuse), are exempt from these regulations:

- Back-burning to control or suppress wildfires;
- Firefighting rehearsals or drills conducted by the Fire Service Agencies
- Traditional and cultural burning of savannah grasslands;
- Burning for purposes of public health protection;

4.5.1.6 Environmental Management and Coordination (Conservation and Management of Wetlands) Amendment Regulations, 2017

This Act applies to all wetlands in Kenya whether occurring in private or public land. It contains provisions for the utilization of wetland resources in a sustainable manner compatible with the continued presence of wetlands and their hydrological, ecological, social and economic functions and services.

The objectives of these Regulations include-

- a) to provide for participatory conservation of wetlands and their resources in Kenya;
- b) to promote the integration of wise-use of resources in wetlands into the local, county, and national management of natural resources for, ecological, aesthetic, cultural and socio-economic development;
- c) to ensure the protection of the diversity of wetland habitats, flora and fauna;
- d) to promote awareness creation, education, research, indigenous knowledge and partnerships with other relevant institutions in the management of wetland ecosystems;
- e) to prepare and maintain an up to date inventory and database of wetlands and wetland resources, for prioritisation of relevant interventions;
- f) to protect wetlands within river basins, lake basins and coastal zones from pollution including siltation, agricultural and infrastructural developments, overexploitation, alien and invasive species, and other activities likely to degrade the wetland ecosystem.

Part II Section 10 of these regulations state that every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution. That no person shall throw or cause to flow into or near a wetland any liquid, solid gaseous or any other hazardous substance or deposit any such substance in or near it, as to cause pollution.

Part IV Section 16 requires a developer to subject to approved standard procedures including carrying out an Environmental Impact Assessment in accordance with the provisions of the Act (EMCA) where he/she intends to carry out drainage; conversion; burning; alteration of a wetland and wetland resources; introduction of alien and invasive species; or extraction of wetland resources through alluvial gold and sand mining.

Any person who contravenes the provisions of these Regulations, commits an Offence and shall be liable on conviction to imprisonment for such term and such fine as are provided for in the Act.

The Proponent shall comply with the provisions of the Act in protecting wetlands, preventing and controlling pollution and Siltation in the ocean.

4.5.1.7 The Environmental Management and Co-Ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006

Kenya has a large diversity of ecological zones and habitats including lowland and mountain forests, wooded and open grasslands, semi-arid scrubland, dry woodlands, and inland aquatic, and coastal and marine ecosystems. In addition, a total of 467 lake and

wetland habitats are estimated to cover 2.5% of the territory. In order to preserve the country's wildlife, about 8% of Kenya's land area is currently under protection.

The country has established numerous goals, as well as general and specific objectives that relate to these issues, among others: environmental policies and legislations; involvement of communities; documentation of national biological resources; sustainable management and conservation of biodiversity; fair and equitable sharing of benefits; technical and scientific cooperation; biodiversity assessment; dissemination of information; institutional and community capacity building; and integration of biodiversity concerns into development planning.

The primary purpose of these regulations is to monitor the status and the components of biological diversity in Kenya and take necessary measures to prevent and control their depletion so as to ensure that conservation of biological diversity resources is achieved. Part II, Section 4 of the regulations states that

- (1) A person shall not engage in any activity that may-
- (a) have an adverse impact on any ecosystem;
 - (b) lead to the introduction of any exotic species;
 - (c) lead to unsustainable use of natural resources,

without an Environmental Impact Assessment License issued by the Authority under the Act.

4.5.1.8 Environmental Management and Co-Ordination (Controlled Substances) Regulations, 2007

The Controlled Substances Regulations defines controlled substances and provides guidance on how to handle them. This regulation mandates NEMA to monitor the activities of persons handling controlled substances, in consultation with relevant line ministries and departments, to ensure compliance with the set requirements. Under these regulations, NEMA will be publishing a list of controlled substances and the quantities of all controlled substances imported or exported within a particular period. The list will also indicate all persons holding licenses to import or export controlled substances, with their annual permitted allocations.

The regulations stipulate that controlled substances must be clearly labelled with among other words, "Controlled Substance-Not ozone friendly") to indicate that the substance or product is harmful to the ozone layer. Advertisement of such substances must carry the words, "Warning: Contains chemical materials or substances that deplete or have the potential to deplete the ozone layer."

Producers and/or importers of controlled substances are required to include a material safety data sheet. Persons are prohibited from storing, distributing, transporting or

otherwise handling a controlled substance unless the controlled substance is accompanied by a material safety data sheet. Manufacturers, exporters or importers of controlled substances must be licensed by NEMA. Further, any person wishing to dispose of a controlled substance must be authorized by NEMA. The licensee should ensure that the controlled substance is disposed of in an environmentally sound manner. These regulations also apply to any person transporting such controlled substances through Kenya. Such a person is required to obtain a Prior Informed Consent (PIC) permit from NEMA.

4.5.2 Coast Development Authority Act (Cap 449)

This act was enacted in 1992 and revised in 2012 with the sole aim of providing for the establishment of an authority to plan and coordinate the implementation of development projects in the whole of the Coast province and in the exclusive economic zone. The jurisdiction of the Coast Development Authority covers any part of the Coast province within Lamu, Mombasa, Malindi, Kilifi, Tana River, Kwale and Taita Taveta districts including the southern half of Garissa district and the exclusive economic zone. The principal function of the Coast Development Authority is to oversee the implementation of sustainable projects and development within its areas of jurisdiction. Section 8 (6) of the Act mandates CDA to develop up to date long range development plans for the area.

4.5.3 The Traffic Act (Cap 403)

The Traffic Act gives provisions and guidelines that govern the Kenya roads transport sector. These guidelines are essential to private, public and commercial service vehicles in ensuring safety and sanity on the roads hence ensuring the environment; the human being a component, is safeguarded.

4.5.4 Public Health Act (Cap. 242)

Part IX, section 115, of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drainers or refuse pits in such state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health.

4.5.5 Urban Areas and Cities Act, No. 13 of 2011

The Act came into function with regard to Article 184 of the Constitution providing regulations on the classification, governance and management of urban areas and cities and further providing the criteria of establishing urban areas.

Part III of the Act gives the regulations and functions of every city or municipality with regard to integrated development plans, which shall include but not limited to environmental plans and disaster preparedness, within the area of jurisdiction in

achieving objects of devolved governments under section 174 of the constitution while maintaining the socio-economic rights of the people.

Moreover, in the first schedule, the Act enlists the services that the any municipality, City or Town shall provide to its residents, which include but not limited to traffic control and parking, water and sanitation, refuse collection, solid waste management, pollution abatement services among others.

4.5.6 Land Act, No. 6 of 2012

This is an ACT of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources, and for connected purposes. The Land Act of 2012 subsection (1) states that ‘any land may be converted from one category to another in accordance with the provisions of this Act or any other written law.’ It continues to state in subsection (2) that Without prejudice to the generality of subsection (1)

- a) Public land may be converted to private land by alienation
- b) Subject to public needs or in the interest of defence, public safety, public order, public morality, public health, or land use planning, public land may be converted to community land
- c) private land may be converted to public land by
 - i. Compulsory acquisition;
 - ii. Reversion of leasehold interest to Government after the expiry of a lease; and
 - iii. Transfers; or
 - iv. Surrender.
- d) Community land may be converted to either private or public land in accordance with the law relating to community land enacted pursuant to Article 63(5) of the Constitution.

It is important to note that any substantial transaction involving the conversion of public land to private land shall require approval by the National Assembly or county assembly as the case may be.

Part I of the same Act states that title to land may be acquired through—

- (a) Allocation;
- (b) Land adjudication process;
- (c) Compulsory acquisition;
- (d) Prescription;
- (e) Settlement programs;
- (f) Transmissions;
- (g) Transfers;
- (h) long term leases exceeding twenty-one years created out of private land; or
- (I) any other manner prescribed in an Act of Parliament.

Part viii of this ACT provides procedures for compulsory acquisition of interests in land. Section 111 (1) States that if land is acquired compulsorily under this Act, just compensation shall be paid promptly in full to all persons whose interests in the land have been determined. The Act also provides for settlement programmes. Any dispute arising out of any matter provided for under this Act may be referred to the Land and Environment Court for determination.

4.5.7 The Land Registration Act, No. 3 of 2012

The Land Registration Act is in place to revise, consolidate and rationalize the registration of titles to land, to give effect to the principles and objects of devolved government in land registration, and for connected purposes. This Act applies to Subject to section 4, this Act shall apply to:

- Registration of interests in all public land as declared by Article 62 of the Constitution;
- Registration of interests in all private land as declared by Article 64 of the Constitution; and
- Registration and recording of community interests in land.

Section 24 states that: (a) the registration of a person as the proprietor of land shall vest in that person the absolute ownership of that land together with all rights and privileges belonging or appurtenant thereto; and (b) the registration of a person as the proprietor of a lease shall vest in that person the leasehold interest described in the lease, together with all implied and expressed rights and privileges belonging or appurtenant thereto and subject to all implied or expressed agreements, liabilities or incidents of the lease.

4.5.8 The Environment and Land Court Act, No. 19 of 2011

This Act is in place to give effect to Article 162(2) (b) of the Constitution; to establish a superior court to hear and determine disputes relating to the environment and the use and occupation of, and title to, land, and to make provision for its jurisdiction functions and powers, and for connected purposes.

This Act shall be of great essence to the proponent, public, interested or affected party that may want to litigate against the development on settlement issues, location of development or even effects of the project to the public.

4.5.9 The National Land Commission Act, No. 5 of 2012

Section 5 of the Act outlines the Functions of the Commission, pursuant to Article 67(2) of the Constitution as follows 5(1): -

- to manage public land on behalf of the national and county governments;
- to recommend a national land policy to the national government;
- to advise the national government on a comprehensive programme for the registration of title in land throughout Kenya;
- to conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities;

- to initiate investigations, on its own initiative or on a complaint, into present or historical land injustices, and recommend appropriate redress;
- to encourage the application of traditional dispute resolution mechanisms in land conflicts;
- to assess tax on land and premiums on immovable property in any area designated by law; and;
- To monitor and have oversight responsibilities over land use planning throughout the country.

4.5.10 Food, Drugs and Chemical Substances (Cap 254)

This Act provides for the prevention of adulteration of food, drugs and chemical substances and for matters incidental thereto and connected therewith. The Act prohibits against sale of unwholesome, poisonous or adulterated food; labelling, packaging, treating, processing, selling or advertising any drug in contravention of any regulations made under this Act, or in a manner that is false, misleading or deceptive as regards its character, constitution, value, potency, quality, composition, merit or safety; selling any device that, when used according to directions on the label or contained in a separate document delivered with the device or under such conditions as are customary or usual, may cause injury to the health of the purchaser or user thereof.

A person who contravenes this Act shall be guilty of an offence.

4.5.11 Occupational Safety and Health Act, No. 15 of 2007

Before any premises are occupied, or used a certificate of registration must be obtained from the chief inspector. The occupier must keep a general register. The Act covers provisions for health, safety and welfare. This Act applies to all workplaces where any person is at work, whether temporarily or permanently. The purpose of this Act is to secure the safety, health and welfare of persons at work, and protect persons other than persons at work against risks to safety and health arising out of, or in connection with, the activities of persons at work. Some of the areas addressed here are machinery safety, chemical safety and health, safety and welfare. Special provisions are also provided in the International Labour Organisation (ILO) conventions on safety and health in construction recommendation, 1988 R175.

4.5.12 Physical Planning Act, 1996 (Revised Edition of 2012)

An Act of Parliament to provide for the preparation and implementation of physical development plans and for connected purposes enacted by the Parliament of Kenya Under this Act, no person shall carry out development within the area of a local authority without a development permission granted by the local authority under section 33. The local authority concerned shall require the developer to restore the land on which such development has taken place to its original condition within a period of not more than ninety days. If on the expiry of the ninety days' notice given to the developer such restoration has not been effected the concerned local authority shall restore the site to its original condition and recover the cost incurred thereto from the developer.

4.5.13 Employment Act, 2007 (Revised Edition, 2014)

The Act is enacted to consolidate the law relating to trade unions and trade disputes, to provide for the registration, regulation, management and democratization of trade unions and employers organizations and federations. Its purpose is to promote sound labour relations through freedom of association, the encouragement of effective collective bargaining and promotion of orderly and expeditious dispute the protection and promotion of settlement conducive to social justice and economic development for connected purposes. This Act is important since it provides for employer – employee relationship that is important for the activities that would promote management of the environment within the housing sector.

4.5.14 Penal Code Act (Cap 63)

Section 191 of the penal code states that if any person or institution that voluntarily corrupts or foils water from public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same Act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons /institution, dwelling or business premises in the neighbourhood or those passing along public way, commit an offence.

4.5.15 County Governments Act, No. 17 of 2012

This Act vests responsibility upon the County Governments in planning of development projects within their areas of jurisdiction be it projects of importance to the local County government or those of national importance.

Section 102 of the Act provides the principles of planning and development facilitation which include integration of national values in county planning, protect the right to self-fulfilment within the county communities and with responsibility to future generations, protection of rights of minorities and marginalized groups and communities, promotion of equity resource allocation, among others.

Section 103 of the Act outlines the prime objective of county planning which aligned to the bill of rights and the constitution of Kenya.

Section 114 and 115 indicate and give guidelines in planning of projects of national significance and instil the aspect of public participation in every aspect of the planning process through that: clear strategic environmental assessments; clear environmental impact assessment reports; expected development outcomes; and development options and their cost implications.

Each county assembly is tasked with the role to develop laws and regulations giving effect to the requirement for effective citizen participation in development planning and performance management within the county.

4.5.16 The Tourism Act, No. 28 of 2011

Part III, section 4 to 7, through the Act the Tourism Regulatory Authority was formed with a mandate of overseeing all tourism related activities in Kenya which include but not

limited registration, licensing and developing and implementing of a code of conduct within the tourism sector.

Part VII, section 98 requires a person not to undertake any of the tourism activities and services specified in the Ninth Schedule, unless that person has a licence issued by the Authority. That the Authority shall, in considering the licence application, have regard to the material considerations which include—

- (a) the standard for the tourism area development plan as prescribed by the Minister under section 3(2)(b);
- (b) the protection of fragile environmental resources, ecosystems and habitats as provided for by the ministry for the time being responsible for matters relating to the environment;
- (c) an environmental impact assessment licence issued under Part VI of the Environmental Management and Co-ordination Act, 1999 (No. 8 of 1999);
- (d) any representations received from members of the public; and
- (e) a recommendation or approval from any other relevant authority as may be necessary.

In the Ninth Schedule of the Act, Hotels are classified under the Class 'A' Enterprises as tourist attraction areas hence governed by the provisions in the regulations provided in the Act. The proposed development has a hotel as one of the major components.

4.5.17 Water Act, 2016

The Water Act, 2016 provides the legal framework for the management, conservation, use and control of water resources and for the acquisition and regulation of right to use water in Kenya. It also provides for the regulation and management of water supply and sewerage services. In general, the Act gives provisions regarding ownership of water, institutional framework, national water resources, management strategy, and requirement for permits, state schemes and community projects. Part IV of the Act addresses the issues of water supply and sewerage. Specifically, section 59 (4) of the Act states that the national water services strategy shall contain details of:

- Existing water services
- The number and location of persons who are not being provided with basic water supply and basic sewerage
- Plans for the extension of water services to underserved areas
- The time frame for the plan; and
- An investment programme

Part II, section 18, of the Water Act 2016 provides for national monitoring and information system on water resources. Following on this, sub-section 3 allows the Water Resources Authority (WRA) to demand from any person or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may require to be kept by a facility operator and the information thereof furnished to the Authority.

4.5.18 The Energy Act, 2006 (Revised Edition, 2012)

The Act establishes an Energy Regulatory Commission mandated to perform all function that pertains to energy production, transmission, setting and enforcing of energy policies, Public education and enforcing energy conservation strategies, prescribing the energy licensing process and issuing of licenses that pertain to energy sector in Kenya. Section 30 of the Act provides the factors that shall be taken into consideration prior to issuance of license. It states the need and expression of an entity to conserve and protect the environment and natural resources in accordance to the Environmental and Coordination Act EMAC, CAP 387. The Act gives provisions for the need to protect health and safety of users of energy by providing an enabling environment of operation that protects the health and safety of users of the service for which the license or permit is required and other members of the public affected by the undertaking.

4.5.19 Work Injury Benefits Act, 2007 (Revised Edition, 2012)

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

Part III Section 10 states that an employer is liable to pay compensation in accordance with the provisions of this Act to an employee injured while at work. An employee is not entitled to compensation if an accident, not resulting in serious disablement or death, is caused by the deliberate and wilful misconduct of the employee.

Part IV Section 22 states that subject to the provisions of this section, an employer shall report an accident to the Director in the prescribed manner within seven days after having received notice of an accident or having learned that an employee has been injured in an accident.

Part VI Section 38 states that an employee who contracts a disease specified in the second schedule that arose out of and in the course of the employee's employment, is deemed to have contracted an occupational disease and is entitled to compensation as if the disablement caused by the disease had been caused by an accident. In section 41, an employer shall, within fourteen days after receiving notice or learning of the employee occupational disease, report such disease, in the prescribed manner to the Director, irrespective of whether the employer may be of the opinion that the employee did not contract such disease in employment or contracted it in the employment of a previous employer.

4.5.20 HIV and AIDS Prevention and Control Act, 2006 (Revised Edition, 2014)

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

Part II Section 7 states that the Government shall ensure the provision of basic information and instruction on HIV and AIDS prevention and control to employees of all Government Ministries, Departments, authorities and other agencies; and employees of private and informal sectors. The information provided under this section shall cover

issues such as confidentiality in the work-place and attitudes towards infected employees and workers.

Part VIII Section 31 requires that no person shall be denied access to any employment for which he is qualified; or transferred, denied promotion or have his employment terminated on the grounds only of his actual, perceived or suspected HIV status.

4.5.21 Persons with Disabilities Act, 2003 (Revised Edition, 2016)

It is an Act of Parliament to provide for the rights and rehabilitation of persons with disabilities; to achieve equalisation of opportunities for persons with disabilities; to establish the National Council for Persons with Disabilities; and for connected purposes. Part III Section 12 states that:

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

4.5.22 Climate Change Act, 2016

The Act provides for a regulatory framework for enhanced response to climate change; to provide for mechanism and measures to achieve low carbon climate development, and for connected purposes.

Part IV Section 16 states that the Council may, in consultation with the Cabinet Secretary and relevant State Departments, impose climate change obligations on private entities, including entities constituted under the Public Benefits Organizations Act, 2013.

4.5.23 Consumer Protection Act, 2012 (Revised Edition, 2016)

This is an Act of Parliament to provide for the protection of the consumer, prevent unfair trade practices in consumer transactions and to provide for matters connected with and incidental thereto. The Act prohibits against unfair practices where a person makes a false, misleading or deceptive representation.

4.5.24 The Standards Act Cap. 496

The Act is meant to promote the standardization of the specification of commodities, and to provide for the standardization of commodities and codes of practice; to establish a Kenya Bureau of Standards, to define its functions and provide for its management and control. Code of practice is interpreted in the Act as a set of rules relating to the methods to be applied or the procedure to be adopted in connection with the construction, installation, testing, sampling, operation or use of any article, apparatus, instrument, device or process. The developer has to comply with the provisions of the Act to ensure the overall safety of the development by ensuring strict vetting of material to be used in the construction. Thorough scrutiny of these material and frequents monitoring will be

done by the construction supervisory staff on site such the Resident Engineers, EHS and Clerk of Works office.

4.6 Relevant Multilateral International Treaties

4.6.1 The Rio Declaration and Agenda 21

The Rio Declaration and Agenda 21, the action plan for the 21st century are two non-legally binding instruments adopted by the 1992 United Nations Conference on the Environment and Development (UNCED). While the Rio Declaration contains general principles and objectives, Agenda 21 contains detailed guidance on their practical implementation. Principle 4 of the Rio Declaration provides that in order to achieve sustainable development environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it. Principle 25 accentuates this by stating that peace, development and environmental protection are interdependent and indivisible.

4.6.2 The World Commission on Environment and Development (The Brundtland Commission of 1987)

The Commission in its 1987 report dubbed “Our Common Future” focused on the environmental aspects of development, in particular the emphasis on sustainable development that produces no lasting damage to the biosphere and to particular ecosystems. In addition to environmental sustainability is economic and social sustainability. Economic sustainable development is development for which progress towards environmental and social sustainability occurs within available financial resources. While social sustainable development is development that maintains the cohesion of a society and its ability to help its members work together to achieve common goals, while at the same time meeting individual needs for health and well-being, adequate nutrition, and shelter, cultural expression and political involvement. The key aspect of sustainability is the interdependence of generations.

4.6.3 The Convention on Biological Diversity (1992)

The convention promotes the protection of ecosystems and natural habitats, respects the traditional lifestyles of indigenous communities, and promotes the sustainable use of resources. The project activities especially during construction will impact negatively to the flora and fauna of the respective construction areas. As such both the proponent and the contractor must ensure that the activities of the proposed project do not affect the immediate ecosystems negatively and that the livelihoods of the local people are not negatively affected but rather enhanced.

4.6.4 African Convention on the Conservation of Nature and Natural Resources

This convention reaffirms the importance of natural resources both renewable and non-renewable, particularly the soil, water, flora and fauna. The main objective is to facilitate

sustainable use of the above resources. The convention was adopted in Algiers on 15th September, 1968 and came into force on 16th June 1969.

4.6.5 United Nations Framework Convention on Climate Change (UNFCCC)

The United Nations Framework Convention on Climate Change provides the basis for concerted international action to mitigate climate change and to adapt to its impacts. Its provisions are far-sighted, innovative and firmly embedded in the concept of sustainable development. With 189 Parties, the Convention has nearly a universal membership.

According to Article 2, the Convention's ultimate objective is "to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [originating in human activity] interference with the climate system". This objective is qualified in that it "should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner". In stating this objective, the Convention reflects concerns that the earth's climate system is threatened by a rise in atmospheric greenhouse gas (GHG) concentrations, which is caused by increased anthropogenic GHG emissions. The Convention does not state a limit for total anthropogenic GHG emissions which would have to be respected to reach the objective. Nor does it indicate the level of total GHG concentrations beyond which "dangerous anthropogenic interference with the climate system" would occur. Estimates of where these levels lie evolve continually with scientific advances and are complicated by the political need to take into account the changing ability of societies to adapt to climate change. Another important factor is that stabilizing atmospheric concentrations of GHGs near current levels would actually require a steep reduction of current emissions. This is because, once emitted, GHGs remain in the atmosphere for a considerable length of time: carbon dioxide, for instance, stays in the climate system, on average, for a century or more.

4.6.6 United Nations Convention to Combat Desertification (UNCCD)

The above Convention was adopted on 17th June 1994 in Paris and came into force on 26th December 1996. Kenya ratified the Convention in 24th June 1997. The purpose of the UNCCD is to address the problem of desertification by the degradation of land and the impact of drought particularly in arid, semi-arid and dry sub-humid areas. UNCCD is a global commitment to achieve Land Degradation Neutrality (LDN) in order to restore the productivity of vast expanses of degraded land, improve the livelihoods of more than 1.3 billion people, and reduce the impacts of drought on vulnerable populations to build a future that avoids, minimizes, and reverses desertification/land degradation and mitigates the effects of drought in affected areas at all levels to achieve a land degradation-neutral world consistent with the 2030 Agenda for Sustainable Development. The UNCCD is particularly committed to a bottom-up approach,

encouraging the participation of local people in combating desertification and land degradation.

4.6.7 Vienna Convention on the Protection of the Ozone Layer

Intergovernmental negotiations for an international agreement to phase out ozone depleting substances concluded in March 1985 with the adoption of the Vienna Convention for the Protection of the Ozone Layer. This Convention encourages intergovernmental cooperation on research, systematic observation of the ozone layer, monitoring of Chlorofluorocarbons (CFC) production, and the exchange of information.

The convention's declaration demands a voluntary attempt at monitoring development processes, their resultant emissions and the impacts on the ozone layer for purposes of knowledge and information sharing in order to combat the same. The Master Plan proposes industrial development, and therefore the SEA report has determined and put in place measures to minimize the emissions that affect the ozone layer through technological monitoring of gaseous emissions and their toxicity levels for purposes of minimizing the same.

4.6.8 The UNEP's Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA)

The GPA draws its legal context primarily from Article 207 of United Nations Convention on the Law of the Sea (UNCLOS) and it is essentially an institutional-strengthening, technical-assistance and capacity-building programme. The GPA works through the existing United Nations Environment Programmes's (UNEP's) Regional Seas Conventions to develop regional and national level action plans to protect the marine environment from land-based activities. The GPA has identified at least nine pollutant or source nodes including municipal wastewater, heavy metals, litter, nutrients, oil, physical alterations and destruction of habitats (PADH), sediment mobilization and persistent organic pollutants (POPs).

The provisions of Section 55 of EMCA Cap 387 relate directly to Kenya's obligations under UNEP's GPA for the protection of the coastal environment from land-based sources. Part of the section states that any person who releases or causes to be released into the coastal zone any polluting or hazardous substances contrary to the provisions of this Act shall be guilty of an offence and liable upon conviction to a fine of not less than one million shillings or to imprisonment for a period not exceeding two years or to both such fine and imprisonment. The Cabinet Secretary shall, in consultation with the relevant lead agencies, issue appropriate regulations to prevent, reduce and control pollution or other form of environmental damage in the coastal zone.

4.6.9 Ageing, Older Persons and The 2030 Agenda for Sustainable Development (UNDP)

The 2030 Agenda for Sustainable Development sets out a universal plan of action to achieve sustainable development in a balanced manner and seeks to realize the human

rights of all people. It calls for leaving no one behind and for ensuring that the Sustainable Development Goals (SDGs) are met for all segments of society, at all ages, with a particular focus on the most vulnerable—including older persons.

Preparing for an ageing population is vital to the achievement of the integrated 2030 Agenda, with ageing cutting across the goals on poverty eradication, good health, gender equality, economic growth and decent work, reduced inequalities and sustainable cities. Therefore, while it is essential to address the exclusion and vulnerability of—and intersectional discrimination against—many older persons in the implementation of the new agenda, it is even more important to go beyond treating older persons as a vulnerable group. Older persons must be recognized as the active agents of societal development in order to achieve truly transformative, inclusive and sustainable development outcomes.

The current brief acknowledges the importance of a life-course approach to ageing and calls for protecting and promoting the rights of older persons in the implementation of the 2030 Agenda.

Population ageing provides significant opportunities for sustainable development which are associated with the active participation of older generations in the economy, labour market and society at large. In view of their experience, knowledge and skills, older persons are important actors in communities, making key contributions in interrelated areas such as economic development, unpaid care work, political participation and social capital.

4.6.10 Convention on the Elimination of all forms of Discrimination against Women

The Convention places explicit obligations on states to protect women and girls from sexual exploitation and abuse. The industrial park proposes to observe and adopt the above guidelines during its implementation. The realization of a non-discriminatory environment can be realized through preventive and mitigative measures by the SEA on matters of social concerns.

4.6.11 International Labour Organization

The International Labour Organization (ILO) is built on the constitutional principle that universal and lasting peace can be established only if it is based upon social justice. The ILO has generated such hallmarks of industrial society as the eight-hour working day, maternity protection, child-labour laws, and a range of policies which promote workplace safety and peaceful industrial relations.

The ILO has four principal strategic objectives:

- To promote and realize standards, and fundamental principles and rights at work.
- To create greater opportunities for women and men to secure decent employment.
- To enhance the coverage and effectiveness of social protection for all.
- To strengthen tri-parties and social dialogue.

The key ILO Conventions applicable to the proposed Vipingo Mixed Use Master Plan include:

- Equal Remuneration Convention (1951) (No. 100) - Calls for equal pay and benefits for men and women for work of equal value.
- Discrimination (Employment and Occupation) Convention (1958) (No. 111) - Calls for a national policy to eliminate discrimination in access to employment, training, and working conditions, on grounds of race, colour, sex, religion, political opinion, national extraction or social origin, and to promote equality of opportunity and treatment.
- Minimum Age Convention (1973) (No. 138) - Aims at the abolition of child labour, stipulating that the minimum age for admission to employment shall not be less than the age of completion of compulsory schooling.
- Worst Forms of Child Labour Convention (1999) (No. 182) - Calls for immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour which include slavery and similar practices, forced recruitment for use in armed conflict, use in prostitution and pornography, any illicit activity, as well as work which is likely to harm the health, safety, and morals of children.

4.6.12 Sustainable Development Goals (SDGs)

In October 2015, The United Nations adopted 17 Sustainable Development Goals aimed at transforming the world. Eleven of these goals have some bearing on the Vipingo Mixed Use Master Plan. They include Goal number 1 aiming at reducing poverty, Goal 2, reducing hunger; Goal 3, good health and wellbeing; Goal 4, clean water and sanitation; Goal 7, affordable clean energy; Goal 8, decent work and economic growth; Goal 9, Industrial growth, innovation and infrastructure; Goal 11, sustainable cities and communities; Goal 12, responsible consumption and production; Goal 13, climate action; and Goal 15, life on land. As described in chapters 2, 6 & 7 of this report, the proposed development will address most of these Goals in its components and infrastructure.

5 PUBLIC PARTICIPATION

5.1 Introduction

The Public Participation and Consultation Process is a policy requirement by the Government of Kenya which is enshrined in the constitution and a mandatory procedure as stipulated by EMCA Cap 387 for the purpose of achieving the fundamental principles of sustainable development. It is an important process through which stakeholders including beneficiaries and members of public living in project areas (both public and private), are given an opportunity to contribute to the overall project design by making recommendations and raising concerns on projects before they are implemented. In addition, the process creates a sense of responsibility, commitment and local ownership for smooth implementation.

This chapter describes the process of the public participation and consultation that was followed in order to identify the key issues and impacts of the proposed project. Views and concerns from the local residents, local leaders, surrounding institutions and development partners for the proposed commercial development, who in one way or another would be affected or have interest in the proposed development were sought through interviews, key stakeholder and public meetings as stipulated in the Environmental Management and Coordination Act Cap 387.

5.2 Objectives of the consultation and public participation

The objectives of the consultation and public participation was to:

- 1) Create awareness among the public on the need for the EISA for the proposed project.
- 2) Disseminate and inform the stakeholders about the project with special reference to its key components and location.
- 3) Gather comments, suggestions and concerns of the interested and affected parties.
- 4) Incorporate the information collected in the ESIA study.

In addition, the process enabled,

- 1) The establishment of a communication channel between the general public and the team of consultants, the project proponents and the Government.
- 2) The concerns of the stakeholders to be known to the decision-making bodies at an early phase of project development.
- 3) Consultation on sensitive issues and establishment of mitigation measures for management of any impacts that may arise during construction and operation phases of the project.

5.3 Methodology used in the CPP

The exercise was conducted by a team of experienced registered environmental experts and field assistants. The process in carrying out the entire exercise involved:

- Key informant interviews and discussions
- Public meeting
- Field surveys and observations
- Completion of the pre-designed questionnaires which captured all the phases of the proposed development

The purpose for such interviews was to identify the positive and negative impacts and subsequently promote proposals on the best practices to be adopted and mitigate the negative impacts respectively. It also helped in identifying any other miscellaneous issues, which may bring conflicts in case project implementation proceeds as planned. The information gathered enabled the identification of the specific issues from the stakeholders' response, which provided the basis upon which the aspects of the Environmental and Social Impact Assessment was undertaken.



Plate 17: A key Informant Interview

5.4 Interested and Affected Parties Consulted

The following list outlines the parties consulted, that will be affected or have interest in the proposed commercial centre in Kilifi County;

- Department of Physical Planning, Kilifi County
- Kilifi-Mariakani Water and Sewerage Company (KIMAWASCO)
- Department of Land, Housing, Energy and Urban Development, Kilifi County
- Department of Environment, Forestry and Natural Resources, Kilifi County
- Department of Health Services, Kilifi County
- National Disaster Management Authority(NDMA)- Kilifi County
- National Environmental Management Authority, Kilifi County
- Learning institutions in Vipingo
- Financial Institutions in Vipingo
- Health centres in Vipingo
- County Government of Kilifi
- Mombasa Cement Limited
- Vipingo Ridge
- Managers of Rea Vipingo Plantations Ltd
- Estate Heads of Rea Vipingo Plantations Ltd
- Rea Vipingo Plantations Ltd employees
- Local community members
- Local community representatives (political and Community leaders)
- Vipingo Youth Leaders/Representatives

5.5 Sources of Information

The public consultation exercise was conducted from 10th December, 2018 to 16th January, 2019. The exercise was conducted via interviews under the guidance of questionnaires and Focussed Group Discussions (FGDs) developed to capture the concerns, comments and issues that the stakeholders, neighbours and business people around the project site have regarding the proposed project. The completion of such exercise allowed for the synthesis and analysis of issues that arose. In addition, a public consultative meeting with the local community members was held at Mkwajuni Youth Polytechnic on 14th January, 2019 from 10:30am to 12:30pm. A summary of participants is shown in the Table 1 below and the questionnaires administered, attendance sheet and minutes for the public meeting are attached as an appendix of the report. (see annex)

Table 1: List of public participants interviewed

Stakeholders	No. of Participats	Appendix
Key Stakeholders	34	See Annex I (B)
Community Members	52	See Annex I (A)
Total	86	
Public Meeting Attendants	69	See Annex III



Plate 18: The Lead Expert and a Proponent’s Representative giving a presentation during the public meeting



Plate 19: A community leader raising his concerns during the public meeting



Plate 20: A community women representative giving her opinions during the public meeting



Plate 21: A youth raising his questions during the Q&A session

5.6 Issues Raised during public consultations

5.6.1 Positive Issues

5.6.1.1 Employment Opportunities for the Locals

The respondents interviewed/consulted were optimistic that the proposed commercial centre development activities would create numerous employment opportunities for skilled, semi-skilled and unskilled labour during the construction and operational phases. Even though most of the development will need skilled labour force during operation, the participants expressed hope that they will be able to access employment once the development commences mostly as casual workers.

Employment opportunities are of benefit both economically and socially. Generally, employment will lead to multidimensional development in the area and improve several people's living standards. The lead consultant also informed the participants present that the proponent, Vipingo Development Ltd, had started a vocational training programme for the youth in the area. He added that the beneficiaries would enjoy a sponsorship for artisan courses relevant to the construction skills required in the project hence preparing them to benefit from arising job opportunities. The members present were also informed that, the proponent was already running a scholarship programme in the region with over 100 needy students already benefitting from the programme.

5.6.1.2 Increased Revenue and Income Generating Activities

The use of locally available materials and labour for the proposed commercial centre development activities would also contribute towards growth of the local and national economies by contributing to the Gross Domestic Product (GDP). The consumption of these materials like sand, cement, steel, building stones, timber, oil and others will attract taxes including Value Added Tax (VAT) which will be payable to the government hence increasing government revenue while the cost of these raw materials will be payable directly to the producers. During operation, various businesses will require licenses thus generating income for Kilifi County government

5.6.1.3 Increased Business Opportunities

The respondents and participants were optimistic that business opportunities will arise during construction and operation of the proposed commercial development. Small scale business people such as food vendors and kiosk owners will benefit greatly during construction and operation stages due to the expected population influx. The customer base for existing businesses will rise due to an influx of people and activities in the area as a result of the proposed development.

5.6.1.4 Improved and Increased Commercial Space in the Area

Those interviewed were appreciative of the amenities that the proposed facility would offer them. They were also enthusiastic about accessing business outlets for expanding their businesses and even starting new business ventures. This will improve their access to much needed facilities.

5.6.1.5 Availability of Goods and Services

Locals working and living in the neighbourhood of the proposed area were optimistic that various goods and services will be brought closer to them. The proposed development will attract various goods and service providers in the area enabling the locals get these services within their proximity. For instance, a supermarket, a filling station etc. There will also be increased access

5.6.1.6 Economic Growth in the Area

The respondents were positive that the proposed development activities would reduce poverty rates in Vipingo area and its environs due to improved economic growth as a result of the proposed commercial development. They were positive that their living standards will improve due to improved income for several individuals and households and hence it is expected to boost the country's GDP and improve the living standards of Kenyans.

5.6.1.7 Increase in Property Prices Land Value

Land value and the standard of living of the populace will increase due to high demand for space for urban development thus increasing the value of land and property within

and surrounding the project site. This in turn will improve the standards of living of the locals.

5.6.1.8 Attraction of Investors

With the proposed commercial centre development commencing, investors will be attracted to invest their money in the proposed area through enterprises and business among others.

5.6.1.9 Improved Infrastructure and Social Amenities in Vipingo Area

Respondents were optimistic that the proposed development activities would improve infrastructure in the area. Vipingo area will develop from a rural area to an urban setting attracting improved transport and communication infrastructure, power distribution network, water and sewerage networks, education, health and recreational facilities among other social amenities.

5.6.1.10 Improved Security

The respondents were optimistic that the development activities would lead to improved security situation in the neighbourhood due to the influx of new business premises and increase in population within the area leading to contracting of various security firms and setting up of streets and/or security lights.

5.6.1.11 Improved Networking and Culture Exchange

The development will attract various people from different counties and countries and this will promote cultural integration; skills, knowledge and technological exchange.

5.6.1.12 Corporate Social Responsibility

The respondents were also optimistic that they would be trained in advance by the proponent to take up jobs during construction and operational stages to ensure social investment to the community. They also expressed their gratitude to the proponent for initiating a scholarship programme for students finishing primary school to access good secondary education.

5.6.1.13 Decongestion of Mombasa City

Respondents were optimistic that the proposed commercial centre development would reduce congestion in Mombasa and reverse traffic flows between Mombasa and Kilifi County. In addition, the respondents were positive that the proposed development would accelerate economic growth and serve as a catalyst for further urban development in Kilifi County and its environs.

5.6.2 Negative Issues

5.6.2.1 Environmental degradation by converting natural environment to built environment

Respondents were concerned with the conversion of the project site from a sisal plantation to a commercial centre. This would degrade the environment and alter the environmental conditions of the area. The Lead consultant informed them that green areas within the development would be created and all ecologically sensitive areas would be conserved. In addition, the proponent of the project would not cut any trees during the construction phase of the project but preserve them as part of landscaping.

5.6.2.2 Air pollution

The people expressed concern over possibility of generation of large amount of dust and fumes within the development and surrounding areas as a result of excavation works and transportation of construction materials. The lead consultant indicated that comprehensive measures on dust control would be developed and included in the environmental social impact assessment report for implementation during the construction phase. An ESMP would also be put in place to ensure environmental sustainability of the development.

5.6.2.3 Noise pollution and Vibrations

The residents expressed fear over noise and vibrations that would be generated during the construction phase of the proposed project by the construction machines and other moving machines in the construction sites. They were informed that the NEMA Noise and Excessive Vibration Pollution Control Regulations, 2009 would be adhered to throughout the implementation period in various projects.

5.6.2.4 Business Competition

Business people in the area were concerned that they will lose their market to the proposed commercial development. They were however informed that the proposed development was going to complement their businesses by providing goods and services that could not be found locally for instance, a supermarket.

5.6.2.5 Shrinking jobs for sisal plantation workers

The local community were concerned that the sisal workers working within and around the proposed project site would lose their jobs once the sisal plantation was cleared. Respondents were also concerned that only the skilled labourers would secure employment during the construction and operational phases of the project leaving out the unskilled who are the majority in Vipingo Area. The lead consultant informed them that the proposed development would generate more quality jobs than the current engagements. However, they would need to acquire new skills to optimize on the benefits of the development. The consultant also informed local community members that the

project proponent had already designed and rolled out a capacity building and training programs for local youth. The community members were informed that the training on various skills required in the construction of the project including masonry, steel fixing, and safety among others was already ongoing and local youths were already at an advanced stage of training. The lead consultant also explained to the local community members that more programs would be rolled out as the project progresses to the other subsequent phases. The lead consultant further explained that development on the site would only commence after the sisal had reached maturity and had been harvested. The community members were also informed that the development will only affect the sisal plants on the proposed site while the remaining sisal plantations will still continue to be propagated.

5.6.2.6 Displacement of the local people

The participants were worried that the proposed commercial centre development activities may lead to displacement of persons within the REA Vipingo Plantations and loss of property in the area. Residents were worried that they would lose their homes, land and businesses. The Lead Consultant clarified that to community members that the proposed project site measuring 10.13 acres did not have any residential settlement and therefore there would be no displacement of locals.

5.6.2.7 Growth of Informal Settlements

Respondents also expressed concerns on overstretched residential supply in the area from influx of workers resulting to growth of slum(s).

5.6.2.8 Increased Social Ills

Some of the community members and key stakeholders interviewed expressed concerns of social ills that come with growth of an area. Some of the social ills that were mentioned included crimes, drug abuse and emergence sex workers.

5.6.2.9 Increased spread of communicable disease such as HIV/Aids

The residents of Vipingo feared that there would be emergence of new infections such as HIV/AIDS especially during construction. There would also be a possibility of prostitution due to influx of workers to the area. The consultant informed the community members that the proponent in collaboration with relevant government agencies would be expected to put in place an HIV/AIDs control programme during the construction and operation stages and carry out sensitization of the local community of the above. The consultant also informed the participants that ongoing capacity building programs sponsored by the proponent would also involve sensitization of youth and community members of diseases such as HIV/AIDS among others.

5.6.2.10 Traffic Congestion

Some of the key stakeholders interviewed expressed fear over the proposed development possibly bringing about traffic congestion in the area along Mombasa-Malindi highway.

They were concerned that the proposed development would attract an increase in traffic which would lead to congestion and possible accidents and traffic jams during construction as well as during the operation stage of the proposed Commercial Development.

5.6.2.11 Competition in terms of water resources and other utilities

The respondents were concerned about competition for water resources as the area was prone to drought and water scarcity. The lead consultant informed the respondents that during the construction phase water from a borehole would be used while during operation the primary source of water for the project would be water sourced from the ocean and supplied from a seawater desalination plant that would be constructed soon.

5.6.3 Suggestions by local community members and key stakeholders

Local community members and key stakeholders also gave suggestions that would be of benefit to the local area residents and work towards ensuring environmental conservation and sustainable development which include:

- The locals to be given priority in employment especially the youth
- Priority for job opportunities to be given to the sisal workers
- Involve Provincial Administration of the area proposed for development in employment opportunities for the locals, CSR and on security
- Involve the planning dept. in the design to ensure it is in line with the County Development Plan
- Consider provision of temporary workers' accommodation to ease burden on the few rental units available in the area.
- Proper drainage systems to be put up to ensure storm water flowing down to the proposed area from the highlands e.g. Vipingo Ridge is well managed.
- The proponent should design a good solid and liquid waste disposal system to protect the environment from pollution.
- Developing a sewerage system that protects the marine ecosystem
- Minimise and control pollution
- Incorporate parks and green areas in the project to provide habitat for the fauna in the area
- Planting of trees in the area
- Ensure proper landscaping of the developed areas
- Beef up security before commencing construction
- A police post should be put up in the neighbourhood
- Proponent should adhere to building standards during construction
- Creation of awareness to the local community and surrounding institutions on safety and health
- Train workers on health and safety

- Provide PPEs for those who will be working at the construction site
- The developer should support local businesses by purchasing goods and services locally
- The proponent to develop a participatory Corporate Social Responsibility programme in consultation with local elected leaders and village elders. The CSR programme to focus on provision of health services, water, educational scholarships/ support, technical skills development especially those required in the construction sector, etc.
- Local communities should be prepared through sensitization so that they can be encouraged to develop skills and knowledge for the upcoming development.

6 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

6.1 Introduction

The environmental baseline information and the project characteristics discussed earlier, form the basis for impact identification and evaluation. The impacts that are expected to arise from the project could either be termed as positive, negative, direct, indirect, short-term, long-term, temporary, and permanent depending on their area of cover and their stay in the environment. This assessment is done for all the project phase namely; construction, operational and decommissioning phases.

6.2 Potential Positive impacts during construction phase.

6.2.1 Employment Opportunities

There will be job opportunities especially to casual workers. Employment opportunities are a benefit both in economic and social sense. In the economic sense, it means abundant unskilled labour will be used in economic production. In the social sense, these young and energetic otherwise poor people will be engaged in productive employment other than remaining idle. Remaining idle may attract them into social ills like drug abuse and other criminal activities like robberies. Several workers including casual labourers, masons, carpenters, joiners, electricians and plumbers are expected to work on the site. Apart from casual labour, semi-skilled and unskilled labour and formal employees are also expected to obtain gainful employment during the construction period.

During the construction phase the project will directly employ the following groups:

- Supervising engineering team;
- Contractor's staff (managerial, skilled and unskilled labour force);
- Suppliers of plant, machinery, materials and essential services;
- Construction monitoring personnel from the various Government agencies.

6.2.2 Provision of market for construction materials

The project will require supply of large quantities of construction materials such as cement, stone chips, metals and sand most of which will be sourced locally within Kilifi, Mombasa and the surrounding areas. This project provides ready market for construction material suppliers such as quarrying companies, hardware shops and individuals with such materials. This will lead to growth of business and enhance the livelihoods of the local people who directly or indirectly depend on this business.

6.2.3 Boost of the surrounding business enterprises

The project will employ quite a number of people to work in the facility. These people will need goods and services to be supplied by the business enterprises within the project site. The enterprises within the project area will hence benefit from increased customer base from construction crew. The project shall also attract more investments in the area such as recyclable material collection, catering as well as security service companies from the local community.

6.2.4 Gains in the local and national economy

There will be gains in the local and national economy. Through consumption of locally available materials including cement among others. The consumption of these materials, fuel, oil and others will attract taxes including VAT which will be payable to the government. The cost of the materials will be payable directly to the producers.

6.2.5 Improved building technology/ knowledge transfer

Majority of the constructions in the area are considered traditional. The proposed commercial centre development will provide modern building/construction facilities which will be adapted by the locals in the area.

6.2.6 Improvement of standards of living

The locals who will be employed during the construction phase will have a source of income to develop themselves and those of their family members.

6.3 Potential Negative impacts during construction phase.

6.3.1 Dust and vehicle emissions

During the construction stage, the air quality of the area will be directly affected by dry, windy and dusty weather. The impact will be a major challenge especially during site clearance, construction and movement of building materials to and from the site. The frequent upwelling of dust as a consequence of construction may impact on workers causing asthma and other respiratory conditions. The impact of dust on watercourses would be low. Further, increased movement of construction equipment will also increase the emission of pollutants. The people in the immediate project vicinity as well as commuters in open vehicles will be affected directly. Gasoline and diesel vehicles and engines used during the construction period will emit pollutants such as carbon dioxide, suspended particulates, nitrogen dioxide, vaporized lead and sulphur dioxide.

Construction earthworks for foundation laying (for building facilities) will release dust particles into the ambient air. When a lot of dust settles on the leaves, it is bound to have negative effects on flora as it covers leaf stomata thus reducing their photosynthetic activity.

These emissions emanating from trucks and construction equipment are known to have adverse impact on the environment, plant and human health including effect on the upper to lower respiratory infections and silicosis condition.

Activities likely to generate dust include;

- speeding of vehicles on earth surface
- Excavation of earth materials in dry sections;
- Activities likely to generate particulate matter include loose material transportation, vehicle and machines exhaust emissions;
- Some of the particulate matter to be generated include sand, soot, cement, gravel and murrum, among others; and
- Exhaust emissions likely to be generated include smoke, hydrocarbons and nitrogenous gases among others pollutants from vehicles, machinery and equipment's exhausts.

6.3.2 Noise pollution

Levels of noise and vibrations typical of construction works will be generated at the project site during the construction phase. Permissible/acceptable human noise levels may temporarily be exceeded. This noise impact is expected to be minimal and temporary during the construction phase.

Elevated noise and vibration levels within the site are averse to the health and safety of the project workers, the residents, passers-by and, other persons and animals within the vicinity of the project site. To be affected mostly are the site workers since noise beyond some level is itself a nuisance if not maintained within acceptable limits and where safety gears (for the ears) are not used.

6.3.3 Solid waste and excavated material

The project envisages major excavation works during the construction phase. Top-soil wastes from the sites will be the main form of solid waste. Some of the excavated soil will be reused for landscaping and as backfill while the rest will be disposed to designated areas. Other solid wastes will include packaging materials, metallic pieces, wooden planks, and stone debris. All these wastes will be disposed of according to the legislation guiding the same.

6.3.4 Soil Erosion

The site slopes gently and possibilities of soil erosion occurring during construction are high specifically during rainy and windy seasons. Soil erosion may be caused by exposure of soil surfaces to rain and wind during site clearing, earth moving, and excavation activities. The mobilization and transport of soil particles may result in sedimentation of surface drainage networks, which may result in impacts to the quality of natural water systems and ultimately the biological systems that use these waters. Lost soil will be deposited in the ocean, and the location of the deposition could alter hydrology. It may also pose a water quality issue directly as a result of siltation and indirectly from contaminants carried with or attached to soil particles.

6.3.5 Hazardous material spillage

As a result of the spillage of lubricant, fuel, cement and other chemicals during construction, soil condition may deteriorate. The spillage of such chemicals will negatively impact the condition of the soil, as this cannot degrade without human intervention. Pollution in soils can further impact on the quality of groundwater and surface water. The construction machines on site may be containing moving parts which will require continuous oiling to minimize the usual corrosion or wear and tear. Possibilities of such oils spilling and contaminating the soil and water on site are real. Likewise, moving vehicles on site may require oil change. These dangers are contained by maintaining the machinery in specific areas designed for this purpose.

6.3.6 Vegetation loss

Destruction of sisal plantation within the site during site clearance to pave way for the project will be inevitable. There are no known protected species or significant habitats that will be adversely impacted by the construction of this project. There is also no conservation area to be affected by the project.

6.3.7 Loss of Biodiversity, Species and Communities

Direct impact results from disturbances that cause changes in temperature, light, moisture and nutrient levels; removal activities (e.g. clear-cutting, bulldozing); impacts resulting from air and water pollution (e.g. turbidity, eutrophication). Indirect impacts result from changes in natural community processes or invasion of non-native plant and animal species. Loss of plant communities also results in decreased water quality, increased erosion as a result of unstable soil, nutrient imbalances in the soil, and/or compaction of soil.

In consequence, de-vegetation during construction may result to negative effects on the fauna by creating a disturbance. The vegetation is important as food and habitat for various animals. It also assists in maintaining the structure of the soil by holding the particles together. This enables the soil microorganisms to flourish as their habitat making the soil

stable. This in turn allows the organisms easily convert the dead leaves and plants to humus which helps enrich the soil as well as preventing soil erosion.

6.3.8 Social crimes

An influx of construction workers to the project site will lead to increased crime rate, competition for limited jobs and competition for housing. Due to limited housing and related services, as well as the isolation of the project due to geographical distance from nearby towns, the influx of outsiders will not be significant.

6.3.9 Public Health

Due to the expected influx of construction workers to the project site there may be increase in disease vectors and diseases including sexually transmitted diseases, such as HIV/AIDS etc. the increased population will also lead to increased solid waste and effluent discharge from informal settlements that may come up.

6.3.10 Occupational health and safety

Potential impacts during construction phase shall include exposure to physical hazards from the use of equipment; trips and fall hazards; rock falls/slides at high elevations and exposure to dust and noise. The uncontrolled proximity to high vehicular traffic during transportation of construction materials and equipment may be a hazard to vehicular and non- vehicular movement in and out of the access road to the site while working near the Mombasa – Malindi highway that may lead to injuries or fatalities due to traffic accidents. Other injuries or fatalities may result from workers operating equipment without adequate training or lack of PPE or extended exposure to outdoor weather resulting in heat related lethargy.

6.3.11 Populations of disease vectors

Disease vectors such as rats, flies, and cockroaches increase where refuse is exposed or uncollected and can be a hazard. Complete refuse collection and handling service will be provided by the proponent so that this is not a hazard in compliance with the Public Health Act and as also required in the Occupational Safety and Health Act, 2007 regarding hygiene at the workplace.

6.3.12 Increased Storm Water Flow

The project will likely interfere with the velocity of storm water or run-off flowing across the area. This will lead to increased amounts of storm water entering the drainage systems, resulting in overflow and damage to such systems in addition to increased erosion or water logging in the site.

6.3.13 Increased Water Demand

Both the workers and the construction operations will create additional demand for water in addition to the existing demand. Water will be mostly used for domestic use by the workforce, concrete mixing, curing of concrete works inter alia.

6.3.14 Increased Energy Consumption

The project will consume fossil fuels (mainly diesel) to run transport vehicles and construction machinery. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. The project will also use electricity supplied by Kenya Power Ltd. Electricity in Kenya is generated mainly through natural resources, namely, water and geothermal resources. In this regard, there will be need to use electricity sparingly since high consumption of electricity negatively impacts on these natural resources and their sustainability.

6.3.15 Increased Traffic Congestion

The trucks used to carry construction materials to and from the site may increase traffic on the Mombasa- Malindi highway.

6.3.16 Risk of Invasive Species in Landscaped Areas

Unless appropriate measures are put in place, some introduced species tend to get out of control and become invasive.

6.3.17 Mushrooming of Food Kiosks and Informal Settlements

The proposed commercial centre development project may involve mushrooming of informal settlements and kiosks around the surrounding area owing to workers' preference to stay near their places of work to reduce on costs associated with transport.

6.4 Potential Positive Impacts During Operation Phase

6.4.1 Job Creation

Employment opportunities are one of the long-term major impacts of the proposed development project that will be realized after construction and during the operation and maintenance of the proposed commercial centre. This will involve security personnel, solid waste management staff, services and businesses that will be located within the project. Other sources of employment will involve direct service provision to the development services e.g. caretakers and cleaning services etc.

6.4.2 Increased Security in the Area

With the coming up of the proposed project, cases of insecurity will reduce given that the project will attract more people hence scaring away ill minded people. The project will also provide for additional security from local firms that will be an added benefit to the local community.

6.4.3 Emergence of a new Urban Development

Growth of businesses, estates, market centres and other essential services will be witnessed within Vipingo area. Being a modern commercial centre development project, there is potential of greatly reducing urban sprawl through densification by constructing a high quality commercial centre.

6.4.4 Growth of Business and Market Centres

There will be growth of new businesses and market centres around the proposed project site leading to growth of the local economy. Economic activities will increase in Vipingo area, as the proposed commercial centre development will attract enterprises.

6.4.5 Increased Property Value

Residents who own property in areas adjacent or near the proposed residential estate development will experience a tremendous increase in the value of their properties due to infrastructural development that will follow and emergence of new developments that will require new space.

6.4.6 Economic Growth

The project is anticipated to generate revenue since the activities during operational phase will contribute to revenue collection by paying relevant taxes and fees. The facilities during the project operation will require maintenance services, which will be provided by personnel employed, paying relevant taxes. The consumption of products and utilisation of services by the residents will also attract taxes including VAT which will be payable to the government hence increasing government revenue and improving national economy.

6.4.7 Expansion of Market Base for Local Agricultural Products

The operation phase of the proposed commercial centre will lead to increased population within and around the proposed project site. The increased population will need consumables such as food crops that will be sourced from the local farmers. This will definitely improve the income of the farmers involved.

6.5 Potential Negative Impacts During Operation Phase

The negative potential impacts likely to occur during the operations and maintenance phase of the project include:

6.5.1 Increased pressure on existing infrastructure

Development projects of this magnitude have a potential of increasing pressure on existing infrastructure such as roads, water supply system, waste handling facilities, electricity etc. This would be due to increased human population and volume of vehicle traffic along the access road and the Mombasa- Malindi highway.

6.5.2 Air pollution

An increase in the number of vehicles to and from the commercial centre results to an increase in exhaust emissions in the area. Poor solid waste management could lead to blocking of drains especially where the project is in existence and this can lead to flooding and unsanitary conditions within the related facilities. Blocked drains produce bad odour hence are environmentally unfriendly.

6.5.3 Water pollution

If the commercial centre's management system of solid and liquid wastes is not done well, it may cause contamination to ground and surface water sources and also form breeding areas for mosquitoes; this may cause human diseases like malaria and cholera.

6.5.4 Insecurity/social crime

The project will attract permanent and temporary residents in the proposed area. This implies increased operations that may make it more difficult to monitor and control. As mentioned earlier, the project may encourage development of informal settlements in the vicinity which is likely to be a source of insecurity and social crimes in the area.

6.5.5 Solid waste generation

The project is expected to generate increased amounts of solid waste during its operation phase. The bulk of the solid waste generated during the operation of the project will consist of domestic waste. Such wastes can be injurious to the environment through blockage of drainage systems, choking of water bodies and negative impacts on animal health. Some of the waste materials especially the plastic/polythene are not biodegradable hence may cause long-term injurious effects to the environment. Even the biodegradable ones such as organic wastes may be injurious to the environment because as they decompose, they produce methane gas, a powerful greenhouse gas known to contribute to global warming.

6.5.6 Increased electricity consumption

The project shall consume large amount of electricity due to the number of street lights and business units being proposed and the activities that will take place once the project is complete. 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 and their sustainability.

6.5.7 Increased storm water flow

Changes in surface hydrology alter the flow of water through the landscape. Construction of impervious surfaces such as parking lots, roads and buildings increase the volume and rate of runoff, resulting in habitat destruction, increased pollutant loads, and flooding. Built or paved areas and changes in the shape of the land also influence groundwater hydrology (i.e. recharge rates, flow, conditions).

The pavements will lead to increased volume and velocity of storm water or run-off flowing across the area covered by the units. This will lead to increased amounts of storm water entering the drainage systems, resulting in overflow and damage to such systems in addition to increased erosion or water logging in the Neighbouring areas.

6.5.8 Increased water demand

Activities during the operation phase of the project will involve the use of large quantities of water as a result of activities that will take place and the large number of people that will stay and work there.

6.6 Potential Positive impacts during Decommissioning Phase.

6.6.1 Rehabilitation and restoration of the site to its original status

Upon decommissioning of the project, rehabilitation of the project site will be carried out to restore the site to its original status. This will include replacement of topsoil and re-vegetation which will lead to improved visual quality of the area.

6.6.2 Employment opportunities

The decommissioning activities will create employment and job opportunities for the different professionals involved in them. These include: engineers, demolition experts, foremen, supervisors, masons, truck drivers and machine/equipment operators among others. Several employment opportunities will be created for the demolition staff.

6.6.3 Business Opportunities and Income Generation

The decommissioning phase and its activities will create business for the contracting company that will be charged with pulling down the structure and transporting the resultant materials/debris. Additionally, on shut down moving companies will also benefit from being contracted to move equipment and materials from the project area. All these income streams will be taxed and generate income for the county government.

6.6.4 Reduced Negative Impacts of Operation

All other negative impacts listed under the operations section will drastically reduce when the decommissioning will take place.

6.6.5 Reduced Environmental Pollution

Decommissioning will obviously lead to reduced air, water, soil and general environmental pollution that is experienced during operations.

6.6.6 Provision of Cheaper Building Materials

The Decommissioning phase of the project will create recyclable building materials such as bricks, stones, metals, glass, wiring, furniture, electronics and plumbing systems etc. which at present market trends will be cheaper than new materials. This will thus provide cheaper building material for future projects. It is also possible that the materials may be donated and used for development projects (schools, hospitals etc.) in much needed areas. This will assist in promoting development where its mostly needed and generally improve the quality of life in those areas.

6.6.7 Environmental Conservation

The recycling of the waste to be used as raw materials in other construction process reduces the demand for raw materials. This in turn reduces the potential impact to the environment that would have been felt if the demand for raw materials had not reduced.

6.7 Potential Negative impacts during Decommissioning Phase

6.7.1 Solid waste generation

Demolition of the project will result in large quantities of solid waste. The waste will contain the materials used in construction including concrete, metal, drywall, wood, glass, paints, adhesives, sealants and fasteners. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as

chloride, sodium, sulphate and ammonia, which may be released because of leaching of demolition waste, are known to lead to degradation of groundwater quality.

6.7.2 Dust emission

Large quantities of dust will be generated during demolition works. This will affect demolition staff as well as the Neighbouring residents.

6.7.3 Noise and Vibration

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas.

6.7.4 Reduced/ loss of positive impacts to the project

All positive impacts of proposed project operation listed in this report will be lost unless an alternative commercial centre will be established around the proposed area.

7 MITIGATION MEASURES

7.1 Introduction

The proponent of the proposed project acknowledges the fact that the proposed project activities will have some impacts on the biophysical environment, health and safety of its employees and members of the public, and socio economic wellbeing of the local residents. Thus, the main focus will be on reducing the negative impacts and maximizing the positive impacts associated with the project activities through a programme of continuous improvement.

An ESMP is developed (Chapter 8) to assist the proponent in mitigating and managing environmental impacts associated with the life cycle of the project.

7.2 Proposed mitigation measures

The Proposed Mitigation measures are:

7.2.1 Construction Phase

7.2.1.1 Air quality

Controlling dust during construction is useful in minimizing nuisance conditions. It is recommended that a standard set of feasible dust control measures be implemented for all construction activities. Emissions of other contaminants (NO_x, CO₂, SO_x, and diesel related PM_{B10B}) that would occur in the exhaust from heavy equipment are also included. The proponent is committed to implementing measures that shall reduce air quality impacts associated with construction. All personnel working on the project will be trained prior to starting construction on methods for minimizing air quality impacts during construction. This means that construction workers will be trained regarding the minimization of emissions during construction. Specific training will be focused on minimizing dust and exhaust gas emissions from heavy construction vehicles. Construction vehicle drivers will be under strict instructions to minimize unnecessary trips, and minimize idling of engines.

Dust emissions will be controlled by the following measures:

- Watering all active construction areas as and when necessary to lay dust.
- Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Apply water when necessary, or apply (non-toxic) dust/soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Use of dust nets during construction of buildings.
- Sweep daily (with physical sweepers) all paved access roads, parking areas and staging areas at construction sites.

- Fast growing trees will be planted around the project area to act as a wind breaks to reduce the uplift of particulate matter that lead to respiratory diseases.

The following mitigation measures are recommended to control effects of project on air quality and human health:

- Provide personnel with PPE&C such as dust masks, boots among others. Mechanism should be put in place to ensure PPE&C are specific for the activities at hand and are always worn within the project sites;
- The stockpiles of earth generated during construction works, unpaved access roads and areas used for handling fine construction materials should be palliated with water regularly in order to suppress evolution of particles;
- All machinery and equipment should be maintained in good working condition in order to minimize emissions to acceptable standards;
- Train construction and delivery truck drivers on pre-cautionary measures that enable curb emissions for example advise on techniques to reduce dust evolution especially when driving in areas of dense human settlement or nearing the project site to avoid creating dusty conditions; techniques to conserve fuel and reduce emission by switching off the engines when vehicles are idling;
- Vehicle idling time shall be minimized,
- Alternatively fuelled construction equipment shall be used where feasible in order to reduce pollutants,
- No burning of materials should be permitted at the project site;
- Limit traffic movement within the earmarked project areas.

This will also be achieved through proper planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road.

7.2.1.2 Minimize the effects of noise and vibrations emitted from the site

Significance of noise impacts depends on whether the project would increase noise levels above the existing ambient levels by introducing new sources of noise. Noise impacts would be considered significant if the project would result in the following:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies,
- Exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels,
- A substantial permanent increase in ambient noise levels (more than five dBA) in

the project vicinity above levels existing without the project,

- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The proponent shall put in place several measures that will mitigate noise pollution arising during the construction phase. The following noise-suppression techniques will be employed to minimize the impact of temporary construction noise at the project site;

- Install portable barriers to shield compressors and other small stationary equipment where necessary,
- Use quiet equipment (i.e. equipment designed with noise control elements),
- Co-ordinate with relevant agencies regarding all construction activities in the nearby residential areas,
- Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance,
- Using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines,
- Avoiding or minimizing project transportation through community areas,
- Install sound barriers for pile driving activity,
- Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible,
- Construction/Demolition works should be done during the day when people are away and also the outside environment is also noisy,
- Adhere to the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 regarding noise limits at the workplace.

7.2.1.3 Minimization of construction waste

It is recommended that construction waste be recycled or reused to ensure that materials that would otherwise be disposed of as waste are diverted for productive uses. In this regard, the proponent is committed to ensuring that construction materials left over at the end of construction will be used in other projects rather than being disposed of. In addition, damaged or wasted construction materials including plumbing and lighting fixtures, will be recovered for refurbishing and use in other projects. Such measures will involve the sale or donation of such recyclable/reusable materials to construction companies, local community groups, institutions and individual residents or homeowners.

The proponent shall put in place measures to ensure that construction materials requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal.

It is further recommended that the proponent should consider the use of recycled or refurbished construction materials. Purchasing and using once-used or recovered construction materials will lead to financial savings and reduction of the amount of construction debris disposed of as waste.

Additional recommendations for minimization of solid waste during construction of the project include: -

- i. Use of durable, long- lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time
- ii. Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements
- iii. Purchase of perishable construction materials such as paints incrementally to ensure reduced spoilage of unused materials
- iv. Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste
- v. Use of construction materials containing recycled content where possible and in accordance with accepted standards.

7.2.1.4 Solid Waste and Excavated material

Containers, cement bags and other packaging materials are likely to be produced during the construction phase. Materials from excavation like debris and rocks will be generated. If these materials are not recycled or put into good use, they will be nuisance to the environment.

Mitigations

- Soil and earth excavated wastes to be used for landscaping.
- Plant matter including grass and shrubs disposed of in appropriate locations without compromising the environment and community at the recipient areas,
- Waste materials should be segregated/ separated i.e. Scrap metals, wood, non-biodegradable, tins and cans etc. and recycled where possible.
- The chips waste and fines should be reduced at source by sound design and operations

- Skips and bins should be strategically placed within the construction site. The ratio of skips/bins to worker needs to be determined to ensure that the sewage and disposal facility is adequate.
- The skips and bins at the construction site should be emptied regularly to prevent overfilling.
- Disposal of the contents of the skips and bins should be done at an approved disposal site and by a licensed waste handler.
- Provide portable sanitary conveniences for the construction workers for control of sewage waste. A ratio of approximately 15 workers per chemical toilet should be used.

7.2.1.5 Minimisation of Soil Erosion

The Proponent will put in place some measures aimed at minimizing soil erosion and associated sediment release from the project site during construction. These measures will include terracing and levelling the project site to reduce run-off velocity and increase infiltration of rain water into the soil. In addition, construction vehicles will be restricted to designated areas to avoid soil compaction within the project site, while any compacted areas will be ripped to reduce run-off.

Other Recommended soil erosion management approaches include:

- i. Reducing or preventing erosion by:
 - Scheduling to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical,
 - Contouring and minimizing length and steepness of slopes,
 - Mulching to stabilize exposed areas,
 - Re-vegetating areas promptly,
 - Designing channels and ditches for post-construction flows,
 - Lining steep channel and slopes (e.g. use jute matting).
- ii. Reducing or preventing off-site sediment transport through use of settlement ponds, silt fences, and water treatment, and modifying or suspending activities during extreme rainfall and high winds to the extent practical.

7.2.1.6 Worker accidents and hazards when handling hazardous materials and wastes

Adequate collection and storage of hazardous waste on site and safe transportation to the disposal sites and disposal methods at designated area shall be provided. In addition, the proponent is committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Health and Safety Act, 2007. In this regard, the proponent is committed to provision of appropriate personal protective equipment, as well as ensuring a safe and healthy environment for construction workers as outlined in the ESMP.

The presence of hazardous substances in or on building materials (e.g., polychlorinated biphenyls) should be assessed, decontaminate or properly managed contaminated building materials.

7.2.1.7 Controlling hazardous spillage

The proponent will control the dangers of oil, grease and fuel spills during construction by maintaining the machinery in specific areas designed for this purpose. Machinery site repair will be discouraged and repair work restricted to only approved garages to avoid pollution from oil, grease and fuel.

Other measures to be taken include;

- Providing adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids,
- Using impervious surfaces for refueling areas and other fluid transfer areas,
- Training workers on the correct transfer and handling of fuels and chemicals and the response to spills,
- Providing portable spill containment and cleanup equipment on site and training in the equipment deployment.

7.2.1.8 Minimization of vegetation disturbance

Clearance of part of the vegetation at the project site to pave way for construction will be inevitable. However, the proponent will ensure proper demarcation of the project area to be affected by the construction works. This will be aimed at ensuring that any disturbance to flora and fauna is restricted to the actual project area and avoid spill over effects on the neighbouring areas. In the same vein, there will be strict control of construction vehicles to ensure that they operate only within the area to be disturbed by access routes and other works.

Another important measure aimed at reducing disturbance of vegetation in the project area will be preservation of individual trees within the site. In addition, the proponent is committed to re-vegetation of some of the disturbed areas through implementation of a well-

designed landscaping programme. It is recommended that part of the topsoil excavated from the construction site be re-spread in areas to be landscaped to enhance plant growth. The Proponent shall undertake the project with areas re-vegetated as required in the site-landscaping programme.

7.2.1.9 Habitat Loss, Alteration and Fragmentation

Clearance of part of the vegetation at the site to pave way for the proposed commercial centre Development will be inevitable. However, the proponent will ensure proper demarcation of the area to be affected by the construction works. This will be aimed at ensuring that any disturbance to flora and fauna is restricted to the actual project area and that nesting grounds are not interfered with.

The construction of the proposed development should observe minimal and selective removal of the existing vegetation covers. Selective habitat clearing reduces the risk for loss of key habitat species and nesting sites for local bird species. It also allows for regeneration. In the long run, this will ensure minimal disturbance on fauna in their natural movement, territorial occupation and other ecological process.

7.2.1.10 Security

The proponent should integrate both physical and technological security solutions to provide advanced security surveillance system that include controlled ingress and egress into construction site. This includes CCTV cameras, vehicle scanning systems, National Police Service that is linked to a response unit and private security. The project should be inclusive of a police unit. A risk analysis should be carried out and a security master plan designed.

7.2.1.11 Public Health, safety and Awareness

Public health and safety at the proposed site should be ensured throughout the construction period. Creation of awareness for the same should also be done on a regular basis. The recommendations for public health and safety include the following.

- i. The contractor should provide a small section of the construction site with a shed and a water stand where the food can be served to the construction workers to promote hygiene and health of the employees.
- ii. A fully equipped first aid kit should be provided at the site.
- iii. The contractor must have workmen's compensation cover as required by law (The Work Injury Benefits Act), as well as relevant ordinances, regulation and union's agreements.
- iv. The workers, immediate neighbour and other stakeholders should be sensitized on the dangers and risk associated with the construction works for enhanced self-responsibility on personal safety.

- v. The proponent should ensure that the work site and buildings are fitted with safety facilities including fire detectors, firefighting equipment, fire exits, adequate access and buffer between the residential premises.
- vi. Disabled access features and safety signage should be placed strategically around and within the buildings.
- vii. Appropriate sanitation conveniences should be provided at the site as required in the OSHA, 2007 and echoed in the Public Health Act.

7.2.1.12 Community Health and Safety

Projects should implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction. Risks may arise from inadvertent or intentional trespassing, including potential contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction, or excavations and structures which may pose falling and entrapment hazards. Risk management strategies may include:

- Restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community,
- Removing hazardous conditions on construction sites that cannot be controlled effectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials.

7.2.1.13 Occupational Health and Safety

a) Over-exertion

Over-exertion, and ergonomic injuries and illnesses, such as repetitive motion, over-exertion, and manual handling, are among the most common causes of injuries in construction sites. Recommendations for their prevention and control include:

- Training of workers in lifting and materials handling techniques in construction projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary,
- Planning work site layout to minimize the need for manual transfer of heavy loads,
- Selecting tools and designing work stations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable work stations,

- Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks.

b) Slips and Falls

Slips and falls on the same elevation associated with poor housekeeping, such as excessive waste debris, loose construction materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at construction sites. Recommended methods for the prevention of slips and falls from, or on, the same elevation include:

- Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths,
- Cleaning up excessive waste debris and liquid spills regularly,
- Locating electrical cords and ropes in common areas and marked corridors,
- Use of slip retardant footwear.

c) Work at Heights

Falls from elevation associated with working with ladders, scaffolding, and partially built or demolished structures are among the most common cause of fatal or permanent disabling injury at construction or decommissioning sites. If fall hazards exist, a fall protection plan should be in place which includes one or more of the following aspects, depending on the nature of the fall hazard;

- Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 200 pounds, when working at heights equal or greater than two meters or at any height if the risk includes falling into operating machinery, into water or other liquid, into hazardous substances, or through an opening in a work surface,
- Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 5000 pounds, as well as fall rescue procedures to deal with workers whose fall has been successfully arrested. The tie in point of the fall arresting system should also be able to support 5000 pounds,
- Use of control zones and safety monitoring systems to warn workers of their proximity to fall or when in hazard zones, as well as securing, marking, and labeling covers for openings in floors, roofs, or walking surfaces.

d) Struck by Objects

Construction activities may pose significant hazards related to the potential fall of materials or tools, as well as ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes, and extremities. Techniques for the prevention and control of these hazards include:

- Using a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels,
- Conducting sawing, cutting, grinding, sanding, chipping or chiseling with proper guards and anchoring as applicable,
- Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap,
- Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged,
- Evacuating work areas during blasting operations, and using blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures,
- Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes.

e) Moving Machinery

Vehicle traffic and use of lifting equipment in the movement of machinery and materials on a construction site may pose temporary hazards, such as physical contact, spills, dust, emissions and noise. Heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. Center-articulated vehicles create a significant impact or crush hazard zone on the outboard side of a turn while moving. Techniques for the prevention and control of these impacts include:

- Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-men wearing high-visibility vests or outer clothing covering to direct traffic,
- Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and training of workers to verify eye contact with equipment operators before approaching the operating vehicle,
- Ensuring moving equipment is outfitted with audible back-up alarms,
- Using inspected and well-maintained lifting devices that are appropriate for the

load, such as cranes, and securing loads when lifting them to higher job-site elevations.

f) Dust

- Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements,
- PPE, such as dusk masks, should be used where dust levels are excessive.

g) Confined Spaces and Excavations

Examples of confined spaces that may be present in construction sites include: silos, vats, hoppers, utility vaults, tanks, sewers, pipes, and access shafts. Ditches and trenches may also be considered a confined space when access or egress is limited. The occupational hazards associated with confined spaces and excavations in construction and decommissioning sites should be prevented according to the following recommendations:

- Controlling site-specific factors which may contribute to excavation slope instability including, for example, the use of excavation dewatering, side-walls support, and slope gradient adjustments that eliminate or minimize the risk of collapse, entrapment, or drowning,
- Providing safe means of access and egress from excavations, such as graded slopes, graded access route, or stairs and ladders,
- Avoiding the operation of combustion equipment for prolonged periods inside excavations areas where other workers are required to enter unless the area is actively ventilated.

h) Other Site Hazards

Construction sites may pose a risk of exposure to dust, chemicals, hazardous or flammable materials, and wastes in a combination of liquid, solid, or gaseous forms, which should be prevented through the implementation of project specific plans and other applicable management practices, including:

- Use of specially trained personnel to identify and remove waste materials from tanks, vessels, processing equipment or contaminated land as a first step in activities to allow for safe excavation, construction, dismantling or demolition,
- Use of specially trained personnel to identify and selectively remove potentially hazardous materials in building elements prior to dismantling or demolition including, for example, insulation or structural elements containing asbestos and

- Polychlorinated Biphenyls (PCBs), electrical components containing mercury,
- Use of waste-specific PPE based on the results of an occupational health and safety assessment, including respirators, clothing/protective suits, gloves and eye protection.

7.2.1.14 Worker accidents during construction and operation

Project management will provide first aid and possibly primary health care services to staff and crew. Emergency and serious cases can be sent to the most accessible clinics and hospitals. Workers accidents especially in deep trenching operations and other confined spaces shall be mitigated by enforcing adherence to safety procedures and preparing contingency plan for accident response in addition safety education and training shall be emphasized.

7.2.1.15 Disease Prevention

a) Possible exposure of workers to diseases

Possible exposure of workers to diseases from building materials at construction site shall be mitigated by occupational health and safety standards enforcement as required in the OSHA, 2007.

b) Communicable Diseases

Communicable diseases pose a significant public health threat worldwide. Health hazards typically associated with large development projects are those relating to poor sanitation and living conditions, sexual transmission and vector-borne infections. Communicable diseases of most concern during the construction phase due to labour mobility are sexually-transmitted diseases, such as HIV/AIDS. Recognizing that no single measure is likely to be effective in the long term, successful initiatives typically involve a combination of behavioural and environmental modifications.

Recommended interventions at the project level include;

- a) Providing surveillance and active screening and treatment of workers,
- b) Preventing illness among workers in local communities by:
 - Undertaking health awareness and education initiatives, for example, by implementing an information strategy to reinforce person-to-person counseling addressing systemic factors that can influence individual behavior as well as promoting individual protection, and protecting others from infection, by encouraging condom use,
 - Training health workers in disease treatment,
 - Conducting immunization programs for workers in local communities to improve

- health and guard against infection,
- Providing health services,
- c) Providing treatment through standard case management in on-site or community health care facilities. Ensuring ready access to medical treatment, confidentiality and appropriate care, particularly with respect to migrant workers,
- d) Promoting collaboration with local authorities to enhance access of workers' families and the community to public health services and promote immunization.

c) *Vector-Borne Diseases*

Reducing the impact of vector-borne disease on the long-term health of workers is best accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease. Project sponsors, in close collaboration with community health authorities, can implement an integrated control strategy for mosquito and other arthropod-borne diseases that might involve:

- Prevention of larval and adult propagation through sanitary improvements and elimination of breeding habitats close to human settlements,
- Elimination of unusable impounded water,
- Increase in water velocity in natural and artificial channels,
- Considering the application of residual insecticide to dormitory walls,
- Implementation of integrated vector control programs,
- Promoting use of repellents, clothing, netting, and other barriers to prevent insect bites,
- Use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs,
- Monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread,
- Collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects,
- Educating project personnel and area residents on risks, prevention, and available treatment,
- Monitoring communities during high-risk seasons to detect and treat cases,
- Distributing appropriate education materials,
- Following safety guidelines for the storage, transport, and distribution of pesticides to minimize the potential for misuse, spills, and accidental human exposure.

7.2.1.16 Increased runoff

Increased run off from paved grounds causing extreme flooding and overflows of drainage systems shall be mitigated. Surface runoff water shall be harvested and stored in underground reservoir for reuse. A Storm Water Management Plan that minimizes impervious area runoff by use of recharge areas and use of detention and/or retention with graduated outlet control structures will be designed.

Recommended water system management approaches include:

a) Clean runoff management

- Segregating or diverting clean water runoff to prevent it mixing with water containing high solids content, to minimize the volume of water to be treated prior to release.

b) Road design

- Limiting access road gradients to reduce runoff-induced erosion,
- Providing adequate road drainage based on road width, surface material, compaction, and maintenance

c) Structural (slope) stability

- Providing effective short term measures for slope stabilization, sediment control and subsidence control until long term measures for the operational phase can be implemented,
- Providing adequate drainage systems to minimize and control runoff.

7.2.1.17 Minimization of water use

The proponent shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water use. The proponent will install water-conserving automatic taps and toilets. Moreover, any water leaks through damaged pipes and faulty taps will be fixed promptly by qualified staff.

7.2.1.18 Waste water Management

Construction activities may include the generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved. Adequate portable or permanent sanitation and lavatory facilities serving all workers should be provided at all construction sites. Sanitary wastewater in construction and other sites should be well managed and where collection is required to be done by licensed liquid waste handlers/collectors.

7.2.1.19 Reduction of energy consumption

The proponent shall ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. In addition, proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. Complementary to these measures, the proponent shall monitor energy use during construction and set targets for reduction of energy use.

7.2.1.20 Minimize traffic related impacts

Traffic safety should be promoted by all project personnel during disarticulation to and from the workplace, and during operation of project equipment on private or public roads. Prevention and control of traffic related injuries and fatalities should include the adoption of safety measures that are protective of project workers and off road users, including those who are most vulnerable to road traffic accidents.

This can be achieved through proper planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road. By implementing the Traffic Management Plan, most of these impacts will be reduced significantly. Recommendations include;

- Warning signs, aimed at both drivers and other road users, to highlight hazards will be erected along the Mombasa-Malindi highway,
- Demarcated pedestrian crossings will be established at appropriate points where necessary,
- Barriers to separate vulnerable road users (pedestrians and cyclists) from vehicle traffic in high-risk areas will be considered in the project area.

Road safety initiatives proportional to the scope and nature of project activities should include:

- a) Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. Measures should include:
 - Emphasizing safety aspects among drivers,
 - Improving driving skills and requiring licensing of drivers,
 - Adopting limits for trip duration and arranging driver rosters to avoid overtiredness,
 - Avoiding dangerous routes and times of day to reduce the risk of accidents,
 - Use of speed control devices (governors) on trucks, and remote monitoring of driver actions.
- b) Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, recommended measures include:

- c) Minimizing pedestrian interaction with construction vehicles,
- d) Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present.
- e) Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns),
- f) Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents,
- g) Using locally sourced materials, whenever possible, to minimize transport distances.
- h) Locating associated facilities such as worker camps close to project sites and arranging for workers' bus transport to minimizing external traffic.
- i) Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions

7.2.1.21 Ensure presence of Vegetation Cover

Limited vegetation removal and clearing will complement the efforts on screen planting and landscaping through re-vegetation, which will lead to improved visual quality of the area.

It is expected that the developer will carry out thorough species selection to avoid introduction of invasive species during landscaping and establishment of green areas within the proposed development.

7.2.1.22 Introduction of Invasive Species

The trees within the proposed site will be preserved within the development. Due to this minimal flora species will be introduced. Where there will be need to plant additional trees/plants, it is expected that the developer will carry out thorough species selection to avoid introduction of invasive species during landscaping and establishment of green areas within the proposed development. It is recommended that indigenous species will be used.

7.2.1.23 Mushrooming Food Kiosks and Informal settlements

Proper planning during the construction phase should be carried out by the contractor and/or proponent in liaison with Kilifi County's planning department. The proponent should develop a good construction plan that provides for sufficient workers' accommodation, workers' changing rooms, a shade where the workers can have their meals and have safe drinking water.

7.2.1.24 Reduction of impacts at extraction sites and efficient use of raw materials

The proponent will source construction materials such as sand, ballast and hard core from registered quarry and sand mining firms, whose projects have undergone satisfactory environmental impact assessment/audit and received NEMA approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are considerably well mitigated.

To reduce the negative impacts on availability and sustainability of the materials, the proponent will only order for what will be required through accurate budgeting and estimation of actual construction requirements. This will ensure that materials are not extracted or purchased in excessive quantities. Moreover, the proponent will ensure that wastage, damage or loss (through run-off, wind, etc.) of materials at the construction site is kept minimal, as these would lead to additional demand for and extraction or purchase of materials.

In addition to the above measures, the proponent shall consider reuse of building materials and use of recycled building materials where applicable. This will lead to reduction in the amount of raw materials extracted from natural resources as well as reducing impacts at the extraction sites.

7.2.1.25 Aviation Related issues

To ensure aviation safety at Vipingo Airstrip, the proponent is not going to construct or put up any tall building or structure. No high-rise buildings or structures will be developed at the proposed site and/or under a flightpath.

The proponent should also ensure proper construction plan and site organisation are well in place. Through this, dust control measures as described in section 7.2.1.1 and in the proposed ESMP.

All waste bins should be scavenger proof to ensure birds such as the marabou stork (*Leptoptilos crumenifer*) are not attracted to the proposed area of development.

The proponent should put up proper measures of control at any excavation sites to ensure ponding and/or flooding does not occur. This is to prevent bird baths from forming in the proposed site.

7.2.1.26 Involvement of the Elderly and Vulnerable Groups in the Project

Communities in areas of development should be given the maximum opportunity to participate in development policies, plans and programmes. Participation, here, does not simply mean being involved in the construction of facilities, it means contributing ideas, making decisions and taking responsibility.

With its promise to “leave no one behind”, the Post-2015 agenda (*UNDP,2016*) now marks an unprecedented opportunity to include ageing populations in future actions for sustainable development. In addition to the emphasis on marginalized groups, the Sustainable Development Goals (SDGs) directly address the concerns of older women, including: targets that lift historic age-caps on data collection for gender-based violence (Goal 5); specifying the right to health “for all at all ages” (Goal 3); promoting “lifelong” learning (Goal 6); encouraging the development of sustainable, inclusive, and accessible urban environments, including for older persons (Goal 11); and, on reducing all forms of violence, including physical, psychological, or sexual violence, among all persons, regardless of age (Goal 16).

Ending poverty in old age will require an expansion of social protection provisions and benefits (*ILO 2014*), inclusion in the formal labour markets, broader opportunities based on older persons’ skills, knowledge and experience, and acknowledging (and compensating for) the unpaid services provided by them. Significant efforts to promote decent work for all should be accompanied by measures to strengthen the ability of older persons to maintain an adequate standard of living independent of their family status and labour market trajectories. Initiatives and investments to enable older persons to access services such as health, care, transport and housing are also needed.

Below are some of the identified solutions on how to involve the vulnerable groups, including the elderly in the proposed project, during the Focussed Group Discussions (FDGs):

a) Health Support programmes

The proponent can support the elderly (35-60) years through offering health support for instance free clinics and check-ups, supporting the health centres in Vipingo area through sponsorship of medical supplies, drugs and various community health programmes.

b) Food support programmes for purposes of sustainability

In supporting the small scale farmers in the local area to produce more and healthy agricultural products contributes to combating food shortage and poverty. In the long run, the farmers will become sufficient enough to a point of supplying their products to the future occupants of the proposed development. The local crops include but not limited to; maize, cow peas, green grams, coconuts and various fruits.

c) Support can be offered through providing farming extension services to increase food production in the area targeting the elderly and vulnerable groups.

d) The proponent can also develop/construct an open market along highway B8 where the elderly and vulnerable groups can sell their local produce.

e) Support can also be offered to empower the elderly and vulnerable groups in the area to do basketry and handcrafts for instance using sisal from the sisal plantation in the area.

- f) Experienced elders can also be selected to work in the project so as to provide technical skills during construction. The proponent should continue to carry out an inventory of the same in the area.
- g) During operation, those aged between 35-60 can be employed to provide security services.
- h) The proponent can also issue specific tenders to specifically target the elderly and vulnerable groups.
- i) The elderly and vulnerable group in the area also practice fishing from the Indian Ocean. They can be supported through provision of fishing gears to enable them carry out deep sea fishing.
- j) Special programmes should be developed for the vulnerable groups to ensure continued productivity and involvement throughout the development.

7.2.2 Operation Phase

7.2.2.1 Increased pressure on the existing infrastructure

It is recommended that the proponent should liaise closely with other development partners and Government/Council Departments to upgrade the existing shared facilities including roads, water distribution systems etc. It is also prudent to note that the Mombasa – Malindi highway adjacent the proposed site is set to be expanded to be a dual highway. Clearing of illegal structures on its road reserve has already been done. The proponent should as well explore alternative means which are environmentally sound like employing the Green Energy Technologies when and where applicable like the proposed use of Solar Panels in water heating among others. This will rather reduce the over dependence on fossils based energy sources which are arguably presently threatened. The idea of having a borehole to facilitate the construction phase is also a way of relieving an existing water supply system.

7.2.2.2 Minimisation of Air Pollution

The proponent will ensure a proper solid and liquid waste management system is available and functional to ensure its control. This will ensure nuisance from mismanaged solid and liquid waste such as bad odours and blocked drainages will be non-existent.

7.2.2.3 Hydrology and water quality degradation

Several measures shall be put in place to mitigate the impacts that are likely to lead to hydrology and water quality degradation. The proponent will prepare a hazardous substance control and emergency response plan that will include preparations for quick and safe clean-up of accidental spills. It will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response programme to ensure quick and safe clean-up of accidental spills. The plan will

identify areas where refuelling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted.

Recommended water system management approaches include:

- Depending on the potential for adverse impacts, installing free-spanning structures (e.g., single span bridges) for road watercourse crossings,
- Restricting the duration and timing of in-stream activities to lower low periods, and avoiding periods critical to biological cycles of valued flora and fauna (e.g., migration, spawning, etc.),
- For in-stream works, using isolation techniques such as berming or diversion during construction to limit the exposure of disturbed sediments to moving water,
- Consider using trenchless technology for pipeline crossings (e.g., suspended crossings) or installation by directional drilling.

7.2.2.4 Wastewater management

The proponent will ensure that there are adequate means for handling the large quantities of waste water generated from the commercial centre development. It will also be important to ensure that sewage pipes are not blocked or damaged so that the waste can be delivered to the recommended waste water treatment plant since such vices can lead to release of the effluent, resulting in land and water contamination. Such blockages or damages will be fixed expeditiously. Wastewater shall be disposed in compliance with the provisions of the Environmental Management and Coordination (Water Quality), Regulations 2006.

7.2.2.5 Ensure general safety

Street lighting to be done and a security lighting system installed. A competent security firm may be engaged to ensure the general safety and security at all times within and around the residential development. The proponent should also consider putting up a security plan and policy.

7.2.2.6 Ensuring efficient solid waste management

The proponent will be responsible for efficient management of solid waste generated by the project during its operation. In this regard, the proponent will provide waste handling facilities such as waste bins and skips for temporarily holding domestic waste generated at the site. In addition, the proponent will ensure that such are disposed of regularly and appropriately. It is recommended that the proponent puts in place measures to ensure that the users of the proposed development units manage their waste efficiently through recycling, reuse and proper disposal procedures.

A lot of solid wastes will be generated from the proposed commercial centre. An integrated solid waste management system is recommendable.

First, the proponent will give priority to Reduction at Source of the materials. This option will demand a solid waste management awareness programme in the management and occupants.

Secondly, Recycling, Reuse and compositing of the waste will be the second alternative in priority. This will call for a source separation programme to be put in place. The recyclables will be sold to authorized waste buyers.

The third priority in the hierarchy of options is combustion of the waste that is not recyclable in order to produce energy.

Finally, sanitary landfilling will be the last option for the proponent to consider.

The proponent will adhere to the Environmental Management and Coordination (Waste Management), Regulations 2006.

7.2.2.7 Ensure efficient energy consumption

The proponent plans to install an energy-efficient lighting system in the proposed commercial centre development. This will contribute immensely to energy saving during the operational phase of the project. In addition, occupants of the proposed development will be sensitized to ensure energy efficiency in their operations. To complement these measures, it will be important to monitor energy use during the operation of the proposed project and set targets for efficient energy use.

7.2.2.8 Ensure efficient water use

The proponent will install water-conserving automatic taps and toilets. Moreover, any water leaks through damaged pipes and faulty taps will be fixed promptly by qualified staff. In addition, the occupants of the residential development will be sensitized to use water efficiently.

7.2.2.9 Competition in terms of water resources and other utilities

The proponent has plans to use a borehole for construction purposes; in effect they will not take water from the community. The proponent plans to use a desalination plant to supply water to the proposed commercial centre.

A rain water harvesting system should also be put in place to collect water during the rainy season and storing them in either above-ground storage tanks or underground storage containers. This can be used for various uses such as cleaning, gardening or landscaping.

7.2.3 Decommissioning Phase

7.2.3.1 *Efficient solid waste management*

Solid waste resulting from demolition or dismantling works will be managed as described in Sections 7.2.1.3, 7.2.1.4, 7.2.2.6.

7.2.3.2 *Reduction of Dust Concentration*

High levels of dust concentration resulting from demolition or dismantling works will be minimized as described in Section 7.2.1.1.

7.2.3.3 *Air Pollution Management*

Open burning of solid wastes, whether hazardous or nonhazardous, is not considered good practice and should be avoided, as the generation of polluting emissions from this type of source cannot be controlled effectively.

Selectively removing potential hazardous air pollutants from existing infrastructure prior to demolition.

7.2.3.4 *Minimization of Noise and Vibration*

Noise abatement measures will be taken within the decommissioning site including scheduling working time. Significant impacts on the acoustic environment will be mitigated as described in Section 7.2.1.2.

7.2.3.5 *Waste water Management*

Decommissioning activities may include the generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved. This will be managed as described in Section 7.2.1.18.

7.2.3.6 *Hazardous Spill Management*

The contents of hazardous materials and petroleum-based products in building systems (e.g. PCB containing electrical equipment, asbestos-containing building materials) should be assessed and removed prior to initiation of decommissioning activities, and managing their treatment and disposal.

7.2.3.7 *Occupational Health and Safety*

Impacts on Occupational Health and Safety will be mitigated as described in Section 7.2.1.13.

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN TO THE PROPOSED DEVELOPMENT.

8.1 Introduction

The proponent of the proposed project acknowledges the fact that the proposed project activities will have some impacts on the biophysical environment, health and safety of its employees and members of the public, and socio economic well-being of the local residents. Thus, the main focus will be on reducing the negative impacts and maximizing the positive impacts associated with the project activities through a program of continuous improvement.

The actions have been grouped according to the various phases of the project cycle i.e. Construction, Operation, and Decommissioning. This categorization shall improve the implementation of the suggested mitigation measures throughout the project cycle. Each phase has a distinct set of activities that will need to be undertaken. An environmental and social management plan (ESMP) has been developed to assist the proponent in mitigating and managing environmental impacts associated with the life cycle of the project. The ESMP has been developed to provide a basis for an Environmental Management System (EMS; ISO 14001 principles) for the project. It is noteworthy that key factors and processes may change through the life of the project and considerable provisions have been made for dynamism and flexibility of the ESMP. As such, the ESMP will be subject to a regular regime of periodic review.

In general, the tables below outline the potential safety, health and environmental risks associated with the project and detail all the necessary mitigation measures, their financial costs, as well as the persons responsible for their implementation and monitoring. The ESMP will be used as checklist in future environmental audits.

8.2 Purpose of an ESMP

The purpose of the ESMP is to ensure the proponent has a predetermined set of compliance guidelines to ensure that the project is carried out safely and; environmental concerns and laid down guidelines are observed. It also ensures that social and environmental impacts and risks identified during the ESIA process are effectively managed during the construction, operation and decommissioning phases of the Project. The ESMP specifies the mitigation and management measures to which the Proponent is committed to and shows how the Project will mobilize organizational capacity and resources to implement these measures.

8.3 Construction Phase Environmental Management Plan

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the construction phase the proposed project are outlined in **Table 2 below**.

Table 2: ESMP for the Construction Phase of the proposed project

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
1. Minimize extraction site impacts and ensure efficient use of raw materials in construction				
High Demand of construction raw materials	Source building materials from local suppliers who use environmentally friendly processes in their operations	Project Management Team & Contractor	Throughout construction period	0
	Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered	Project Management Team & Contractor	Throughout construction period	500,000
	Ensure that damage or loss of materials at the construction site is kept minimal through proper storage.	Project Management Team & Contractor	Throughout construction period	200,000
	Use at least 5%-10% recycled, refurbished or salvaged materials to reduce the use of raw materials and divert material from landfills	Project Management Team & Contractor	Throughout construction period	0
2. Minimize vegetation and Faunal disturbance at and or around construction site				
Vegetation/biodiversity disturbance	Ensure proper demarcation and delineation of the project area to be affected by construction works.	Contractor, Civil engineer & Project Management Team	1 month	100,000
	Specify locations for trucks and equipment, and areas of the site which	Contractor	1 month	0

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	should be kept free of traffic, equipment, and storage			
	Designate access routes and parking within the site	Civil Engineer, Architect and Project Manager	1 month	80,000
	Introduction of vegetation (trees, shrubs and grass) on open spaces and their maintenance	Architect & Landscape specialist	Monthly to Annually	250,000
	Design and implement an appropriate landscaping programme to help in re-vegetation of part of the project area after construction	Architect & Landscape specialist	2 months	350,000
3. Reduce storm-water, runoff and soil erosion				
Increased storm water, runoff and soil erosion	Consider harvesting and recycling storm water for utilization within the project site. Disposal of storm water that will not be harvested will be via surface drain off.	The Civil Engineer, Mechanical Engineer and Project Manager	1 month	200,000
	Apply soil erosion control measures such as levelling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil.	The Civil Engineer, Mechanical Engineer and Project Manager	1 months	

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the project site	Contractor	Throughout construction period	
	Ensure that any compacted areas are ripped to reduce run-off.	Contractor	2 months	
	Open drains all interconnected will be provided on site	Civil Engineer	Throughout construction period	70,000 per unit
4. Minimize solid waste generation and ensure efficient solid waste management during construction				
Increased solid waste generation	Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3. Composting and reuse 4. Combustion 5. Sanitary land filling	Project Manager & Contractor	Throughout construction period	50,000
	Through accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed rather than cutting them to size, or having large quantities of residual materials	Project Manager & Contractor	One-off	0
	Ensure that construction materials left over at the end of construction will be	Project Manager & Contractor	One-off	0

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	used in other projects rather than being disposed of.			
	Ensure that damaged or wasted construction materials including cabinets, doors, plumbing and lighting fixtures, marbles and glass will be recovered for refurbishing and use in other projects	Project Manager & Contractor	One-off	0
	Donate recyclable/reusable or residual materials to local community groups, institutions and individual local residents or homeowners.	Project Manager & Contractor	One-off	0
	Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time	Project Manager & Contractor	Throughout construction period	-
	Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements	Project Manager & Contractor	One-off	60,000
	Purchase of perishable construction materials such as paints should be done incrementally to ensure reduced spoilage of unused materials	Project Manager & Contractor	Throughout construction period	0

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Use building materials that have minimal or no packaging to avoid the generation of excessive packaging waste	Project Manager & Contractor	Throughout construction period	0
	Use construction materials containing recycled content when possible and in accordance with accepted standards.	Project Manager & Contractor	Throughout construction period	0
	Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at the site	Project Manager, Mechanical Engineer & Contractor	Throughout construction period	0
	Dispose waste more responsibly by dumping at designated dumping sites or landfills only.	Project Manager, Mechanical Engineer & Contractor	Throughout construction period	20,000/ month
	Waste collection bins to be provided at designated points on site	Project Manager, Mechanical Engineer & Contractor	Throughout construction period	40,000
	Private waste disposal company to be contracted to transport and dispose the solid waste from site	Project Management Team, Mechanical Engineer & Contractor	Throughout construction period	

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Running educational campaigns amongst employees, e.g. through use of posters, to encourage reuse or recycling of the solid waste	Contractor	Throughout construction period	
5. Reduce dust emissions				
Dust emission	Ensure strict enforcement of on-site speed limit regulations	Project Management Team & Contractor	Throughout construction period	80,000
	When working in an extremely dry weather ensure adequate dust mitigation measures are in place. This includes dust nets around the construction site.	Project Management Team & Contractor	Throughout construction period	
	Sprinkle water on graded access routes when necessary to reduce dust generation by construction vehicles	Contractor	Throughout construction period	
6. Minimization of exhaust emissions				
Exhaust emission	Vehicle idling time shall be minimized	Contractor	Throughout construction period	0
	Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking	Contractor	Throughout construction period	0

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	areas, and to switch off vehicle engines at these points			
	Alternatively fueled construction equipment shall be used where feasible and equipment shall be properly tuned and maintained	Project Proponent & Contractor	Throughout construction period	As per projects BoQ
7. Traffic Safety				
Obstructed traffic flow and lack of safety during the construction period	<ul style="list-style-type: none"> ▪ No overloading of trucks and. good driving practices to be practiced. ▪ Suitable junction/access point to be provided. ▪ Provision of a suitable access road, ▪ Erect appropriate & legible road signage informing other road users of the nearby construction works. ▪ Employment of formal flagmen / women in order to ensure the public safety. ▪ Ensure that truck drivers are educated on road safety. ▪ Check periodically on drivers by use of tools/equipment such as alco-blow. 	Project Proponent & Contractor	Throughout construction period	200,000
Traffic Congestion	<ul style="list-style-type: none"> ▪ Transport of materials during the traffic off peak hours to avoid possible traffic congestion, ▪ Purchasing of material according to the demand, 	Project Proponent & Contractor	Throughout construction period	

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	<ul style="list-style-type: none"> ▪ Ensuring minimal residence period for trucks mobilizing material on site, ▪ Proper planning during construction period 			
8. Minimization of noise and vibration				
Noise and vibration	Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.	Contractor	Throughout construction period	5,000
	Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, residential areas and hospitals	Project Manager & Contractor	Throughout construction period	5,000
	Ensure that construction machinery are kept in good condition to reduce noise generation	Project Manager & Contractor	Throughout construction period	50,000
	Ensure that all generators and heavy-duty equipment are insulated or placed in enclosures to minimize ambient noise levels	Project Manager & Contractor	Throughout construction period	100,000
	Comply with the provisions of Environmental Management and Coordination (Noise and Excessive	Project Management Contractor	Throughout construction period	0

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Vibration Pollution) (Control) Regulations, 2009 regarding noise limits at the workplace			
9. Minimization of energy consumption				
Increased energy consumption	Ensure electrical equipment, appliances and lights are switched off when not being used	Project Management Team & Contractor	Throughout construction period	0
	Install energy saving fluorescent tubes at all lighting points instead of bulbs which consume higher electric energy	Contractor	Throughout construction period	3,800
	Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts	Project Manager & Contractor	Throughout construction period	9,000
	Monitor energy use during construction and set targets for reduction of energy use.	Project Management Team & Contractor	Throughout construction period	2,400
10. Minimize water consumption and ensure more efficient and safe water use				
High water demand	Install water conserving taps that turn-off automatically when water is not being used	Contractor	One-off	10-40 % higher

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Promote recycling and reuse of water as much as possible	Contractor	Throughout construction period	5,500
	Install a discharge meter at water outlets to determine and monitor total water usage	Contractor	One-off	30,000
	Promptly detect and repair of water pipe and tank leaks	Project Manager & Contractor	Throughout construction period	3,500 per month
	Sensitise staff to conserve water by avoiding unnecessary water use	Project Manager & Contractor	Throughout construction period	2,500
	Ensure taps are not running when not in use	Contractor	Throughout construction period	0
11. Minimize release of liquid effluent				
Generation of wastewater	Provide means for handling sewage generated by construction workers	Contractor	One-off	5,000 per Month
	Conduct regular checks for pipe blockages or damages since such vices can lead to release of the effluent onto land and water bodies	Mechanical Engineer, Contractor &	Throughout construction period	4,000/month

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
		Project Management Team		
	Monitor effluent quality regularly to ensure that the stipulated discharge rules and standards are not violated	Contractor ,Mechanical Engineer & Project Management Team	Throughout construction period	4,000/month
12. Minimize occupational health and safety risks				
Increased risks, hazards, incidents, accidents and dangerous occurrence.	Ensure that all building plans are approved by the Local Authority and the local Occupational Health and Safety Office	Developer	One-off	60,000
	Registration of the premises under the Occupational Safety and Health Act, 2007 Laws of Kenya is mandatory	Developer	One-off	5,000
	A general register should be kept within the facility as stipulated in Sec 122&123 of the Occupational Safety and Health Act, 2007.	Project Management Team & Contractor	One-off	1,500
	There shall be displayed at prominent places within the site the prescribed abstract of the OSHA and the relevant notices as stipulated in section 121 of the OSHA, 2007.	Project Management Team & Contractor	One-off	2,500

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Incidents, accidents and dangerous occurrences.	Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the local Occupational Health and Safety Office (OHSO) are in place.	Project Management Team Developer & Contractor	Continuous	2000/month
	Enforcing adherence to safety procedures and preparing contingency plan for accident response in addition safety education and training shall be emphasized.	The Contractor, Project Manager & Site Safety Officer	Continuous	14,400
	Ensure that the premises are insured as per statutory requirements (third party and The Work Injury Benefit Act No. 13 of 2007)	Developer/ Contractor	Annually	-
	Develop, document and display prominently an appropriate SHE policy for construction works	Project Management Team, Developer & Contractor	One-off	2,500
	Provisions must be put in place for the formation of a Health and Safety Committee, in which the employer and the workers are represented	Contractor & Project Management Team	One-off	5,500

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Increased health risks and issues	Suitable, efficient, clean, well-lit and adequate sanitary conveniences should be provided for construction workers	Contractor	One-off	5,000
	Arrangements must be in place for the medical examination of all construction employees before, during and after termination of employment	Contractor	Continuous	500 per examination
Machinery/equipment safety issues	Ensure that machinery, equipment, personal protective equipment, appliances and hand tools used in construction do comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded	Project Manager, & Contractor	One-off	-
	Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain	Project Management Team & Contractor	Continuous	-
	All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury	Contractor	One-off	-
	Arrangements must be in place to train and supervise inexperienced workers	Contractor	Continuous	5,000 per training

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	regarding construction machinery use and other procedures/operations			
	Equipment such as fire extinguishers must be examined by a government authorized person. The equipment may only be used if a certificate of examination has been issued	Contractor	Continuous	5,000 per examination
	Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register	Project Manager	Continuous	3,000 per examination
Hit/struck by objects	Ensure that materials are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse	Contractor	Continuous	8,000
	Ensure that items are not stored/stacked against weak walls and partitions	Contractor	Continuous	-
Slips and falls	All floors, steps, stairs and passages of the premises must be of sound construction and properly maintained	Project Management Team & Contractor	Continuous	-
	Securely fence or cover all openings on floors	Project Management Team & Contractor	One-off	-

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Provide all staircases within the premises with suitable handrails on both sides	Project Management Team & Contractor	One-off	
	Ensure that construction workers are not locked up such that they would not escape in case of an emergency	Project Management Team & Contractor	Continuous	-
	All ladders used in construction works must be of good construction and sound material of adequate strength and be properly maintained	Project Management Team & Contractor	One-off	-
Dangerous occurrences	Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency	Project Management Team & Contractor	One-off	5,000
	Such procedures must be tested at regular intervals	Project Management Team & Contractor	Every 3 months	5,000
	Ensure that adequate provisions are in place to immediately stop any operations where there is an imminent and serious danger to health and safety and to evacuate workers	Project Manager & Contractor	One-off	8,000
	Ensure that the most current emergency telephone numbers posters are	Project Manager & Contractor	One-off	3,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	prominently and strategically displayed within the construction site			
Injuries	Provide measures to deal with emergencies and accidents including adequate first aid arrangements	Project Management Team & Contractor	Continuous	2,500
	Well stocked first aid box which is easily available and accessible should be provided within the premises	Project Manager & Contractor	One-off	2,800
	Provision must be made for persons to be trained in first aid and firefighting, with certificates issued by a recognized body.	Project Management Team & Contractor	One-off	10,000
13. Ensure the general safety and security of the site and surrounding areas				
Increased Pressure on Infrastructure	Coordinate with other planning goals and objectives for the region	Architect, Project Manager, Contactor and the Developer	Continuous	5,000
	Upgrade existing infrastructure and services, if and where feasible.	Architect, Project Manager, Contactor and the Developer	Continuous	
Insecurity	Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the construction site.	Contractor & Police	Continuous	5,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Body-search the workers on entry, to avoid getting weapons on site, and leaving site to ensure nothing is stolen.	Contractor	Continuous	
	Ensure only authorized personnel get to the site	Contractor	Continuous	
	Security alarms will be installed	Contractor	Continuous	
14. Environmental monitoring of the project				
Environmental concern during the construction phase	Due to the magnitude of the project the proponent will liaise with the environmental consultants throughout the construction phase and ensure that the conditions of approval are adhered to.	Proponent, Contractor and AWEMAC	Throughout construction phase	-

8.4 Operational Phase EMP

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the operational phase of the project are outlined in **Table 3**.

Table 3: ESMP for the Operational Phase of the proposed project

Expected Negative impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
1 Minimization of solid waste generation and ensuring more efficient solid waste management				
Solid waste generation	Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3. Composting and reuse 4. Combustion 5. Sanitary land filling.	Proponent/Property Managers	One-off	10,000/Month
	Provide solid waste handling facilities such as waste bins and skips	Proponent/Property Managers	One-off	3,000
	Ensure that solid waste generated is regularly disposed of appropriately at authorized dumping sites	Proponent/Property Managers	Continuous	5,000/month
	Donate redundant but serviceable equipment to charities and institutions	Proponent/Property Managers	Continuous	0
	Comply with the provisions of Environmental Management and Co-ordination (Solid Waste) Regulations 2006	Proponent/Property Managers	Continuous	0
Hazardous Waste	Design and Implement a Hazardous substance control and emergency response plan	Proponent/ Environmental Consultants.	Continuous	70,000
	Adhere to Waste Management Regulations, 2006 (Legal Notice No. 121)	Proponent/ Property Managers.	Continuous	-
2 Minimize risks of liquid waste release into environment				

Expected Negative impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Waste water release into the environment	Provide adequate and safe means of handling liquid waste at the premises	Proponent/Property Managers	One-off	-
	Conduct regular inspections for pipe blockages or damages and fix appropriately	Proponent/Property Managers	Continuous	1000 per inspection
	Ensure regular monitoring of the sewage discharged from the project to ensure that the stipulated sewage/effluent discharge rules and standards are not violated	Proponent/Property Managers	Continuous	5000
	Design and construct water treatment plant/s so as to recycle wastewater generated from the development.	Proponent/Engineers/Environmental Consultants	Continuous	5,000,000
	Comply with the provisions of Environmental Management and Co-ordination (Water Quality) Regulations 2006	Proponent/Property Managers	Continuous	0
3 Minimize energy consumption				
Energy misuse	Switch off electrical equipment, appliances and lights when not being used	Proponent/Property Managers	Continuous	-
	Install occupation sensing lighting at various locations such as the parking areas which are not in use all the time	Proponent/Property Managers	One-off	10-40 % higher than ordinary lighting

Expected Negative impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Install energy saving fluorescent tubes at all lighting points within the building instead of bulbs which consume higher electric energy	Proponent/Property Managers	One-off	10-40 % higher than ordinary lighting
	Monitor energy use during the operation of the project and set targets for efficient energy use	Proponent/Property Managers	Continuous	3,000/month
	Sensitize workers and the clientele to use energy efficiently	Proponent/Property Managers	Continuous	500/month
4 Minimize water consumption and ensure more efficient and safe water use				
Water mismanagement	Promptly detect and repair of water pipe and tank leaks	Proponent/Property Managers	Continuous	2,000/month
	Clientele and employees to conserve water.	Proponent/Property Managers	Continuous	500/month
	Ensure taps are not running when not in use	Proponent/Property Managers	Continuous	500/month
	Install water conserving taps that turn-off automatically when water is not being used	Proponent/Property Managers	One-off	10-40 % higher than ordinary taps
	Install discharge meters at water outlets to determine and monitor total water usage	Proponent/Property Managers	One-off	Already captured.
5 Minimization of health and safety impacts				

Expected Negative impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Health and safety issues	Implement all necessary measures to ensure health and safety of occupants, tenants, workers, proposed development clientele and the general public during operation of the development as stipulated in the Occupational Safety and Health Act, 2007	Proponent/Property Managers1	Continuous	-
6 Ensure the general safety and security of the premises and surrounding areas				
Insecurity	Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises	Proponent/Property Managers	Continuous	100,000/month
7 Ensure environmental compliance				
Environmental degradation	Undertake an environmental audit within 12 months after operation commences as required by law	Africa Waste and Environment Management Centre Firm of Experts	12 months after operation commences	100,000

8.5 Decommissioning Phase

In addition to the mitigation measures provided in **Tables 2** and **3**, it is necessary to outline some basic mitigation measures that will be required to be undertaken once all operational activities of the project have ceased. The necessary objectives, mitigation measures, allocation of responsibilities, time frames and costs pertaining to prevention, minimization and monitoring of all potential impacts associated with the decommissioning and closure phase of the project are outlined in **Table 4** below.

Table 4: ESMP for the Decommissioning Phase

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
1. Demolition waste management				
Demolition waste generation	Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3. Composting and reuse 4. Combustion 5. Sanitary land filling.	Project Management Team & Contractor	Once-off	10,000
	All buildings, machinery, equipment, structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible	Project Management Team & Contractor	Once-off	10,000
	All foundations must be removed and recycled, reused or disposed of at a licensed disposal site	Project Management Team & Contractor	Once-off	5,000
	Where recycling/reuse of the machinery, equipment, implements, structures, partitions and other demolition waste is not possible, the materials should be taken to a licensed waste disposal site	Project Management Team & Contractor	Once-off	0
	Donate reusable demolition waste to charitable organizations, individuals and institutions	Project Management Team & Contractor	Once-off	0
2. Rehabilitation of project site				

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Site degradation	Implement an appropriate re-vegetation program to restore the site to its original status	Project Management Team & Contractor	Once-off	0
	Consider use of indigenous plant species in re-vegetation	Project Management Team & Contractor	Once-off	0
	Trees should be planted at suitable locations so as to interrupt slight lines (screen planting), between the adjacent area and the development.	Project Management Team & Contractor	Once-off	0

9 ENVIRONMENTAL MONITORING PLAN

Environmental monitoring is an essential component of project implementation. An Environmental Monitoring Plan provides mechanism of monitoring environmental impacts of a project during its execution in order to reduce their negative effects and to introduce standards of good practice to be adopted for all project works. The Environmental Monitoring Plan facilitates and ensures the follow-up of the implementation of the proposed mitigation measures proposed in the ESMP. The parameters of the proposed development that were identified for monitoring include: water quality, air quality, solid waste generation, Occupational Health and Safety risks, livestock/human accidents, HIV/AIDS incidences, soil erosion, storm water drainage, livelihood and environmental risks. These are presented in table 5.

In general, monitoring for the project will include the following:

9.1 Construction phase

- Monitor that occupational health and safety measures are carried out in accordance with relevant Environmental, Health and Safety Guidelines.
- Monitor that impacts from construction such as erosion and sedimentation, solid and sanitary waste disposal, hazardous materials (including fuels and lubricants) management, are being mitigated in accordance with relevant Environmental, Health and Safety Guidelines.
- If applicable, monitor that any cultural heritage that may be found or affected during construction is treated in accordance with relevant guidelines.
- Respond to and record community grievances.
- If applicable, monitor habitat and species impact in accordance with relevant guidelines and/or the Project's biodiversity management plan.

9.2 Operation phase.

- Monitor for potential cumulative impacts.
- Ensure that restoration of any disturbance during construction has occurred.

9.3 Decommissioning phases

- Monitor for potential cumulative impacts.
- Ensure that restoration of any disturbance during construction and operation has occurred.

The table below presents summarized environmental components to be monitored.

Table 5: Environmental Monitoring Plan

Environmental component	Parameters to be monitored	Points to be monitored	Frequency of monitoring	Lab materials equipment's/ other requirements	Responsibility	Cost Kshs.
Occupational health and safety risks	<ul style="list-style-type: none"> ▪ Safety training for workers, ▪ accident reports and records, ▪ number and type of accidents, hazard 	Construction site	Continuous	Incident log- book	Contractor	40,000 per month
Noise pollution	Noise levels during day and night	Construction site Possible noise generation areas e.g. In case of use of generator	continuous	Noise level meter	Contractor and Property Manager	50,000 per month
Water Quality	<ul style="list-style-type: none"> ▪ pH, ▪ Total Suspended Solids (TSS) and Total Dissolved Solids(TDS), ▪ heavy metals, ▪ oils and grease 	Wells and boreholes	Quarterly	Sampling bottles, cooler box, Access to a NEMA accredited laboratory	Contractor and Property Manager	32,000 per quarter
Solid waste generation	<ul style="list-style-type: none"> ▪ Construction waste and organic wastes ▪ Slag, domestic refuse, metallic scraps, sludge, ▪ waste composition, 	Construction and residential site	monthly	Waste sampling bins, plastic bags, boxes, weighing machine	Contractor and Property Manager	20,000 per month

	<ul style="list-style-type: none"> ▪ treatment methods 					
Soil Erosion	<ul style="list-style-type: none"> ▪ Soils eroded, ▪ Turbidity in storm water and other water sources, ▪ sources and causes 	Excavated areas, sloppy areas	Continuous	Camera, field vehicle	Contractor and Property Manger	15,000 per month
Storm Water Drainage	<ul style="list-style-type: none"> ▪ Rainfall volume, ▪ Topography 	Flood prone areas, culverts, water ways, low lying areas	Continuous	Rain-gauge, field survey maps	Contractor and Property Manger	20,000 per month
Traffic incidents and accidents	<ul style="list-style-type: none"> ▪ Safety training for workers, ▪ accident reports and records, ▪ number and type of accidents, hazard ▪ Presence of road safety signs erected on the road. 	Along Mombasa – Malindi highway.	continuous	Incident log book	Contractor	40,000 per month
Air quality and dust emissions	<ul style="list-style-type: none"> ▪ Dust particles, ▪ Particulate matter etc. <p>(TSP, NO_x, SO₂, CO,)</p>	Construction sites Along the road Residential houses near the project site	continuous	Air sampling equipment	Contractor	20,000 Per month
Environmental Risks	<ul style="list-style-type: none"> ▪ Hazardous spills and/or releases. ▪ Fire outbreak 	Possible hazardous areas only	Continuous during operation stage	Incident log book Inspect areas likely to have fire outbreaks	Contractor and property manager	45,000 per month

<p>Epidemiology</p>	<ul style="list-style-type: none"> ▪ Health check-up records, ▪ Training programmes, ▪ number of incidences, ▪ number of condoms distributed, ▪ seminars, and participants trained etc. 	<p>Construction sites, neighbouring towns, villages,</p>	<p>Quarterly</p>	<p>Office and Testing Medical Supplies</p>	<p>Contractor and Property Manger</p>	<p>50,000 per quarter</p>
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10 ANALAYSIS OF ALTERNATIVES

This section analyses the project alternatives in terms of site, design technology, water sources, and waste management options.

10.1 Relocation Option

Relocation option to a different site is an option available for the project implementation. At present, the developer does not have an alternative site. This means that the developer has to look for the land. Looking for the land to accommodate the scale and size of the project and completing official transaction on it may take up to three (3) years although there is no guarantee that the land would be available. The developer will spend another two years on design and approvals since design and planning has to be according to site conditions. Project design and planning before the stage of implementation will cost the developer millions of Kenya shillings. What has been done and paid to date will be counted as a loss to the developer. Assuming the project will be given a positive response by the relevant authorities including NEMA, this project would have been delayed for about two (2) years period before implementation. Our economy cannot afford this delay. This would also lead to a situation like No Project Alternative option. The other consequence of this is that it would be a discouragement for private/local investors. In consideration of the above concerns and assessment of the current proposed site, relocation of the project is not a viable option.

10.2 No Project Alternative

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses to both the developer and the community as a whole. The developer will continue to pay rates on the land plot while accruing minimal benefits. The No Project Option is the least preferred from the socio-economic perspective due to the following factors:

- The economic status of the Kenyans and the local people would remain unchanged.
- The local skills would remain underutilized.
- Reduced interaction both at local, national and international levels.
- No employment opportunities will be created for thousands of Kenyans who will work in the project area.
- Increased rural poverty and crime in Kenya.
- Discouragement of investors
- Development of infrastructural facilities (roads, electrical etc.) will not be undertaken.

From the analysis above, it becomes apparent that the No Project alternative is no alternative to the local people, Kenyans, and the Government of Kenya.

10.3 The proposed development alternative

Under the proposed development alternative, the developers of the proposed project would be issued with an EIA License. In issuing the license, NEMA would approve the proponent's proposed commercial centre including a filling station development project, provided all environmental measures are complied with during the construction period and occupation phases. This alternative consists of the applicant's final proposal with the inclusion of the NEMA regulations and procedures in minimizing the environmental impacts to the maximum extent practicable.

10.4 Analysis of Alternative Construction Materials and Technology

The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Equipment that saves energy and water will be given first priority without compromising on cost or availability factors. The concrete pillars and walls will be made using locally sourced stones, cement, sand (washed and clean), metal bars and fittings that meet the Kenya Bureau of Standards requirements.

Beautiful and durable reinforced concrete roofs will be used because they are good in heat insulation as compared to the iron sheet roofs, and afford more security. This will also ensure that the rainwater harvested will be used in the developments units. Heavy use of timber during construction is discouraged because of destruction of forests. The exotic species would be preferred to indigenous species in the construction where need will arise. However, the construction methods and technologies to be used will require very little timber.

10.5 Water Supply

Water is becoming a scarce resource by the day in most parts of the country. Therefore, the developer will look into various methods of sustaining water supply. The methods to be considered will include;

i. Alternative one - Rain water harvesting

Rain water that will be flowing into drainage systems during wet seasons. The proponent will put measures to ensure that its harvested and stored then can be used for watering flower gardens, toilets and cleaning.

ii. Alternative two - Tanker supply

There are commercial water supply services which carry water to clients during tap water supply cut offs. The proponent can use the services as a supply option.

iii. Alternative three - Borehole water consumption

The proponent may consider sinking a borehole to cover for the deficit amount that will not be met by the existing water supply, as well as to cut on purchasing costs. The proponent plans to use this source during the construction phase of the proposed commercial centre.

iv. Alternative four – Desalination Plant

This is the process of removing salt from ocean or sea water to make it drinkable. The project site is in close proximity to the Indian Ocean. Water from the ocean can be purified by use of a reverse osmosis desalination plant, which is less energy intensive as compared to multi-stage flash distillation. The proponent plans to use this alternative during the operation phase of the proposed commercial centre.

10.6 Waste water management alternatives

In addition to the water demand, the proposed development will generate substantial amount of wastewater. The wastewater if not well managed could have a detrimental effect to the environment. Five locally available technologies as listed below will be discussed considered: -

i. Alternative one - Waste water treatment plant

This involves the construction of a plant and use of chemicals to treat the effluents to locally/internationally accepted environmental standards before it is discharged into the environment. It is usually expensive to construct and maintain, but it is the most reliable, efficient and cost-effective in the long term. The treated waste water can be used for landscaping purposes and outdoor non-domestic cleaning while the sludge obtained can be composted and used for agricultural and gardening purposes. Water analysis will need to be

undertaken periodically in order to ensure effectiveness of the treatment plant. This is the most viable option for the proposed project.

ii. Alternative two - Use of stabilization ponds/lagoons

This refers to the use of a series of ponds/lagoons which allow several biological processes to take place, before the water is released to the outside environment. The lagoons can be used for aquaculture purposes and irrigation. However, they occupy a lot of space but are less costly. No chemicals are used, heavy metals sink and decomposition processes take place. They are usually a nuisance to the public because of smell from the lagoons/ponds. This option is not preferable in the area because the local community are not likely to accept the option.

iii. Alternative Four - Use of septic tanks

This involves the construction of underground concrete-made tanks to store the sludge. The wastewater from the septic tanks is then channeled to soak pits. It is not expensive to construct septic tanks. However, septic tanks will require regular emptying in large discharge points with possibility of polluting water bodies. Given the size and magnitude of the project, this is not a viable option since the proponent will need to construct several septic tanks at different locations. This will mean use of more space and higher project cost. Hence this option is considered not viable and economical to such a big project. It is also not friendly to the environment.

iv. Alternative Five - Connection to the existing sewer system

This alternative works best in areas served by a sewer line. Connection to an available large main sewer line solves waste water management issue at a very minimal cost and in an environmental efficient manner. However, the site within which the proposed project is to be undertaken is not served by a sewer line hence this option is inapplicable for this case.

10.7 Solid waste management alternatives

A lot of solid wastes will be generated from the proposed project. An integrated solid waste management system is recommendable. First, the proponent will give priority to Reduction at Source of the materials. This option will demand a solid waste management awareness programme for the management and occupants/tenants. Secondly, Recycling, Reuse and compositing of the waste will be the second alternative in priority. This will call for a source separation programme to be put in place. The recyclables will be sold to authorized waste buyers. The third priority in the hierarchy of options is combustion of the waste that is not recyclable. Finally, sanitary landfilling will be the last option for the proponent to consider.

10.8 ESIA WITH/WITHOUT ESMP

10.8.1 Without

This scenario was based upon the assumption that the proposed development would go ahead without any environmental and social management plan/options being implemented. The total project impact for the scenario is on the appreciably adverse side. This shows that if the project goes ahead without an ESMP, the adverse impact on the existing environment would be several times that of the impact without the project. Thus, this assumption is disqualified and not applicable since the greatest challenge worldwide presently is geared towards sustainable developments and sustainable use of natural resources.

10.8.2 With

If the environmental management strategies are fully implemented, the adverse impacts of the project shall be reduced, and there will be an overall improvement in physical, chemical, biological and socioeconomic environment of the region. Therefore, the proposed activity will be beneficial for the environment of the area, provided the ESMP is in place. It is clear from the above, that the proposed project would have negative effects without implementing certain environmental management strategies. If an ESMP is adopted and implemented, the adverse impacts will be reduced and the overall environmental quality of the area would improve hence this remains a preferred option.

11 CONCLUSION AND RECOMMENDATIONS

The ESIA study has established that the proposed development project by Vipingo Development Ltd is a worthy investment by the proponent and broadly, with no doubt, will contribute significantly to the improved economic development of Vipingo area. This will be achieved through the prior discussed positive impacts namely; growth of the economy, boosting of the informal sector during the construction phase, provision of market for supply of building materials, employment opportunities, increase in government revenue and optimal use of land among others. The studies conducted on the proposed commercial centre including a filling station shows that indeed the project will contribute to development in Kilifi County.

However, the ESIA study has established that the proposed project will also come along with some negative impacts. The negative environmental impacts that will result from establishment of the proposed project can however be sufficiently mitigated.

The proponent of the proposed project shall be committed to putting in place several measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the project. It is recommended that in addition to this commitment, the proponent shall focus on implementing the measures outlined in the ESMP and the Environmental Monitoring Plan as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects in Kenya. It is expected that the positive impacts that emanate from such a project shall be maximized as much as possible as exhaustively outlined within the report.

Considering the positive socio-economic and environmental benefits which will accrue as a result of the proposed development and the ESIA study having found no major impacts to arise from the development, it is our recommendation that the project be allowed to proceed on the understanding that the proponent will adhere to the mitigation measures recommended herein and will further still implement the proposed Environmental & Social Management and Monitoring Plan to the latter. The area in which the proposed project is to be developed has a big shortage of such commercial centre developments, hence the construction of the proposed project goes a long way in solving part of the economic sector.

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13 APPENDICES

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