ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY REPORT FOR

PROPOSED INTEGRATED WASTE MANAGEMENT AND TREATMENT FACILITY ON PLOT L.R NO. KLF/DOLA/10 MIGUJINI AREA, BAMBA KILIFI COUNTY

SERGENT
Logistics Limited

Project proponent:

SERGENT LOGISTICS LIMITED

P.O BOX 1549-80100

MOMBASA

GPS Coordinates

3º 37´51.67″S & 39º 21´52.15″E

June 2022

DOCUMENT AUTHENTIFICATION

ESIA EXPERTS

This report has been prepared in pursuant to the Environmental Management and Coordination Act Cap.387 of the Laws of Kenya. We hereby certify that this study report was prepared on the information provided by the proponent, consulted stakeholders as well as that collected from other primary and secondary sources and on the best understanding and interpretation of the facts by the environmental experts. It is issued without any prejudice.

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EXECUTIVE SUMMARY

This Environmental and Social Impact Assessment (ESIA) report documents the findings of a study of the proposed Integrated Waste Management and Treatment Facility (IWMTF) to be situated at Migujini area, Bamba, Ganze Sub County within Kilifi County by Sergent Logistics Limited herein referred to as the proponent. The proponent, Sergent Logistics Limited, proposes to set up an Integrated Waste Management and Treatment Facility pursuant to Section 58 of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya and Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019, the proponent has contracted a team of Environmental experts (consultants) licensed by National Environment Management Authority (NEMA), to prepare an Environmental and Social Impact Assessment (ESIA) Study Report for the proposed project. In addition to compliance with the law, the output of the ESIA process will provide a baseline of the environmental and social conditions of the project area to enable future monitoring of the environmental performance of the proposed project.

The proponent has proposed to set up integrated waste management and treatment facility that will include waste oil transfer station/sludge handling facility, pretreatment and management hazardous wastes, incineration facility, handling of non-hazardous/biodegradable wastes in sanitary landfills through deep burying/composting and onsite waste water treatment plant as well as management and disposal of construction debris on Plot number KLF/DOLA/10 situated along/off Tsangasini – Munago wa Dola Road in Migujini sub location, Mitangani Location, Bamba Division, Ganze Sub County within Kilifi County. The proposed project will cover approximately six (6) acres out of the total seventeen (17) acres of the total piece of land. The geo-reference points of the site are Latitude 3º 37′51.67″S & Longitude 39º 21′52.15″E at an elevation of 814ft above sea level. The proponent intends to have all the these projects integrated and processed as a comprehensive Environmental Impact Assessment considering they are on the same parcel of land.

The proponent intends to increase their waste handling capacity with enhanced health and safety mechanisms and without compromising environment and public health with prospects of future expansion. Currently, the proposed project site has an existing asbestos disposal (landfill) facility licensed by the Authority (NEMA) vide license number NEMA/EIA/PSL/17192.

The methodology for preparing the ESIA study report was guided by the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019. Project site visits were undertaken in May 2022 for purposes of area reconnaissance survey, assessing the baseline and environmental risks associated with the proposed project as well as applicable environmental safeguards and standards. An environmental screening was conducted by the environmental experts in compliance with Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019 criterion. The issues considered by the experts included; ecological and socio-economic issues, landscape changes, land use character and water use and requirements. Data

collection methods included literature review of relevant documents, observations during site visits and photography. The stakeholder engagement strategy included stakeholder consultative meeting that was conducted at the proposed project site and administration of questionnaires to the other Project Affected Parties (PAPs).

The proposed project will comprise integration of various types of wastes with their respective management and handling mechanisms simultaneously on the same site hence the term integrated waste management and treatment facility. The project will integrate the following waste management mechanisms as explained below;

The proposed project will include installation of Waste Incinerator. Waste incineration is a method of waste disposal whereby high temperatures are used to sufficiently oxidize the combustible components in waste. The proponent will install incineration plant to handle hazardous wastes through combustion. Compared with landfills and composting, incineration is more effective in dealing with infectious waste due to a few advantages, such as taking up comparatively small space, decreasing the volume of waste and possible generating electricity (co-generation).

The project proponent proposes to set waste oil handling facility; this will involve the construction and subsequent operation of a sludge handling facility. The facility will comprise of three overhead oil storage tanks with the capacity of 33,000litres each, loading and offloading area and oil/water interceptor. The tanks will be mounted on concrete slabs above a paved ground with a drain to channel the oil sludge into the oil/water interceptor. At the interceptor, oil will be separated from water. The end product is furnace oil which will be sold off to industrial clients for further use. Oil sludge is the viscous, non-flowing, semi-solid material which is generated as a result of long storage of oils. The sludge is hazardous and thus special attention and utmost care in handling and disposal should be accorded. Sludge will be generated from the oil water interceptor and cleaning of the storage tanks. The sludge should be managed through incineration in accordance with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006 and the proponent should ensure compliance with the Technical Guidelines on the Management of Used Oil and oil Sludge in Kenya, 2016.

Sludge/waste oil contains hydrocarbons which are volatile and their vapors in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise. Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Fire occurrence may lead to death, financial losses and loss of livelihoods for the workers and neighbors. The proponent should implement proper mechanisms on fire and emergency response plan, provide adequate firefighting equipment and ensure they are serviced regularly by fire service providers, train employees on the use of fire-fighting equipment, designate a fire assembly point within the facility,

display fire safety and warning signage and conduct fire drills and fire safety audits annually for the facility for proper compliance.

Pretreatment and management of hazardous wastes will comprise of the following major components, PH Neutralization/Adjustment System and Heavy Metal Removal Systems. PH Neutralization system will entail chemical neutralization of acids and bases from any source whereby hydroxide ions and hydrogen cations are used to produce water and harmless stable salt. Heavy Metal Removal System will entail removal of all heavy metal ions such as Iron (Fe), Lead (Pb), Zinc (Zn) among others from various hazardous industrial wastes. This will occur in two main forms, the particulate suspended form will be removed using a physical and mechanical filtration processes. The second form will involve removal of dissolved heavy metals using hydroxide, sulphide oxide or carbonate precipitation then passed through the mechanical filtration processes.

Handling of non-hazardous and biodegradable wastes will entail sanitary landfills through deep burying/ composting. The proposed sanitary landfill will be operated as one-off since the landfill will be dug depending on the capacity and amount of wastes to be disposed at any given time.

The integrated facility will also include Onsite Wastewater Treatment Plant (OWTP) in handling liquid wastes onsite. The proposed project will comprise of waste reception/receiving area, effluent monitoring and sampling area (chamber), and the septic tank and soak pit system. The whole plant will be linked through effective and efficient piping system from the waste receiving bay to the soak pit system. Onsite Wastewater Treatment is a small-scale plant aimed to treat liquid wastes/effluent from various areas ranging from contaminated liquids, water and other liquid wastes meant for disposal/destruction in compliance with existing waste management regulations through mechanical and biological processes. The objective of OWTP is to treat liquid wastes for safe release of the resultant effluent into the environment.

The documented findings of this ESIA study report demonstrate that the proposed project is expected to have both positive and negative environmental and social impacts to the community and other Project Affected Parties (PAPs). Anticipated positive impacts include; provision of effective and sustainable waste management services in compliance with Waste Management Regulations 2006, creation of employment opportunities and generation of revenue to the Kilifi County Government and Central government through payment of operational permits/licenses. Alongside the positive impacts, several environmental and social constrains will arise at different phases of the project implementation stages.

There are potential safety and health risks associated with operations of the proposed integrated waste management site. These include dermal contact with waste oil and inhalation of vapors during handling of such products, accidental falls, air pollution, increased waste generation in terms of stockpiles and other social concerns associated with the proposed project. All these risks have potential to cause injuries, permanent disability or even death and hence the management should be committed to ensuring safety and

health of workers and visitors at the facility. The proposed mitigation measures include developing and implementing a safety and health policy, and emergency response plan for the site, sensitizing employees to adhere to work procedures to minimize accidents, providing adequate and appropriate PPE to workers and enforcing on their use and displaying precautionary signage at appropriate sections within the facility. Additionally, the proponent should conduct first aid training among the workers, provide well-stocked first aid kit, conduct annual occupational safety and health audits and comply with the provisions of the Occupational Safety and Health Act, 2007.

Conclusion

The proposed project is considered important and beneficial to the economy as it will ensure safe management of wastes both hazardous and non-hazardous; promote socio-economic growth of the area through employment creation and revenue generation to the relevant government agencies. This study report proposes comprehensive mitigation measures for the negative anticipated impacts during the entire project cycle and improves the environmental performance of the proposed project. It is on this basis that we recommend that the project be allowed to proceed alongside conditions which will ensure compliance with the relevant environmental legislations and standards

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ABBREVIATIONS AND ACRONYMS

CBO	Community Based Organizations
DCC	Deputy County Commissioner
EA	Environmental Audit
ESIA	Environmental and Social Impact Assessment
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EMS	Environmental Management System
EPRA	Energy and Petroleum Regulatory Authority
ERC	Energy Regulatory Commission
IWMTF	Integrated Waste Management & Treatment Facility
ESMP	Environmental and Social Impact Plan
KNBS	Kenya National Bureau of Statistics
NEMA	National Environmental Management Authority
OHS	Occupational Health & Safety
OWTP	Onsite Wastewater Treatment Plant
PAPs	Project Affected Parties
PPE	Personal Protective Equipment
VOC	Volatile Organic Compounds
WRUA	Water Resource Users Association
WRA	Water Resource Authority
WSP	Water Service Providers
WWDA	Water Works Development Agencies
STI	Sexually Transmitted Infections

CHAPTER 1: INTRODUCTION

1.1 Background

Waste management is an integral part of industrial development in Kenya and all over the world. Without this, all the development activities would be detrimental to the environment and to life in general. Waste management in the Kenya has been assumed to be managed by the National Environmental Management Authority (NEMA) and the County governments. However, the National Environmental Management Authority has had private entities/companies to help in the collection, transfer of wastes to designated areas and waste management through other means in compliance with set regulation and standards. It is in this regard that Sergent Logistics Limited is engaging in waste management activities in compliance with existing waste management regulations. Currently, the proposed project site has an existing asbestos disposal (landfill) facility licensed by the Authority (NEMA) vide license number NEMA/EIA/PSL/17192.

The Company deals in general waste management and disposal activities and have been in the same industry for the past close to 8 years. Sergent Logistics Limited is seeking to expand and improve its waste management by setting up integrated waste management and treatment facility to increase and supplement its waste handling capacity with enhanced safety and health and without compromising environment and public health.

The inception of the proposed project is necessitated by the ever increasing and escalating waste generation from industrialization and other development activities in Kilifi County, its environs and the country in general.

1.2 Project Location

Proposed project site is located Plot number KLF/DOLA/10 situated along/off Tsangasini – Munago wa Dola Road in Migujini sub location, Mitangani Location, Bamba Division, Ganze Sub County within Kilifi County. The geo-reference points of the site are **Latitude 3º 37′51.67″S & Longitude 39º 21′52.15″E at an elevation of 814ft above sea level.** The proposed project land use comprises of communal ranch owned by Dola Group Ranch, the main economic activity being livestock keeping, agriculture & charcoal burning. The proposed site lies on a flat ground covered with natural growing grass, shrubs, and trees.

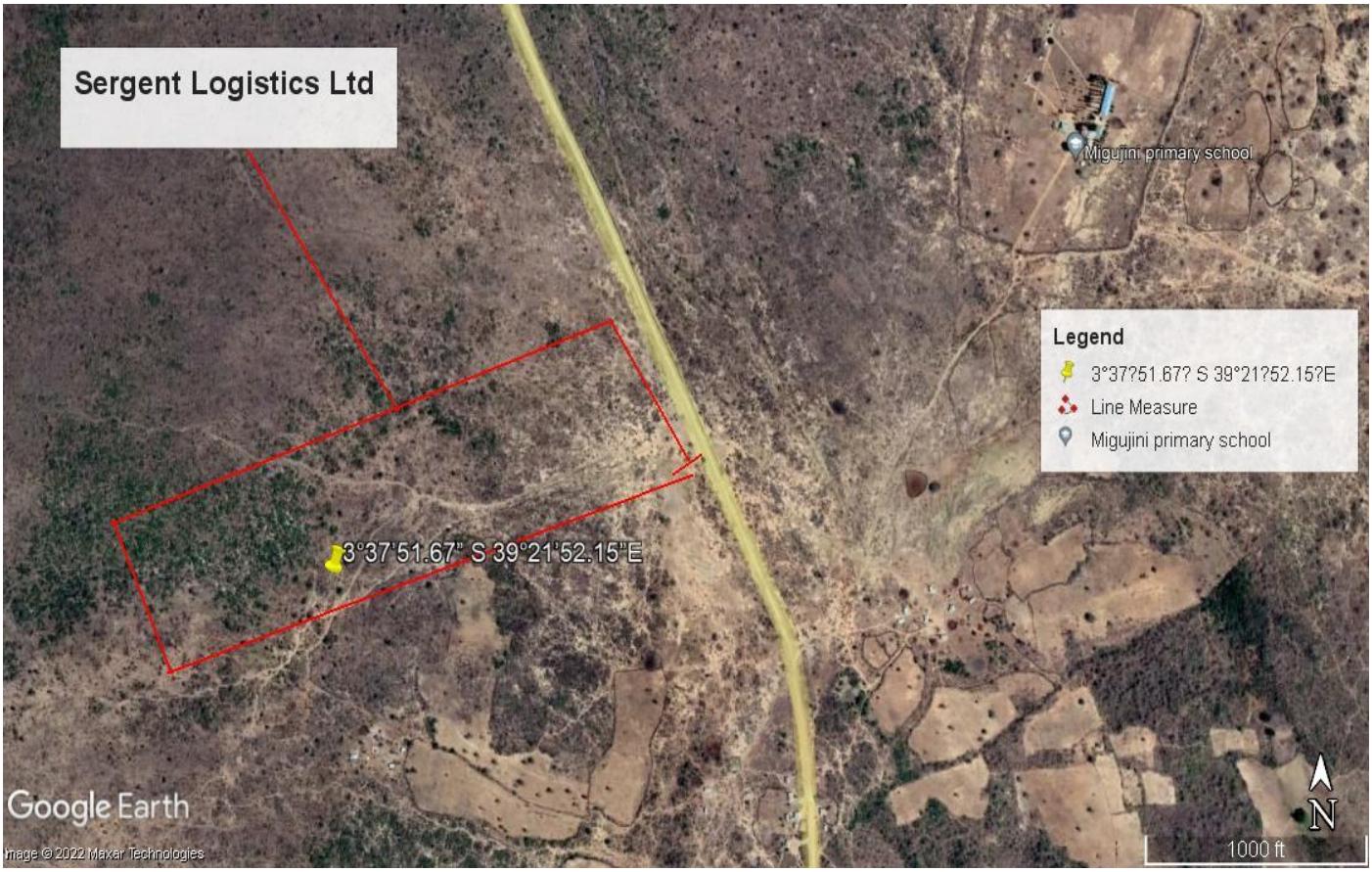


Figure 1.1: Location Map (Source: Google map 2022)

Figure 1.2: Proposed project site (Source; Site Survey/Photography)

Figure 1.3: Access weather road to the project site (Source; Site Survey/photography)

Project Neighborhood

Some of the adjacent parcels of land neighboring the site are not developed with either commercial or residential developments, it's a bare ranch land used as grazing land.

1.3 Project objective

The overall objective of the proposed project is to set up & operate an integrated waste management and treatment facility pursuant to Section 58 of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya

1.4 Project Justification

Managing waste properly is essential for building sustainable and livable cities, but it remains a challenge for many developing countries and cities. The proposed project will improve public health and livelihoods by reducing improper waste management mechanisms through open burning, mitigating pest and disease vector spreading leading to environmental degradation. In Kenya, management of wastes (both hazardous & non-hazardous) is regulated under the Environmental Management and Co-ordination Act (Waste Management) Regulations, 2006 and other related regulations. These regulations establish an order of preference for the management of wastes to enhance environmental protection. A number of waste generation facilities in the country lack proper waste management systems thus opting for open dumping or even illegal disposal. However, this is not safe thus the urgency to establish quality and functional waste management facilities within Kilifi County and its environs. Operation of the proposed project will thus foster proper management and handling of various waste streams within Kilifi County and the surrounding environs.

1.5 Scope and criteria

The study has been conducted to evaluate the environmental impacts of the proposed integrated waste management and treatment facility. Upon evaluation, recommendations are made on the accentuation of positive impacts and the mitigation of negative ones. The scope for the assessment dwelled on impacts the project will have on the following parameters:

- Physical environment
- Socio-cultural environment
- Land use
- Socio-economic aspects
- Flora and fauna
- Occupational safety & health issues

1.6 Assessment methodology

This ESIA study is based on site visits, literature review, and discussions with the project proponent, engineers and consultation with the stakeholders through public participation with Project Affected Parties (PAPs). The project proponent provided all details relevant to the proposed project. While

preparing the ESIA study report, care has been taken to identify the potential negative impacts and their mitigation measures in terms of:

- Impacts due to project location;
- Impacts from project design and during construction; and
- Impacts during the operation of the project

For the purpose of the assessment and preparation of the Study report, the following approaches and methodologies were employed:

a) Desktop studies which involved review and analysis of literature for acquisition of secondary data;
b) Environmental screening, in which the project was identified as among those requiring ESIA under second schedule of Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019, the proposed project is classified as a High Risk Project.
c) Environmental scoping that provided the key environmental issues to be investigated in relation to implementation of the proposed project;
d) Physical inspection of the site and surrounding areas;
e) Consultation involving key stakeholders for collection of primary data through public meeting and questionnaires administration
f) Identification of potential impacts and preparing an ESMP;
g) Confirmation and sharing of findings with the project proponent;
h) Reporting assessment findings

1.7 Stakeholder Identification, Analysis and Engagement Plan

a) Stakeholder Identification

Stakeholders represent individuals or groups that hold a stake in the project, either because they will be impacted by the project or because they have a vested interest in it. A public consultation/engagement process is very important in gauging the sentiments of a variety of stakeholders. Besides the fact that this is a regulatory requirement under the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019, it is an excellent opportunity to offer the public an opportunity to ventilate their concerns and probably give recommendations concerning the proposed project in the specific area.

The stakeholders categories identified in this proposed project included the following Project Affected Parties;

- Local communities/immediate neighbors
- Local Administration (DCC/Area chief)
- Government agencies

- Political representatives
- Community Based Organizations (CBO's)

Each of the stakeholders above had different requirements, different interests, different levels of influence, and different expectations towards the project. A project proponent's challenging role is to align these expectations, engage the stakeholders, and promote acceptance of the project in totality.

b) Stakeholder Analysis

After the identification of the stakeholders, they were analysed by the environmental consultants on who they really were, their level of interest, what power they had, what their expectations were, and if they seemed favourable or against the proposed project. This was done through a power-interest matrix, where each stakeholder was plotted in the matrix based on their level of power to impact the project and their level of interest. In any project, all stakeholders are equal, but some are more equal than others.

Depending on power and interest of the stakeholder, different strategies apply to manage their engagement:

- **Keep them satisfied**

Stakeholders in this group have little interest in the project but high power to continue or stop. Examples of such stakeholders include the local communities which forms the larger group. The best engagement strategy is to meet their needs and keep them satisfied, which can mean invite them for project updates meetings occasionally or ensure that their communication requirements are being met.

- **Minimal effort**

Stakeholders who have little power and little interest in the project are the least important and require minimal effort from the project manager. However, they should not be totally overlooked.

- **Engage closely**

Stakeholders with a high level of power and a high level of interest are the most important stakeholders. This will include the lead and government agencies interested in the proposed project.

- **Keep them informed**

These are the stakeholders with low power but highly interested in the project. These are stakeholders to whom you need to show consideration, such as the project end-users and whom you should keep informed regularly on the project status.

In consideration of the above stakeholder engagement plan, public consultative meeting for the proposed project was conducted at the proposed project site and questionnaires administered to the key stakeholders. (*See attached meeting minutes*)

1.8 Terms of reference

The terms of reference for the proposed project represents NEMA approved terms of reference report vide reference number NEMA/TOR/5/2/434 that was submitted to the Authority prior to the commencement of this study report. The approved terms of reference define the objectives and scope of the ESIA as follows:

- Assess the baseline environmental conditions in the project area, such as biological, physical and socio-economic environment;
- Study the potential positive and negative impacts of implementing the proposed project in the society living within the influence of the project including, but not limited to, sound disposal and management of wastes, job creation and improvement in the livelihood within the local community.
- Assess the potential environmental and social impacts of the project and suggest suitable mitigation measures for the adverse impacts;
- Study the project conditions and requirements in terms of location, implementation and operation requirements;
- Study negative impacts arising from the proposed project for example public safety and health and rehabilitation of the affected environment.
- Prepare an Environmental and Social Management Plan (ESMP) for implementation and monitoring of mitigation measures along with budgetary estimates.

CHAPTER 2: BASELINE INFORMATION ON PROJECT AREA

2.1 Introduction

This chapter presents a status report on the situation of the proposed project within the context of Kilifi County as a whole. The environmental baseline offers both the present and future status of the environment. It takes into account changes which might be occasioned by natural and anthropogenic activities. Baseline information provides a basis to ascertain the implication of the development process and determine the mitigation measures to be undertaken or suitable to ameliorate the identified impacts. The baseline survey was done through literature review, site visits and baseline environmental monitoring within the proposed project area.

2.2 Administrative location and size

Administratively, Kilifi County is divided into nine sub-counties namely; Chonyi, Ganze, Kaloleni, Kauma. Kilifi North, Kilifi South, Magarini, Malindi and Rabai Sub Counties. Kilifi County was formed in 2010 as a result of a merger of Kilifi District and Malindi District. Its capital is Kilifi and its largest town is Malindi. The county has a population of 1,453,787. It covers an area of 12,245.90 km^2. The county is located north and northeast of Mombasa. Kilifi has fewer tourists than Mombasa County, but there are some tourists' beaches in Kikambala, Watamu, Malindi and Kilifi.

2.3 Location

The proponent has proposed to set up an integrated waste management and treatment facility on a piece of land of approximately seventeen (17) acres to be located on Plot number KLF/DOLA/10. The proposed project area is located along/off Tsangasini – Munago wa Dola Road in Migujini sub location, Mitangani Location, Bamba Division, Ganze Sub County within Kilifi County. The geo-reference points of the site are **Latitude 3º 37′51.67″S & Longitude 39º 21′52.15″E at an elevation of 814ft above sea level**.

2.4 Climatic conditions

Kilifi County lies within the coastal strip which is a hot tropical region. Local weather is influenced by monsoon winds. 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 ArabukoSokoke 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 temperatures in the county range between 21 degrees Celsius and 30 degrees Celsius in the coastal belt and between 30 degrees Celsius and 34 degrees Celsius in the hinterland. The county experiences relatively low wind speeds ranging between 4.8 km/hr and 12 Km/hr.

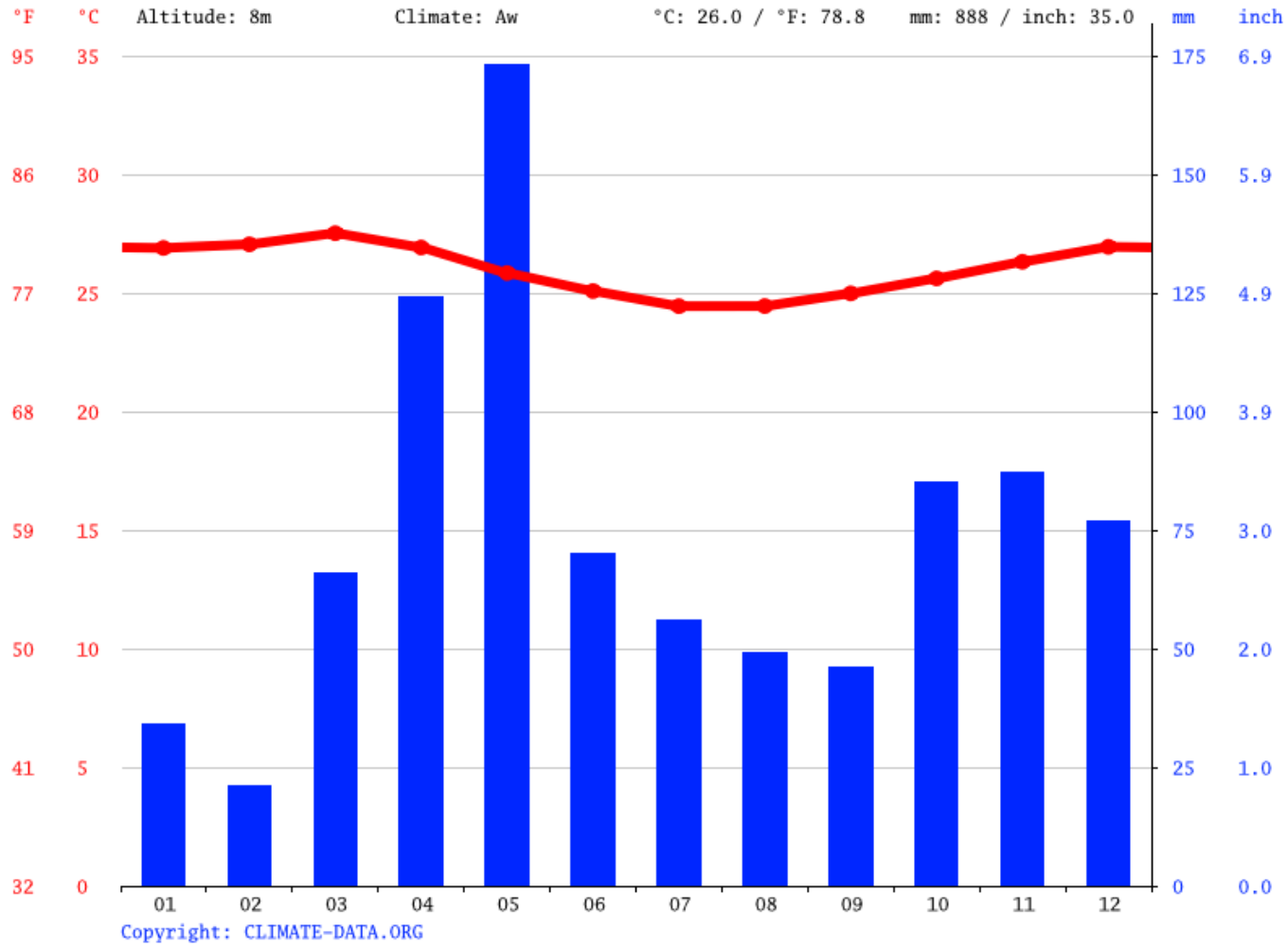


Figure 2.1: Climatic conditions graph (Source: CLIMATE-DATA.ORG)

2.5 Topography and geology

The hydrogeology of any area is intimately related to the geology; the occurrence of groundwater being a function of recharge, porosity and permeability. This section examines the geology of the investigated area in detail, and is based on researches done by A.O. Thompson, (1951).

The proposed area lies on maji ya chumvi beds as observed on the ground. There is no geological map of this area as shown on the geological map below.

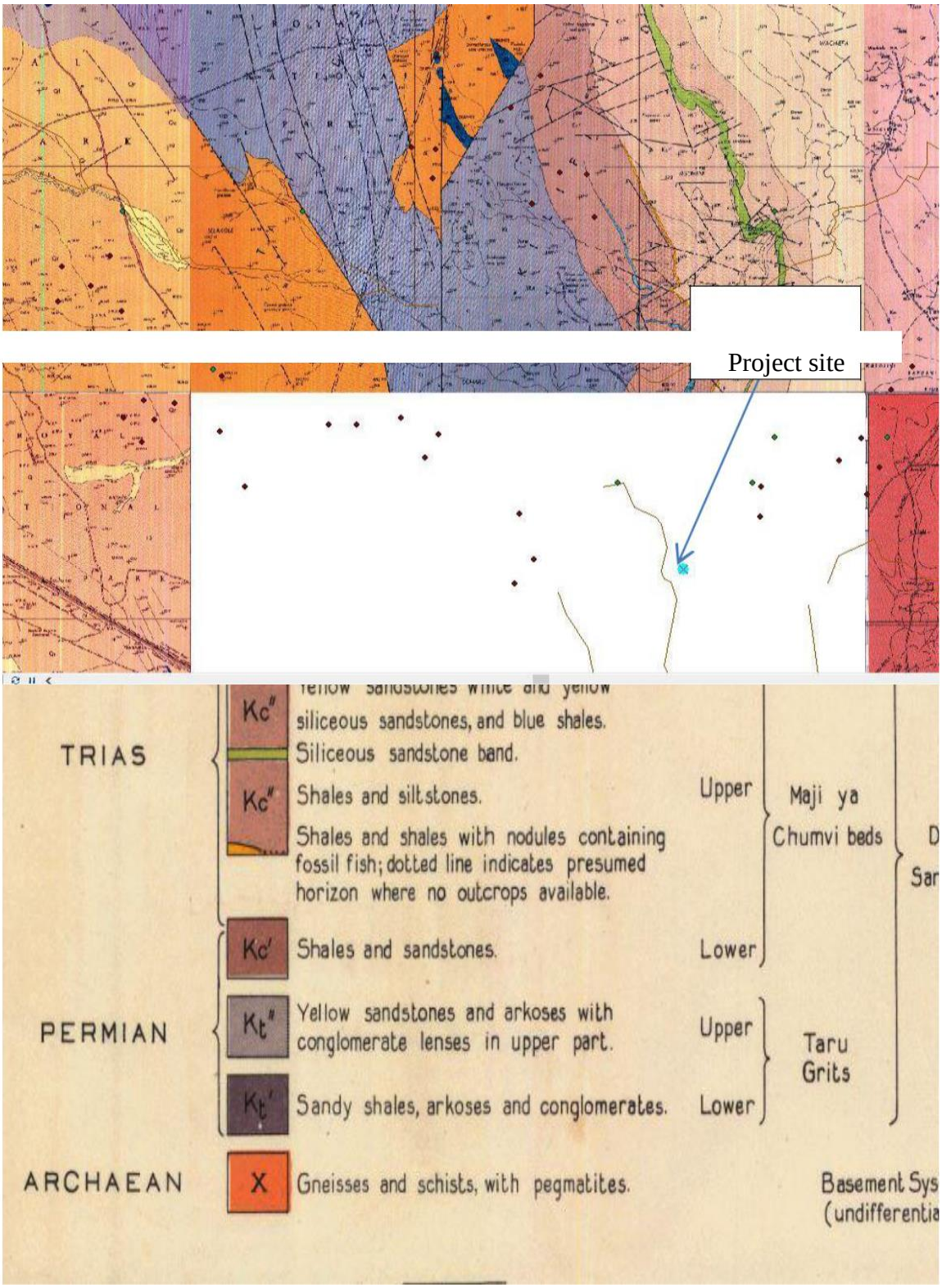


Figure 2.2: Site Geological Map (Source: Hydrogeological survey)

2.6 Water Supply infrastructure

The area relies on water from dams, ponds and water pans. There is also a stream within the locality which is about 10km from the project site.

2.7 Land Use Systems

The proposed project land use comprises of communal ranch owned by Dola Group Ranch, the main economic activity being charcoal burning and forest harvesting. This is coupled by the unavailability of sustainable rainfall in the area to support any other activity that is dependent on rainfall. The nearby land is used as grazing grounds for livestock being within the ranch.

The proposed site lies on a flat ground covered with natural growing grass, shrubs, and trees. Vegetation gives the ground a lot of cover, which prevent rainwater from hitting the ground directly to cause soil erosion. The cover also stops the water from flowing freely to the streams, hence giving the rainwater more time to percolate and recharge the groundwater. The cover in some cases stops evaporation of the soil moisture and leaves the water on the soil for long allowing plants to utilize the same for their growth. During transpiration the water, which evaporates from the plants increases the cloud moisture and cools the clouds causing rain. Trees also hold rain water for a short period before it falls to the ground giving it more time for percolation as to much water on the ground would flow to the rivers.

This area is sparely populated with the population density being below the Kenya's average population density.

2.8 Physiography and vegetation

The proposed site lies on a relatively flat land covered with thorny bushes. Cutting down of trees in this area is not common as the population is very scarce. Therefore the land lays undisturbed and vegetation grows naturally. Vegetation gives the ground a lot of cover, which prevent rainwater from hitting the ground directly to cause soil erosion. The cover also stops the water from flowing freely to the streams, hence giving the rainwater more time to percolate and recharge the groundwater. The cover in some cases stops evaporation of the soil moisture and leaves the water on the soil for long allowing plants to utilize the same for their growth. During transpiration the water, which evaporates from the plants increases the cloud moisture and cools the clouds causing rain. Trees also hold rain water for a short period before it falls to the ground giving it more time for percolation as to much water on the ground would flow to the rivers.

Fig 2.3: Project site vegetation covers (Source, Site visit/photography)

2.9 Energy Supply

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 house-holds and 73% in female headed households using it.

Ganze constituency has the highest level of firewood use in Kilifi County at 95%.This is twice Malindi constituency, which has the lowest share at 39%. Ganze constituency is about 28 percentage points above

the county average. Jaribuni ward has the highest level of firewood use in Kilifi County at 97%.This is six times Malindi Town ward, which has the lowest share at 15%. Jaribuni ward is 30 percentage points above the county average.

2.10 Waste Management Practices

The proposed project area (Migujini village) is classified as rural area and the waste production is negligible. There is no formal waste disposal service and each household disposes of its own waste. The most frequently utilized means of waste disposal is through burning of combustible materials or used as manure or buried.

2.11 Population Density

According to the 2019 Population and Housing Census, the population of Kilifi County stood at 1,453,787 of which 704,089 are males, 749,673 females and 25 intersex persons. There are 298,472 household with an average household size of 4.4 persons per household and a population density 116 people per square kilometer

Sub County	Male	Female	Intersex	Total
Chonyi	29,527	32,807	1	62,335
Ganze	66,921	76,981	4	143,906
Kaloleni	92,614	101,063	5	193,682
Kauma	10,965	11,673	5	22,638
Kilifi North	86,986	91,836		178,824
Kilifi South	101,852	104,897	2	206,753
Magarini	93,302	98,308	4	191,610
Malindi	163,351	169,866		333,226
Rabai	58,571	62,242	9	120,813
Total	**704,089**	**749,673**	**25**	**1,453,787**

Table 2.1: Distribution of Population by Sex and Sub-County

2.11 Settlement Patterns

Within the project area, inhabits are Giriama tribe of the larger Mijikenda Community. The population of the village is sparsely distributed, the average density of Ganze Sub County being 42 persons per square kilometer while the total population of 143,906 for the whole Sub County. The population distribution patterns in the area are skewed towards the availability of social amenities and infrastructural distribution such as access roads and availability of water pans which are the major source of water provision within the area.

2.12 Socio-Economic Profile

The area where the project will be located relies mostly on charcoal making. Formal employment is very low apart from charcoal making. There are no cultural or historically important sites within the project influence area and therefore the proposed project is bound to have no adverse impacts on the cultural aspects of the neighboring community.

CHAPTER 3: POLICY, INSTITUTIONAL & LEGAL FRAMEWORK

3.1 Introduction

The relevant legislation which the project must comply with is intended to ensure project's sensitivity to environmental concerns, public safety, public health, physical planning regulations. Kenya has a policy, legal and administrative framework for guiding it in environmental management. Under the framework, NEMA is responsible for ensuring that EIAs/ESIAs are carried out for new projects and EAs on existing facilities as per the provisions of Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019. ESIAs are carried out in order to identify positive and negative impacts associated with ongoing projects with a view to taking advantage of the positive impacts and developing mitigation measures for the negative ones.

The legal and institutional frameworks provide important safeguards for protection and conservation of fragile environments and vulnerable communities and enhance the implementation of the Environmental and Social Management Plans. Under this section, the ESIA study report will therefore review the applicable sets of laws, management principles and institutions that require level of environmental compliance for the proposed integrated waste management site.

This chapter will discuss the following aspects in relation to the proposed project;

- Policy Framework
- Environmental Management Principles and Guidelines
- Institutional Framework
- Legal Framework
- International Conventions and Treaties

3.2 Policy Framework

3.2.1 National Environment Policy, 2013

The National Policy aims to provide a framework for an integrated approach to sustainable management of Kenya's environment and natural resources. In particular, it proposes to strengthen;

- Legal and institutional framework for good governance
- Integrate environmental management with economic growth, poverty reduction and improving livelihoods
- Research and capacity development
- Promote new environment management tools
- Promote collaboration and cooperation and partnerships in environment management

- Promote domestication, co-ordination and maximization of benefit from Strategic Multilateral Environment Agreements

National Environment Policy also elaborates on environmental quality and health and the need to ensure a clean and health environment for all.

3.2.2 The National Land Policy, 2009

The National Land Policy guides the country towards efficient, sustainable and equitable use of land for prosperity and posterity. The Mission of the Policy aims at promoting positive land reforms for the improvement of the livelihoods of Kenyans through the establishment of accountable and transparent laws, institutions and systems dealing with land. The overall objective of the Policy is to secure rights over land and provide for sustainable growth, investment and the reduction of poverty in line with the Government's overall development objectives. Specifically the policy offers a framework of policies and laws designed to ensure the maintenance of a system of land administration and management that will provide:

- All citizens with the opportunity to access and beneficially occupy and use land
- Economically viable, socially equitable and environmentally sustainable allocation and use of land
- Efficient, effective and economical operation of land markets
- Efficient and effective utilization of land and land-based resources
- Efficient and transparent land dispute resolution mechanisms.

Sustainable land use practices are key to the provision of food security and attainment of food self-sufficiency.

3.2.3 The National Health Policy, 2014-2030

The goal of the Policy is to attain the highest possible standard of health in a responsive manner. The health sector aims to achieve this goal by supporting equitable, affordable, and high-quality health and related services at the highest attainable standards for all Kenyans. This Policy has six objectives which include; eliminating communicable conditions, to halt and reverse the rising burden of non-communicable conditions and mental disorders, to reduce the burden of violence and injuries, to provide essential healthcare, to minimize exposure to health risk factors and to strengthen collaboration with private and other sectors that have an impact on health. This policy takes into account the functional responsibilities between the two levels of government (county and national) with their respective accountability, reporting and management lines. It proposes a comprehensive and innovative approach to harness and synergize health services delivery at all levels.

3.2.4 The National Energy and Petroleum Policy, 2018

Energy is a critical component in the economy, standard of living and national security of a country. The level and the intensity of energy use in a country is a key indicator of economic growth and development. The Kenya Vision 2030 identified energy as one of the infrastructure enablers of its socio-economic pillar. Sustainable, competitive, affordable and reliable energy for all citizens is a key factor in realization of the Vision.

This Policy aims to ensure sustainable, adequate, affordable, competitive, secure and reliable supply of energy at the least cost geared to meet national and county needs while protecting and conserving the environment. It has twenty objectives that include but not limited to providing an environment conducive for the development and provision of energy services and ensuring that prudent environmental, social, health and safety considerations, as well as issues of climate change are factored in energy and petroleum sector developments.

3.3 Environmental Management Principles & Guidelines

The project proponent and the contractor/project engineer are expected under law and best practice to consider and exercise all the principles and tenets of environmental management. These principles are as discussed below:

3.3.1 The Principle of Sustainability

The principle of sustainability requires that natural resources should be utilized in a way and at a rate that does not lead to the long-term decline of natural resources, thereby maintaining its potential to meet the needs and aspirations of present and future generations. It strives for equity in the allocation of the benefits of development and decries short-term resource exploitation which does not consider the long-term costs of such exploitation. In the course of implementing the proposed project, the project proponent/manager is strongly advised to use resources sustainably and source materials from suppliers that have been identified as employing/ practicing sustainable resources use.

3.3.2 The Principle of Intergenerational Equity

The principle of sustainability should be examined together with that of intergenerational equity, which focuses on future generations as a rightful beneficiary of environmental protection. Essentially, the principle of intergenerational equity advocates for fairness, so that present generations do not leave future generations worse off by the choices they make today regarding development. Operations and activities undertaken at all the stages of the proposed project ought to be designed to embrace the rationale of intergeneration equity in resources use both natural and man-made resources. Besides, intra-generation equity should be observed

whereby various resources users in the current generation should not have their resources use ability compromised by the proposed project.

3.3.3 The Principle of Prevention

The principle of prevention states that protection of the environment is best achieved by preventing environmental harm in the first place rather than relying on remedies or compensation for such harm after it has occurred. The reasoning behind this principle is that prevention is less costly than allowing environmental damage to occur and then taking mitigation measures. The project proponent is duty bound under EMCA Cap 387 to undertake all the preventive and viable measures to protect the environment in the course of implementing the project, upon commissioning the project through to decommissioning of the project.

3.3.4 The Precautionary Principle

The precautionary principle recognizes the limitations of science, as it is not always able to accurately predict the likely environmental impacts of resource utilization. It calls for precaution in the making of environmental decisions where there is scientific uncertainty. Accordingly, it is closely related to the principle of prevention and can be viewed as the application of the principle of prevention where the scientific understanding of a specific environmental threat is not complete. The precautionary principle thus requires that all reasonable measures must be taken to prevent the possible deleterious environmental consequences of development activities. Further, it demands that scientific uncertainty should not be used as a reason for not taking cost effective measures to prevent environmental harm. The project proponent should undertake all the necessary precautionary measures in the course of implementing the proposed project.

3.3.5 The Polluter Pays Principle

The polluter pays principle requires that polluters of natural resources should bear the full environmental and social costs of their activities. It seeks to internalize environmental externalities by ensuring that the full environmental and social costs of resource utilization are reflected in the ultimate market price for the products of such utilization. Since environmentally harmful products will tend to cost more, this principle promotes efficient and sustainable resource allocation as consumers are likely to prefer the cheaper less polluting substitutes of such products. This principle dictates that when undertaking a project or running institution, if damage is caused to private properties or even public utilities such as roads or public goods such as water bodies, measures to compensate the affected should be instituted immediately.

3.3.6 The Principle of Public Participation

The principle of public participation seeks to ensure environmental democracy and requires that the public, especially local communities should participate in the environment and development decisions that affect their lives. It requires that the public should have appropriate access to information concerning the environment that is held by public authorities and should be given an opportunity to participate in decision-making processes. This principle calls for public participation in the development of policies, plans and processes for the management of the environment. Public participation ensures that:

- The process is open and transparent;
- Provides valuable sources of information on key impacts, potential mitigation measures and possible alternatives;
- Ensures that a project meets the community's needs;
- Ensures that a project is legitimate and it is a way of ensuring that conflicts can be addressed before NEMA makes a decision;
- Assists in informed decision making
- Promotes better implementation of projects once NEMA has made a decision;
- Enlightens the community on the opportunities and benefits that could arise from a project;

In compliance to this principle, public meeting was conducted at the proposed project site with the Project Affected Parties (PAPs) to give their views regarding the proposed project.

3.3.7 The Cultural and Social Principle

The Cultural and Social Principle is traditionally applied by many communities in Kenya for the management of the environment or natural resources in so far as the same are relevant and are not repugnant to justice and morality or inconsistent with any written law. Since time immemorial many communities have lived sustainably in various ecosystems in Kenya. It against this setup that existed where resources utilization though devoid of sophisticated/ complicated technologies guaranteed health environment that the current development should borrow leave from. It is therefore important for the proponent to factor in local/ traditional environment management systems in the course of implementing the project.

3.3.8 The Principle of International Co-operation

The Principle of International Co-operation applies in the management of environmental resources shared by two or more states. Environmental impacts do not respect national or international boundaries and as such are trans-boundary. This principle ensures that international relations and understanding are upheld and therefore management of environmental concerns arising from a project/ action across two jurisdictions can be managed. However, the proposed project does not have far reaching impacts across national boundaries. (trans-boundary impacts)

3.4 Legal Framework

The key national laws that govern the management of environment resources in the country in relation to the proposed project have been discussed in the following paragraphs. The relevant legislation which the proposed project must comply with is intended to ensure project's sensitivity to environmental concerns, public safety, public health and physical planning regulations

3.4.1 The Constitution of Kenya, 2010

The Constitution of Kenya 2010 is the supreme law of the land. Any other law that is inconsistent with the Constitution is null and void to the extent of its inconsistency. Under Chapter IV, article 42 provides for the right to a clean and healthy environment for all. Further, Chapter V of the Constitution deals with Land and Environment. Specifically Part 2 elaborates on the following components regarding the protection of the environment.

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

Relevance to the proposed project

Under the Constitution the proponent is entitled to carry out the project within legal limits and a fair administrative decision making process from NEMA and other State organs. On the other hand, he is required to ensure:

- *That the development is carried out in an ecologically, economically and socially sustainable manner;*
- *That the right to a clean and healthy environment for all is upheld in all phases of the development*
- *That all the applicable provisions of the Constitution are observed at all times.*
- *The proponent should ensure that construction and operations of the facility do not infringe on the right to a clean and healthy environment for all*

3.4.2 The Environmental Management and Co-ordination Act (EMCA) Cap. 387 of the Laws of Kenya

The Act is the framework environmental law and aims to improve the legal and administrative coordination of the diverse sectoral initiatives in the field of environment so as to enhance the national capacity for its effective management. The Act harmonizes the sector specific legislations touching on the environment in a

manner designed to ensure greater protection of the environment in line with the National Environment Policy, 2013.

Relevance to the proposed project

- *Section 58 of the Act requires proponents of a development likely to have deleterious effects on the environment to prepare and submit an EIA report to NEMA for consideration for decision making. This ESIA study report is prepared to comply with the provisions of this section.*

The relevant Regulations under EMCA that are relevant to the proposed project are discussed below;

a) The Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019

These Environmental (Impact Assessment and Audit) Regulations, 2003 were amended in by deleting regulation 7. The EIA/EA Regulations are meant to ensure the implementation of Sec. 58 of EMCA. It makes it illegal for anyone to undertake developments without an EIA license and stipulates the ways in which environmental experts should conduct the Environment Impact Assessment and Audits reports in conformity to the requirement stated. It is concise in its report content requirements, processes of public participation, licensing procedures, inspections and any possible offences and penalties under the Act.

Relevance to the proposed project

- *The proponent is preparing this ESIA report for submission to the Authority for licensing/approval prior commencement of the project.*

b) Environmental Management and Coordination (Waste Management) Regulations, 2006

These regulations define the responsibilities of waste generators and define the duties and requirements for transportation and disposal of waste. The regulations provide for mitigation of pollution and handling of hazardous and toxic wastes. The regulations require a waste generator to dispose waste only to a designated waste receptacle. The proponent shall adhere to the regulations during the project implementation.

Relevance to the proposed project

- *Seek license to operate/own waste disposal site and ensure that vehicles delivering the waste are licensed.*
- *Ensure hazardous wastes are disposed off in the manner prescribed*
- *Ensure that tracking documents for the waste are used.*

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

The objective of these Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. The general prohibitions state that no person shall cause the emission

of air pollutants listed under First Schedule (Priority air pollutants) to exceed the ambient air quality levels as required/ stipulated under the provisions of the Seventh Schedule (Emission limits for controlled and non-controlled facilities) and Second Schedule (Ambient air quality tolerance limits). The regulations 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, 1999. It also covers any other air pollution source as may be determined by the Minister in consultation with the Authority. The Regulations prohibits the Proponent from:

- Acting in a way that directly or indirectly cause or may cause air pollution to exceed levels set out in the second Schedule to the Regulations
- Allowing particulates emissions into the atmosphere from any source not listed in the Six Schedule of the Regulations
- Causing ambient air quality in controlled areas (listed in Schedule Thirteen) to exceed those stipulated under second Schedule.
- Allowing (during construction and demolition) emission of particulate matter above the limits stipulated in Second Schedule
- Causing or allowing stockpiling or storage of material in a manner likely to cause air pollution.
- Causing or allowing emissions of oxides of nitrogen in excess of those stipulated in the eleventh Schedule of the Regulation

d) Environmental Management and Coordination (Water Quality) Regulations, 2006

These Regulations address the challenges of pollution of water resources and conservation. It consists of VI parts and eleven schedules dealing with protection of sources of water for domestic use to miscellaneous provisions.

Relevance to the proposed project

- *The proponent should implement measures to prevent water pollution from construction activities, effluent discharge and oil spills at operational phase.*
- *The proponent should apply for and obtain an Effluent Discharge License from NEMA during the operation phase of the proposed project*

e) Environmental Management and Coordination (Noise and Excessive Vibrations Pollution) (Control) Regulations, 2009

These regulations prohibits any person to cause unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. Part 11 section 6 (1) provides that no person shall cause noise from any source Page 6 of 9 which exceeds any sound

level as set out in the First Schedule of the regulations. The proposed project will comply with this regulation to reduce the possibility of adverse noise impacts to human health in the project area.

Relevance to the proposed project

- *Ensure compliance with the set noise level limits for the site especially during construction and occupational phases. The proponent should ensure that employees are not exposed to noise levels above 85 dB (A) and in such cases provide suitable personnel protection equipment (ear protective devices).*

3.4.3 The Climate Change Act, 2016

This is an Act of Parliament to provide 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. The Act provides a regulatory framework for the development, management, implementation and regulation of mechanisms to enhance climate change resilience and low carbon development for the sustainable development of Kenya. It provides for mainstreaming of climate change responses into development planning, decision making and implementation as well as resilience and adaptation in all governance sectors.

The Act also stipulates the climate change response measures and actions; this includes the formation of National Climate Change Action Plan. The National Climate Change Action Plan shall be presented for approval by the Council.

The National Climate Change Action Plan shall prescribe measures and mechanisms that will include guiding the county toward the achievement of low carbon climate resilient sustainable development among other measures and mechanisms aimed at reducing carbon levels in the country.

Relevance to the proposed project

- *The proponent should develop a Climate Change Action Plan and implement measures to ensure low carbon footprint at the facility through incorporating low carbon technologies in order to reduce emission intensity*
- *The proponent should install renewable energy sources such as lighting, energy efficient machines and ensure low carbon emissions to the environment*

3.4.4 Technical Guidelines on the Management of Used Oil and Oil Sludge in Kenya, 2016

These guidelines were developed to promote safe management of used oil in Kenya. The guidelines will contribute to reduction of pollution because they provide direction on safe management of waste oil and

sludge. In particular, they expound on the requirements stipulated in Part IV and specified in the fourth schedule of the Environmental Management and Coordination (Waste Management) Regulations, 2006 on management of hazardous waste.

Relevance to the proposed project

In compliance with these guidelines, the proponent should comply with the following Guidelines for Used Oil/Sludge Transfer Stations

- **Requirement for the site**

- Every person intending to establish a transfer station shall undertake an Environmental Impact Assessment (EIA) and obtain EIA license before commencement of construction works
- The facilities shall undertake annual Environmental Audits
- All transfer stations must obtain an operational license issued under the Waste Management Regulation to own or operate a transfer station from the Authority
- All used oil from transfer stations shall be transferred to licensed recycling facilities
- A transfer station shall not process the used oil in any way except dewatering
- All transfer stations shall be provided with adequate and functional oil interceptors and other pollution control measures e.g. spillage control kit
- At each site the operator is to have a minimum amount of storage capacity of $90M^3$ on site to allow for discharge from the largest capacity of a vehicle that may be received, in the event of a contaminated load
- The loading and offloading area must have paved surfaces with an impervious material to prevent any spills from contaminating the soil
- The offloading and loading area should be bunded and must equal or exceed the volume of the largest compartment of any vehicle to be discharged
- All transfer stations shall provide valid physical addresses, contact details, telephone numbers, email contacts and GPS coordinates of their locations
- All transfer stations should have in place an Emergency Response Plan (spill control equipment, a fire control plan, an evacuation plan) in case of incidents, spillages, fires, explosions etc
- The transfer stations shall only sell used oil to licensed recycling facilities and energy recovery users
- All used oil to and from a transfer station shall be transported by licensed used oil transportation vehicles
- The transfer station shall have a waste management plan and
- Establish a complaint management system (twenty-four (24) hour complaint contact telephone number) and ensure verbal response is provided to the complainant within two (2) hours.

- **Tank farm**

- All oil tanks shall meet the KS 200: Part 1: 2002 on specifications for storage tanks for petroleum industry
- All oil tanks shall be bunded appropriately with a bund wall of size stipulated under the KS 1967:2006
- All tanks are to be made from steel
- All tanks compartments should be padlocked when not in use
- All tanks are to be bunded. The bund must equal or exceed the volume of the largest tank in that bunded area
- The bunded area must be paved with concrete or asphalt, not soil, clay or gravel
- All tanks are to be inspected on a regular basis for worthiness in accordance with KS 1938
- All tanks are to have some method to determine the volume in each tank
- All tank maintenance is to be recorded and kept for five years and
- Haulage of 5% must be left when the tank is full

3.4.5 The Occupational Safety and Health Act, 2007

The purpose of the Occupational Safety and Health Act (OSHA) is to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces and to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes.

Of particular importance to the proposed project is the requirement that all work places must be registered with the Department of Occupational Safety and Health Services. Further, there is a requirement that a Safety and Health Committee must be put in place and those employees and members of this committee must be inducted and trained on the provisions of the Act accordingly.

The OSHA, 2007 stipulates that an employer shall not require or permit his employee to engage in the manual handling or transportation of a load which by reason of its nature is likely to cause the employee to suffer bodily injury.

Relevance to the proposed project

- *Under OSHA, the proponent should register the site as a workplace with the DOSHS and ensure timely renewal of the same*
- *It also involves the prevention of accidents at the workplace and provision of personal protective equipment (PPE) to all workers and enforces their use.*
- *Strict provisions will be made for the requirement of supervision and training of inexperienced workers during commissioning period and carry out occupational safety and health audit annually*

3.4.6 Public Health Act, 2012

This is an act of parliament to make provision for securing and maintaining health. Section 13 states that it shall be the duty of every health authority to take all lawful, necessary and under its circumstances reasonably practicable measures for preventing the occurrence or dealing with any outbreak, or prevalence of any infections, communicable or preventable diseases or conditions to safeguard and promote the public health and to exercise the powers and perform the duties in respect of the public health conferred or imposed on it by this act or by any other law. The Public Health Act Cap 247, Section 3 gives provisions for use of poisonous substances. It refers to regulations for protection of persons against risk of poisoning, imposing restrictions or conditions on the importation, sale, disposal, storage, transportation or use of poisonous substances. This Act also requires persons concerned with importation, sale, disposal storage, transportation or use of poisonous substances to be registered and licensed and provides measures for detecting and investigating cases in which poisoning has occurred.

Relevance to the proposed project

- *The proponent should ensure compliance with the Act by providing clean, healthy and safe environment during construction and subsequent operation of the sludge handling facility.*

3.4.7 The Water Act, 2016

The purpose of the 2016 Water Act is to align the water sector with the Constitution's primary objective of devolution. The act recognizes that water related functions are a shared responsibility between the national government and the county government. The Constitution acknowledges access to clean and safe water as a basic human right and assigns the responsibility for water supply and sanitation service provision to the 47 established counties.

An act of Parliament to provide for the regulation, management and development of water resources, water and sewerage services; and for other connected purposes. This Act may be cited as the Water Act, 2016 and shall come into operation on such a date as the Cabinet Secretary responsible for matters relating to water May by notice in the Gazette, appoint, and different dates may be appointed for the coming into operation of different provisions. Water in Kenya is owned by the Government, subject to any right of the user, legally acquired. However; this Act regulates conservation and management of all water resources within the republic, and related purposes. In section 3 of part II, it states that every water resource is vested in the State, subject to any rights of user granted by or under this Act or any other written law. The Act also provides for establishment of a Water Resource Authority, whose aim is to manage and coordinate conservation and utilization of water resources at national scale and other several organs to ensure development and sustainable use of water resources. These include Water Sector Trust Fund (WSTF), Water Resources Users

Associations (WRUAs), Water Services Providers (WSPs) and Water Works Development Agencies among others.

Relevance to the proposed project

- *The proponent should ensure that water usage in all phases of the project cycle is in line with the provisions of this Act*
- *The proponent should also ensure that the activities of the site does not cause any leachate that may cause ground water pollution.*

3.4.8 The Energy Act, 2019

An Act of Parliament to consolidate the laws relating to energy, to provide for National and County Government functions in relation to energy, to provide for the establishment, powers and functions of the energy sector entities; promotion of renewable energy; exploration, recovery and commercial utilization of geothermal energy; regulation of midstream and downstream petroleum and coal activities; regulation, production, supply and use of electricity and other energy forms; and for connected purposes. The Act sets up the establishment of Energy and Petroleum Regulatory Authority (EPRA) hereinafter referred to as the Authority. The Energy and Petroleum Regulatory Authority (EPRA) is established as the successor to the Energy Regulatory Commission (ERC) under the Energy Act, 2019 with an expanded mandate of inter alia regulation of upstream petroleum and coal.

Relevance to the proposed project

- *The proponent is required to ensure that the energy supplied is consumed in accordance to the provisions of the Act and energy audits carried out on the facility*

3.4.9 The Petroleum Act, 2019

An Act of Parliament enacted by the Parliament of Kenya to provide a framework for the contracting, exploration, development and production of petroleum; cessation of upstream petroleum operations; to give effect to relevant articles of the Constitution in so far as they apply to upstream petroleum operations, regulation of midstream and downstream petroleum operations; and for connected purposes. The facility should strive to be compliant to provisions of this Act.

Relevance to the proposed project

- *The proposed project should strive to be compliant to provisions of this Act.*

3.4.10 Physical and Land Use Planning Act, 2019

The Act provides for the planning, use, regulation and development of land and for connected purposes. It was enacted to ensure that every person engaged in physical and land use planning shall promote sustainable use of land and livable communities which integrates human needs in any locality. The Act allows the County Government to prepare a local physical and land use development plan in respect of a city, municipality, town or unclassified urban area.

3.4.11 County Government Act, 2012

An Act of Parliament to give effect to Chapter Eleven of the Constitution; to provide for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Section 109 of the County Government Act (2012) helps counties to ensure effective coordination of spatial developments. Sub - section (2) part C states in part; a spatial county plan shall;

- Indicate desired patterns of land use within the county
- Address the spatial construction or re-construction of the county
- Provide strategic guidance in respect of the location and nature of development within the county
- Set out basic guidelines for a land use management system in the county taking into account any guidelines, regulations or laws as provided for under Article 67(2) (h) of the Constitution
- Set out a capital investment framework for the county‘s development programs and;
- Contain a strategic assessment of the environmental impact of the spatial development framework

Relevance to the proposed project

- *The Act gives right to access private property at all times by the County Government officers for inspection purposes.*

3.4.12 Occupiers Liability Act Cap 34

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

Relevance to the proposed project

- *Ensure safety of workers during construction, implementation and possible decommissioning phases of the proposed project*
- *The act requires that the occupier warn the visitors of the likelihood of dangers within his premises to enable the visitor to be reasonably safe*

3.5 Institutional Framework

At present there are many institutions and departments which deal with environmental issues in Kenya. To implement the above legal framework, these government institutions have varying mandates of implementation. These include;

The National Environment Management Authority (NEMA)

The object and purpose for which NEMA is established is to exercise general supervision and coordinate 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 Directorate of Occupational Safety and Health Services

The mandate of the Directorate is to ensure compliance with the provisions of the Occupational safety and health Act 2007 and promote safety and health of workers. The directorate is aimed to promote a safe and health workplace by implementing effective systems for the prevention of Occupational diseases, ill health accidents and damage to property in order to reduce the cost of production and improve productivity in all sectors of our economic activities. The core function of the directorate is among other functions Inspecting workplaces to ensure compliance with safety and health law.

- The Water Resources Authority to implement the Water Act
- The County Government of Kilifi to implement the County Government Act, its by-laws, the Public Health Act, the Physical and Land Use Planning Act and the Occupiers Liability Act.

CHAPTER 4: PROJECT DESIGN & DESCRIPTION

4.1 Project description

The proposed project will comprise integration of various types of wastes with their respective management and handling mechanisms on the same piece of land hence the term integrated waste management facility. The proposed integrated waste management and treatment facility project will comprise of waste oil transfer station/sludge handling facility, pretreatment and management hazardous wastes, incineration facility, handling of non-hazardous/biodegradable wastes in sanitary landfills through deep burying/ composting and management of construction debris/wastes and onsite waste water treatment plant. The proposed project will also comprise of other existing site amenities such as offices, water sources and other support services. The intended wastes will be transported using trucks licensed by the Authority in compliance with Waste Management Regulations 2006, both owned by the proponent or the other parties and deposited for sorting and pretreatment/denaturing at the site before final disposal as appropriate either through incineration, onsite wastewater disposal system, sanitary landfills and or any other method appropriate depending on the nature of waste being handled.

4.2 Project Design

The proposed project will cover approximately six acres out of the total seventeen acres of the total piece of land. The project proponent proposes to set waste oil handling facility; this will involve the construction and subsequent operation of a sludge handling facility. The facility will comprise of three overhead oil storage tanks with the capacity of 33,000litres each, loading and offloading area and oil/water interceptor. The tanks will be mounted on concrete slabs above a paved ground with a drain to channel the oil sludge into the oil/water interceptor. At the interceptor, oil will be separated from water. The end product is furnace oil which will be sold off to industrial clients for further use. The Sludge/used oil will be sourced from the following major bulk generators;

- Motor vehicle garages, repair yards, workshops and petrol service stations, ship yards,
- Industrial manufacturing operations
- Commercial operators and power generators
- Collection centres

The proposed project will incorporate installation of the incineration plant within the facility. Waste incineration is a method of waste disposal whereby high temperatures are used to sufficiently oxidize the combustible components in waste.

The incinerator type

The project proponent intends to install an incinerator plant to be used in disposal of both hazardous, non-hazardous materials/wastes and biomedical wastes. The incinerator will install electric operated incinerator and manual operated, a box type furnace with two chambers (primary & secondary). The incinerator will have the following components;

- Manual door for feeding the wastes for combustion
- 2 main burners (chambers) each with electronic temperature control from 0 to 1,200ºC
- The control panel for adjusting of the plant operation, with: The main switch, On /Off buttons for the burners and the ventilator
- The stack beside the furnace
- The ventilator (air pump) with connections to the furnace and the reaction chamber
- Hand adjustable time-clocks for the burners and the ventilator
- Digital displays of the electronic burner temperature controls

The process will entail complete combustion through injection of air (oxygen) from the installed air fan to aid in secondary combustion of other gases within the furnace before emitting the smoke into the atmosphere. The incinerator will have the capacity of 20,000kgs/hr.

The proposed project will entail pretreatment and management of hazardous wastes before final disposal through the most efficient and environmentally sound methods depending on the nature of the wastes to be handled. The proposed hazardous waste treatment and management will comprise of the following major components; PH Neutralization/Adjustment System and Heavy Metal Removal Systems.

PH Neutralization system will entail chemical neutralization of acids and bases from any source whereby hydroxide ions and hydrogen cations are used to produce water and harmless stable salt. Heavy Metal Removal System will entail removal of all heavy metal ions such as Iron (Fe), Lead (Pb), Zinc (Zn) among others from various hazardous industrial wastes. This will occur in two main forms, the particulate suspended form will be removed using a physical and mechanical filtration processes. The second form will involve removal of dissolved heavy metals using hydroxide, sulphide oxide or carbonate precipitation then passed through the mechanical filtration processes.

The integrated waste management and treatment facility will also entail disposal of non-hazardous and biodegradable wastes in sanitary landfill through deep burying and composting. The proposed sanitary landfill will be operated as one-off since the landfill will be dug depending on the capacity and amount of wastes to be disposed at any given time. The facility will also handle construction debris/wastes in accordance with Waste Management Regulations, 2006.

The integrated facility will also include Onsite Wastewater Treatment Plant (OWTP) in handling liquid wastes onsite. The proposed project will comprise of effluent monitoring and sampling area (chamber), and the septic tank and soak pit system. The whole plant will be linked through effective and efficient piping system from the waste receiving bay to the soak pit system. Onsite Wastewater Treatment is a small-scale plant aimed to treat liquid wastes/effluent from various areas ranging from contaminated liquids, water and other liquid wastes meant for disposal in compliance with existing waste management regulations through mechanical and biological processes.

The proponent intends to set up environmentally friendly waste management and treatment facility with enhanced health and safety standards without compromising environment and public health. The proposed integrated waste management and treatment facility will be designed to facilitate proper handling and management of wastes and will accommodate the following basic components;

a) Waste reception

It is expected that waste will be delivered to the site by trucks from all parts of the country as desired. Delivery will also be mainly by road but in compliance with waste transport regulations. The waste reception will comprise of;

- Security check of the wastes at the site entrance with issued gate pass
- Offloading area for the containerized waste since the wastes will be delivered using trucks
- The proponent has an existing waste transport license from the Authority

b) Waste sorting

The wastes that will be received at the proposed site may be mixed depending on sources and the transportation means. Sorting of the wastes before final disposal will be important since some wastes may require varying handling options/method depending on the nature of the waste. Sorting will be a manual process by the human labour at the site during operations, sorting bay will therefore, be provided with/fitted with appropriate quantification facilities, documentation and temporal holding zones. Necessary safety and environmental protection provisions will be provided.

c) Waste disposal/handling operations

The proposed project will entail management and disposal of wastes in compliance with waste management regulations depending on the nature of the wastes being handled. The proposed project will handle wastes through denaturing & incineration, deep burying through sanitary landfills, PH neutralization, heavy metal removal system and onsite wastewater disposal system or any other method depending on the nature of the waste. The wastes which will not be final disposed at the site will be transferred to the other sites such as licensed recycling sites for final disposal.

d) Waste transport

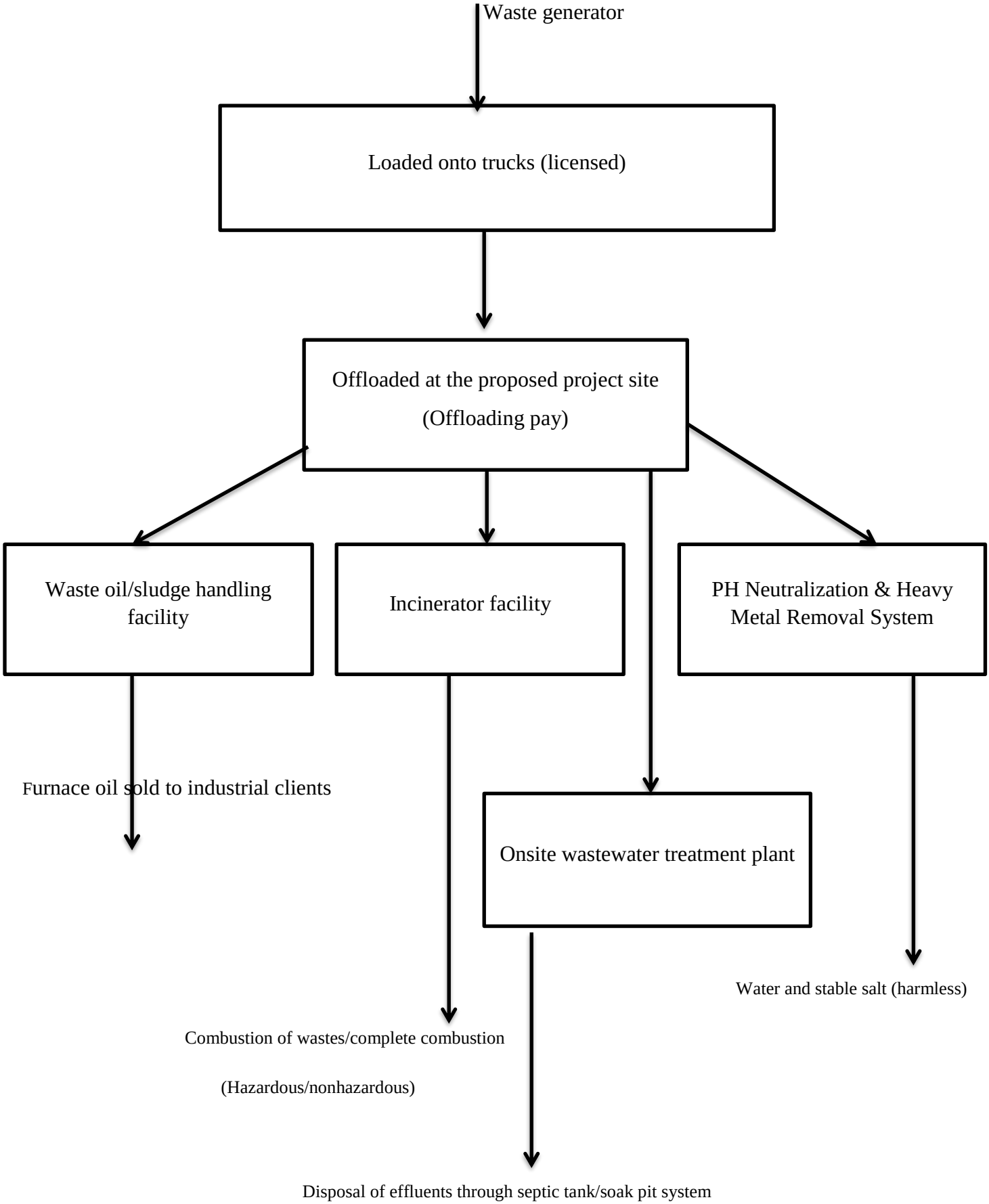
The waste transportation from the source to the project site for disposal will be in compliance to Waste Management Regulations, 2006. The transport trucks will be required to have waste transport licenses from the Authority accompanied with tracking documents for easy waste tracking. The proponent has an existing waste transport license.

e) Support amenities/services

The site for the proposed project has existing support amenities/services since it has ongoing operations. The site for the proposed project has the following support amenities;

- Site offices
- Sanitation facilities (toilets, bathrooms)
- Water supply (supplied on need basis)
- Trucks parking area
- Access weather road
- Health and safety provisions (fire extinguishers, proper signage, first Aid points etc)
- Security arrangements (all round chain-link boundary with one entrance gate

Figure 4.1: Schematic waste management flow at the proposed project site



4.3 Project Activities

a) Construction activities

The construction activities shall involve civil and engineering works as here on:

- Site preparation/clearing the site
- Laying of concrete foundations slab and bud walls for the facility
- Landscaping
- Installation of electrical works and other support services
- Government inspection/occupation certificate and completion of works issued
- Commissioning the project

b) Operational activities

The proponent intends to set up an integrated waste management and treatment facility. The site shall be used as a disposal facility and management site for various streams of wastes within Kilifi County and its environs from potential clients. The proponent intends to increase their waste handling capacity with enhanced health and safety mechanisms and without compromising environment and public health with prospects of future expansion. The site shall only be commissioned once operational license has been granted by the Authority.

4.4 The Project Concept

Environmental Hygiene is the science of anticipation, recognition, evaluation and control of health hazards in the work environment with the objective of protecting the health of workers and citizens of the community. Its role is first, to ensure a healthy work environment through continuous surveillance; second, to protect workers from diseases that can be caused by unhealthy environments; third, to break the vicious cycle of 'unhealthy environment' thus occupational diseases. It is for this reason, that proponent sought the assistance of environmental consultants to carry out an environmental impact assessment of the proposed integrated waste management and treatment facility.

4.5 Project Cost

The project implementation cost is estimated at Kshs. Eighty Million (80,000,000). See the attached project Bill of Quantities.

CHAPTER 5: PUBLIC & STAKEHOLDER CONSULTATION

4.1 Introduction

A public consultation process was engaged in gauging the sentiments of a variety of stakeholders. Besides the fact that this is a regulatory requirement under the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019, it was an excellent opportunity to offer the public (PAPs) an opportunity to ventilate their concerns and probably give recommendations concerning the proposed project in the specific area

Stakeholders represent individuals or groups that hold a stake in the project, either because they will be impacted by the project or because they have a vested interest in it. A public consultation/engagement process is very important in gauging the sentiments of a variety of stakeholders. The stakeholders categories identified in this proposed project included the following Project Affected Parties;

- Local communities/immediate neighbors
- Local Administration (DCC/Area Chief)
- Government agencies
- Political representatives
- Community Based Organizations (CBO's)

Each of the stakeholders above had different requirements, different interests, different levels of influence, and different expectations towards the project.

Figure 5.1: First stakeholder consultative meeting at the project site (Source: Site survey/photography)

Figure 5.2: Second stakeholder consultative meeting at the project site (Source: Site survey/photography)

5.2 Public consultation methodology

Two public consultative meetings were conducted at the project site among the local community and local leadership regarding the proposed project. Administration of open-ended questionnaires was also used as a consultation methodology to obtain their comments about the proposed project within the area. Meeting minutes & filled questionnaires have been appended to this report.

5.3 Stakeholder comments/concerns

The issues raised by neighbors of the site were thought to be pertinent to the eventual success of the proposed project. Such issues/views included:

- Creation of employment to the local community
- Safety of those working within the facility and neighborhood
- Environmental conservation measures to be put in place to protect the environment during project operation
- Sustainability of the proposed project in relation to the neighboring communities

5.4 Conclusion on findings

Members of the public and key stakeholders could see enormous benefits accruing to them by the coming into being of the proposed project. The local community and local leadership endorsed and supported the proposed project on condition that the relevant regulations and guidelines will be followed during operations and the local community will stand a chance to benefit from the project.

CHAPTER 6: ANALYSIS OF PROJECT ALTERNATIVES

6.1 Introduction

Investigating the available alternatives to the development proposal is an important aspect of the assessment process that could invariably help in mitigating the impacts of the proposed project. In this analysis, the consultants' team considered alternatives on the following basis.

- The project site
- Design and technology alternatives
- Scale and extent
- Waste management alternatives

In most cases, the ESIA process often occurs too late in decision-making to consider a full range of alternatives. This can undermine ESIA goals to encourage more environmentally sound and publicly acceptable solutions. Allowing new alternatives and objectives to evolve in relation to environmental conditions, public preferences and project sustainability may be a solution to most of the environmental and socio-economic problems associated with the implementation of new projects

6.2. Proposed Project Alternatives

6.2.1 The "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 noninterference with the existing environmental conditions. This alternative is however not viable owing to the fact that the status quo denies the proponent a viable investment opportunity and thereby income generation translating into profits, denies the local community employment opportunities and also denies both the County and National Government revenue. The 'No project' alternative is therefore not considered viable in the light of the benefits and deprivations of the project. From the analysis above, it becomes apparent that the No Project alternative is no alternative to the proponent.

6.2.2 The "Yes Project" alternative

This option envisages that the proposed project will be implemented thus was considered as the most viable because of the following reasons;

- There will be employment creation
- Commitment to environmental performance
- Source of income to the proponent through investment
- County and National Government revenue generation

6.2.3 Alternative project site

Relocating the proposed project to an alternative site is not a viable option. An alternative site could be considered for the proposed project if the proposed project would present serious environmental challenges that cannot be effectively managed. However, the proposed mitigation measures are considered adequate to minimize the impacts to levels that do not warrant significant environmental damage. In addition, the proponent intends to expand the capacity of the existing facility to handle wastes, the facility has an existing asbestos disposal landfill licensed by the Authority, there is also availability of adequate piece of land for the development, the site is also accessible and away from the densely populated areas thus making it suitable for waste disposal activities, this piece of land is also dully owned by the project proponent. This alternative is therefore not viable.

6.2.4 Project Design Alternatives

a) Technological Alternatives and Input Materials

The proposed project will be constructed using environmentally accepted technological innovations and materials compliant to engineering standards but locally available 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 project will entail use of locally available materials like sand, cement and ballast or similar approved materials that would not have adverse impacts on the environment. The technology to be used is environmentally friendly. Proposed project design will employ simple technology that lowers the cost of setting up the project based on the prevailing geographical formation.

b) Sustainability and Affordability

Sustainability of the proposed integrated waste management site would have a bearing on the environment in the area. This is because the operations of the project might affect the local environment positively or negatively; the proponent is expected to operate waste management and treatment facility in line with the set guidelines by NEMA and internationally acceptable standards. This will be assured by developing standard operating procedures (SOPs) that will ensure that the project is sustainable. Sustainability would mean the ability of the project to continuously serve the proponent without adverse impacts within the project area. This would call for designs that would ensure that the cost of operating the waste management facility is cost effective and does not impact negatively on the environment. Subsequently, this translates to affordability of the proposed project. Sustainability would also translate to the longevity of the project versus intended use. Affordability is greatly determined at the design stage.

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CHAPTER 7: POTENTIAL ENVIRONMENTAL IMPACTS IDENTIFICATION & MITIGATION MEASURES

This Chapter identifies both positive and negative environmental and social impacts likely to be occasioned by the activities of the proposed integrated waste management site. These impacts are hereby identified in three distinct phases of the project i.e. planning and designing phase, implementation/construction phase and operation phase. It discusses the nature of impacts, their magnitude, spatial and time extent and significance. The table below shows how these impacts are assessed.

Table 7.1: Scale for evaluation of project impacts

SCORE	**(-1) +1**	**(-2) +2**	**(-3) +3**	**(-4) +4**	**(-5) +5**
PARAMETER					
Magnitude	Impacts occur or are felt on site		Impacts affect more than 3 kilometers radius		Impacts affect the region
Significance	**Low** Small changes which are hardly detectable	**Moderate** Impact measurable but does not alter processes	**High** Many people, animals, plants affected. Disruption to ecosystems and social systems.	**Very high** Loss of biodiversity, property, livelihood systems	**Unknown effects** Insufficient information available. Apply precautionary principle
Probability of occurrence	**Possible** Impacts can occur but are controllable		**Probable** The impact is likely to occur but can be controlled by effective measures.		Definitely will occur
Duration of occurrence	**Short term** During pre-disposal phase only	**Medium term** Impacts will be during operational phase only		**Long term** Impacts will be there for entire operation phase	**Very Long term** For the entire operational phase and afterwards

7.1 Planning and Design Phase

7.1.2 Positive Impacts

- ***Creation of Employment opportunities***

During the planning and design phase of the proposed project, there will be employment opportunities especially for professionals. Those involved in planning and design include engineers, surveyors, environmentalists and sociologists among others. Those employed will improve their living standards from the fees they will be paid for their services.

- ***Awareness creation among the local community***

During the planning and design phase of the proposed project, a lot of awareness shall be done through consultations on different aspects of the project. Awareness improves civility in project planning, implementation and operations. This is a sure formula for ensuring there is sustainability of the project and acceptability among the local community. Impacts during this phase of the project are not significant. However, the professional consultants shall take necessary measures to document any concerns and address them on as they occur.

7.2 Implementation/Construction Phase

7.2.1 Positive Impacts

- ***Employment opportunities***

The construction works will require several human resources from machine operators to other skilled and unskilled labourers. Machine operators will be engaged for excavation works, site clearance and compaction works. Several workers including casual labourers, plumbers and engineers are expected to work on the site for a period of time. Semi-skilled, unskilled and formal employees are expected to obtain gainful employment during the period of construction. With labour intensive construction technologies, the project will provide employment for the locals.

- ***Market for construction inputs***

The project will require construction materials, most of which will be sourced locally. These include sand, cement, ballast and steel bars/ rods among others. This will provide a ready market for suppliers in and outside the project area.

7.2.2 Negative Impacts

- ***Loss of Flora and Fuana***

The proposed site lies on a relatively flat land covered with thorny bushes. The project site is a virgin land hence there will be clearing of the bushes to set up the site in preparation of the project implementation. The significance of the vegetation loss and other living organism during the site clearance will be high.

Proposed Mitigation Measures

- The contractor will ensure proper demarcation of the project area to be affected by the construction works; Strict control of construction vehicles to ensure that they operate only within the area to be disturbed by access routes and other works;
- The proponent has started planting and maianting some of the already depleted indigenous plant species with the project site

- ***Excavation and loss of top soil***

Project construction will involve earthworks and excavation that will comprise of pits and other landscaping activities. These activities will generate a lot of top soil that will need to be disposed from the project site. This top soil will also be used during backfilling and landscaping activities. The excavated soil may affect the surrounding environment if not adequately disposed.

Proposed Mitigation Measures

- Maximizing the re-use of excavated materials to ensure that no permanent spoil dumps are created
- Extra loads of excavated soil should be used to make good the access road to the project site
- Properly disposing off the spoil in an area identified by the experts and approved by NEMA

- ***Physical disturbance of the project setting***

The proponent is expected to undertake physical works on the project site especially during the clearing of the project area and making of the access roads within. These activities will have minimal negative impacts and could result in; changes in the local topography during excavation and blockage of natural drainage for rain water.

The negative impacts will be temporal because the proponent is expected to mitigate all the negative impacts prior to commissioning of the project. The potential negative impacts on the physical environment will be addressed through the environmental management plan.

Proposed Mitigation Measures

- The proponent should ensure that there is minimal disturbance to the topography of the area
- The excavation and lanscaping design shall not interfere with local drainage or change the topography or introduce physical changes that are not in harmony with the physical setting of the project area
- The project components and associated structures should be aesthetically acceptable to blend in with the surroundings

- The proponent shall as much as possible complete the works in such a way that natural aesthetics shall be retained at the locations
- Restoration shall be undertaken to ensure that the original setting is as much as possible retained
- The proponent should observe measures stipulated in the ESMP

- ***Noise and Excess Vibrations***

Constructions of the proposed project will most likely result in noise disturbance as a result of the machines that will be used e.g. excavation equipment and construction vehicles delivering materials to site. Noise will also be generated by construction workers. 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 noise levels in excess of acceptable and permitted levels
- Exposure of persons to excessive ground-borne vibration or ground-borne noise levels
- A substantial permanent increase in ambient noise levels (more than 3dBA) in the project vicinity above levels existing before the project

Proposed Mitigation Measures

- Provision of appropriate Personnel Protective Equipment (PPE)
- Construct mainly during the day
- Consider labour based construction methodologies; and
- The provisions of EMCA on noise and excessive vibrations should be observed

- ***Dust Emissions***

Dust will be emitted during excavation and related earthworks. Air-borne particulate matter pollution is likely to occur during the excavation works. This is likely to affect site workers, in extreme situations leading to respiratory problems.

Proposed Mitigation Measures

- Minimizing the number of motorized vehicles on use
- Rehabilitate disturbed areas
- Wet all active construction areas as and when necessary to reduce dust.

- ***Increased Waste Generation***

Solid wastes generated during construction include papers used for packing, plastics, cuttings and trimmings of materials among others. Dumping around the site will interfere with the aesthetic status and has a direct

effect on the surrounding community. Disposal of the same solid wastes off-site could also be a social inconvenience if done in the wrong places. The off-site effects could be aesthetic, pest breeding, pollution of physical environment including water resource, invasion of scavengers and informal recycling by communities.

Proposed Mitigation Measures

- Setting up waste collection and segregation area strategically within the site for collection and sorting of slid wastes before disposal.
- Construction waste should be recycled or reused as much as possible to ensure that materials that would otherwise be disposed as waste are diverted for productive uses
- 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
- Employ the 3R's concept (Reduce, Reuse & Recycle) in dealing with wastes onsite

- ***Increased Water Demand***

During the construction phase of the proposed project, both the construction workers and the construction works will create demand for water in addition to the existing demand. Water will mostly be used during construction for wetting surfaces or cleaning/curing completed structures. It will also be used by the construction workers to wash and drink.

Proposed Mitigation Measures

- The proponent through the contractor shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water use
- Any water handling equipment, facility and systems shall be appropriate for the intended usage.
- Water used on the construction shall reflect the level of conservation achieved by the contractors.
- Documentation of amounts of water used will be helpful in minimizing wastage

- ***Occupational hazards at workplace***

Construction workers are likely to have injuries and hazards as the construction works unavoidably expose workers to occupational safety and health risks. The workers are also likely to be exposed to risk of accidents and injuries resulting from accidental falls and injuries from hand tools and construction equipment. There will also be an increased risk of traffic accidents where delays and diversions are imposed or altered without adequate warning.

Proposed Mitigation Measures

- To reduce on the workers accidents and hazards, the proponent will develop and commit the contractors to Site Occupational Safety and health rules and regulations as stipulated in the Occupational Safety and Health Act, 2007
- All construction workers should be advised of the dangers associated with construction work
- Workers should be provided with suitable and appropriate PPE's
- Provision of adequate sanitary facilities to workers, the site has an existing sanitary facilities
- Train all workers on Safety Health and Environment (SHE) with an aim of improving awareness
- Install safety signage along the work areas
- Task-based risk assessment should be done on daily basis to assess the risks and hazards thereby prescribing the appropriate prevention measures

- ***Loss of Heritage, Cultural and Historical values***

The proposed project has the potential to cause loss of heritage cultural and historical significant to the community during its implementation. The site for the proposed project does not possess any cultural and heritage sites. From the field studies, there are no known impacts on archaeologically protected monuments and cultural properties in the proposed project area, if any archaeological or culturally important artefact be discovered during the construction process, the contractor should develop and implement a chance find procedure that should be approved by the relevant government body.

- ***High Prevalence of Infectious and Communicable diseases***

During the construction phase there is a risk of spread of communicable diseases. Aspects of the physical environment that promote transmission of diseases include: disposal of wastes and ventilation which are likely to occur during the construction phase of the project. With the influx of people during construction, there will be a likelihood of increase in diseases such as typhoid, tuberculosis, diarrheal diseases, respiratory diseases, dysentery and cholera.

The infection rate of HIV/AIDS and other STI's is expected to rise during the construction phase of the proposed project. This is due to the fact that the contractors, traders and workers will have money to attract women/men from the project area in a bid to solicit for sex, thereby creating avenues for spread of HIV/AIDS and other STIs. The most vulnerable members of the community are women as they don't have access to resources necessary for production and wealth creation.

Proposed Mitigation Measures

- Education and sensitization of workers and the local communities on STIs including provision of condoms to the project team and the public

- The contractor has to institute HIV/AIDS awareness and prevention campaign amongst workers for the duration of the contract e.g. erect and maintain HIV/AIDS information posters at strategic locations within the site.
- The contractor has to ensure that staff are made aware of the risks of contracting or spreading sexually transmitted diseases
- The contractor should ensure that the project workers are sensitized on the local culture

7.3 Operation Phase

7.3.1 Impacts on Occupational Health and Safety at Workplace

There are potential safety and health risks associated with operations of the facility. These include dermal contact with waste oil and inhalation of vapors during handling of such products, accidental falls, injuries and general health hazards as a result of handling of hazardous industrial wastes. All these risks have potential to cause injuries, permanent disability or even death and hence the management should be committed to ensuring safety and health of workers and visitors at the facility.

Proposed Mitigation Measures

- All employees to be provided with the appropriate Personal Protective Equipment and Clothing (PPE & C) and enforce their use
- Warning & Safety signage to be displayed at strategic areas within the site
- Restrict access to the site by the unauthorized people/persons
- Develop and implement a safety and health policy, and emergency response plan for the site
- Sensitize employees to adhere to work procedures to minimize accidents
- Conduct first aid training among the workers and provide well-stocked first aid kit
- Provide and keep an accident/incident register occurring on the facility including near misses and actions taken to prevent future occurrences
- Conduct annual occupational safety and health audits and other statutory safety audits
- Comply with the provisions of the Occupational Safety and Health Act, 2007

7.3.2 Impacts of oil spill and leakages and management of waste oil

There is potential of oil spills especially during offloading, and transfer of waste oil into the storage tanks and into the interceptor. Oil/ lubricant leakages may result from the delivery tankers. These products contain detrimental elements which should not be exposed to the environment since they contain traces of heavy metals such as lead, sulphur and mercury among others and would thus contaminate ground water and soil.

Proposed Mitigation Measures

- Construct a bund wall around the storage tanks, and loading and offloading area to prevent accidental oil leaks and spills from flowing to other areas
- Conduct regular tests on the waste oil tanks to curb possible tank failure
- Pave the loading and offloading area with an impervious material to prevent any spills from contaminating ground water and soil
- Ensure that adequate spill containment is provided at all times in case of severe leakage of oils. The containment should be of at least 20% the capacity of the storage tanks
- Regularly de-sludge and maintain the oil interceptor in good working condition
- Comply with the Technical Guidelines on the Management of Used Oil and Oil Sludge in Kenya, 2016

Waste oil management procedures

Oil sludge is the viscous, non-flowing, semi-solid material which is generated as a result of long storage of oils. The sludge is hazardous and thus special attention and utmost care in handling and disposal should be accorded. Sludge will be generated from the oil water interceptor and cleaning of the storage tanks.

Proposed Mitigation Measures

- The sludge should be managed through incineration in in accordance with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006
- Comply with the Technical Guidelines on the Management of Used Oil and Oil Sludge in Kenya, 2016

7.3.3 Fire risks

The proposed waste management site will comprise of waste oil handling facility, waste oil contains hydrocarbons which are volatile and their vapors in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise. Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Fire occurrence may lead to death, financial losses and loss of livelihoods for the workers and neighbors.

Proposed Mitigation Measures

- Provide additional firefighting equipment within the facility
- Firefighting equipment should be serviced quarterly by fire service providers
- Train employees on the use of fire-fighting equipment
- Develop and implement a fire and emergency response plan

- Provide informative fire safety and warning signage and replace warn out ones within the facility
- Enforce a 'no smoking' rule within the facility
- Conduct fire drills and fire safety audits annually

7.3.4 Impact on air quality (air & noise pollution)

Integrated waste management and treatment facility will have the potential to affect the general air quality of the environment due to various waste streams to be handled. For instance, waste oil storage facilities can be a potential source of air pollution. The main sources of emissions to air include evaporative losses of volatile organic compounds (VOCs) of waste oil from storage, particularly during bulk deliveries and exhaust fumes from the waste oil delivery tankers. Other sources of potential air pollution will include bad odor gases associated with municipal wastes such as biodegradable wastes. On the other hand, noise pollution will emanate from vehicular movement in and out of the facility. However, the background noise within the area is in keeping with that will be generated by the vehicles accessing the facility.

Proposed Mitigation Measures

- Provision of appropriate and adequate PPE to all workers within the site and enforce on their use
- Sensitize the drivers to avoid unnecessary hooting and running of vehicle engines
- Conduct air quality monitoring in collaboration with a NEMA designated laboratory especially for the incinerator
- Comply with the provisions of the Environmental Management and Coordination (Air Quality) Regulations, 2014 and (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009

7.3.5 Impact on water quality (effluent management)

Water will be required during the project operation for dilution of the water based wastes (effluent/domestic wastes) before final disposal through onsite wastewater treatment plant, water will also be used for sanitation and drinking purposes and will be supplied on need basis. Waste water from the facility will be generated as effluent from sanitation facilities and will be managed through septic tank and soak away pit. Additionally, wastewater will be generated at the interceptor during the separation process of the sludge.

Proposed Mitigation Measures

- Create awareness among the staff on water conservation mechanisms
- Monitor the quality of the domestic effluent and the discharge from the oil/water interceptor to ascertain conformity to the standards stipulated under the Third Schedule of Environmental Management and Coordination (Water Quality) Regulations, 2006
- Apply for and obtain an Effluent Discharge License (EDL) from NEMA

- Comply with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006

7.3.6 Impact on solid waste generation and management

The facility will generate different types of solid wastes i.e. from the office comprising of mainly paper from administrative activities, glass and plastics for office supplies; and from the used oil operations of the facility in the form of rags, used seals and general packaging materials. The facility will also produce both hazardous and no hazardous wastes. Poor disposal of solid waste degrades environmental quality. Adequate measures should be put in place to ensure that hazardous wastes are not mixed with regular wastes.

Proposed Mitigation Measures

- Provide adequate solid waste collection bins with a capacity for segregation within the facility
- Sensitize workers on the process of solid waste collection, segregation and proper disposal
- Procure a sizeable central solid waste collection bin with chambers to accommodate separated waste
- Contract a NEMA licensed waste handler to dispose off the solid waste, the facility has existing licensed incinerator to handle wastes
- Comply with the provisions of Waste Management Regulations, 2006

7.3.7 Impacts on Traffic and Site accessibility

The operations of the proposed waste management site are likely impact on the traffic in the area through the access road to the site. This will be as a result of trucks visiting the site in delivering the wastes. The proposed site area does not exhibit traffic jams since the site is within the village setting.

Proposed Mitigation Measures

- The trucks carrying wastes will be advised to access the site at intervals to reduce traffic congestion along the access road
- The operations of the site will be on contractual basis hence reducing the potential impacts of heavy traffic
- Develop and implement a traffic management plan
- Control entry and exit of vehicles to and from the facility
- Comply with the provisions of Traffic Act, 2016

7.3.8 Impacts on Heritage, Cultural and Historical Values

The site for the proposed project does not possess any cultural and heritage sites. Therefore, the proposed protect will not have any impact on the cultural and heritage values of the community.

CHAPTER 8: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

8.1 Introduction

The objectives of the Environmental and Social Management Plan are:

- To guide the project implementers in project planning,
- To guide the Project implementers on the likely impacts of the project and when they are likely to occur
- To give an assessment of the capacity requirements for the implementation of the ESMP
- To guide the project implementers to allocate adequate resources for the implementation of the mitigating measures

8.2 ESMP Outline

The table below outlines the environmental and social management plans for the proposed project cycle. The plan considers the following;

- Predicted/anticipated environmental impact
- Proposed mitigation measures
- Responsible party / parties
- Timeframe
- Estimated costs

The ESMP for the proposed project will cover all the project cylce or phases. The project phases comprises of construction phase, operation phase and decommissiong phase.

8.2 ESMP for Proposed Integrated Waste Management & Treatment Facility

8.2.1 Construction Phase

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
Occupational Health and Safety Hazards at Workplace	− Provide all employees with appropriate and adequate Personal Protective Equipment and Clothing (PPE's & C). These include working safety boots, overalls, helmets, goggles, earmuffs, respirators/masks and gloves. − Warning & Safety signage will be placed at the strategic areas within the facility − Provide employees with correct equipment tools and for the jobs assigned and train on their use − Provide first aid services and emergency services kit at the project site. This should be fully equipped at all times and should be managed by qualified person. − Register the site as a workplace with the Directorate of Occupational Safety and Health Services − Ensure moving parts of machines and sharp surfaces are securely protected while on site − The proponent should have workmen's compensation cover (WIBA). It should comply with workmen's compensation − Comply to the guidelines in place in mitigating spread of Covid-19	Project Manager/Contractor	50,000.00
Loss of flora and fauna (biodiversity loss)	− The contractor will ensure proper demarcation of the project area to be affected by the construction works; Strict control of construction vehicles to ensure that they operate only within the area to be disturbed by access routes and other works − The proposed site will be rehabilitated through the rehabilitation plan to be developed by the proponent to try and retain the natural flora and fauna during the operation phase. − This will entail progressive planting of native trees within the boundary of the facility. − Introduction of vegetation (trees, shrubs and grass) on open spaces within and around the site. Indigenous species would be preferred.	Proponent/ site manager	10,000.00

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
Excavation and loss of top soil (land degradation)	− Maximizing the re-use of excavated materials to ensure that no permanent spoil dumps are created − Extra loads of excavated soil should be used to make good the access road to the project site − Properly disposing off the spoil in an area identified by the experts and approved by NEMA − Ensure compliance with Waste Management Regulations, 2006 in disposing the excavated soil	Site Manager/proponent	20,000.00
Physical disturbance of the project area	− The proponent should ensure that there is minimal disturbance to the topography of the area − The excavation and lanscaping design shall not interfere with local drainage or change the topography or introduce physical changes that are not in harmony with the physical setting of the project area − The project components and associated structures should be aesthetically acceptable to blend in with the surroundings − The proponent shall as much as possible complete the works in such a way that natural aesthetics shall be retained at the locations − Restoration shall be undertaken to ensure that the original setting is as much as possible retained	Proponent/contractor	Nil
Noise and excessive vibrations	− Provision of appropriate Personnel Protective Equipment (PPE) to protect the empoyees from noise and vibrations effects − Construct mainly during the day (8am-5pm) − Consider labour based construction methodologies − Sensitize truck drivers to avoid unnecessary hooting and running of vehicle engines − Ensure compliance with provisions of Environmental Management and Coordination (Noise and Excessive Vibrations Pollution) (Control) Regulations, 2009	Proponent/contractor	50,000

Anticipated Impacts/environmental aspect	**Recommended Mitigation Measures**	**Responsible Party**	**Estimated Cost (Ksh)**
Dust Emissions (Air pollution)	− Minimizing the number of motorized vehicles on use − Rehabilitate disturbed areas − Wet all active construction areas as and when necessary to reduce dust. − Dry materials should be kept dump or covered at all time − Install gadgets to intercept the particulate matter as well as controlling gaseous emissions.	Proponent/contractor	20,000.00
Increased waste generation	− Setting up waste collection and segregation area strategically within the site for collection and sorting of solid wastes before disposal. − Construction waste should be recycled or reused as much as possible to ensure that materials that would otherwise be disposed as waste are diverted for productive uses − 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 − All combustible materials or wastes will be disposed at the onsite in accordance to waste management regulations	Proponent and site supervisor	50,000.00
Increased Water demand	− The proponent through the contractor shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water use − Any water handling equipment, facility and systems shall be appropriate for the intended usage. Water used on the construction shall reflect the level of conservation achieved by the contractors. − Documentation of amounts of water used will be helpful in minimizing wastage − Comply with Water Quality Regulations, 2006	Proponent/contractor	30,000.00

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
Loss of Heritage, Cultural and Historical values	− Prevention and restoration of cultural and heritage values of the community in the proposed project site − The site for the proposed project does not possess any cultural and heritage sites	Proponent/contractor	Nil
High Prevalence of Infectious and Communicable diseases	− Education and sensitization of workers and the local communities on STIs including provision of condoms to the project team and the public − The contractor has to institute HIV/AIDS awareness and prevention campaign amongst workers for the duration of the contract e.g. erect and maintain HIV/AIDS information posters at strategic locations within the facility. − The contractor has to ensure that staff are made aware of the risks of contracting or spreading sexually transmitted diseases − The contractor should ensure that the project workers are sensitized on the local culture − Comply to the guidelines in place in mitigating spread of Covid-19	Contractor/proponent	10,000.00
The community conflicts	− Make sure all stakeholders and the local population is comfortable with project implementation. − Comprehensive public consultation was conducted with the local community and leadership to create awareness among the locals	Proponent/ESIA experts	40,000

8.2.2 Operation phase

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
Occupational Health and Safety	− Develop and implement a safety and health policy, and emergency response plan for the site/facility − All employees to be provided with the appropriate Personal Protective Equipment and Clothing (PPE & C) and enforce their use − Sensitize employees to adhere to work procedures to minimize accidents − Warning & Safety signage to be displayed at strategic areas within the facility − Restrict access to the site by the unauthorized people/persons − Register the site as a workplace with the Directorate of Occupational Safety and Health Services − Sensitize employees to adhere to work procedures to minimize accidents − Conduct first aid training among the workers and provide well-stocked first aid kit − Provide and keep an accident/incident register occurring on the facility including near misses and actions taken to prevent future occurrences − Conduct annual occupational safety and health audits − Comply with the provisions of the Occupational Safety and Health Act, 2007	The Proponent/Health and Safety advisor	100,000.00

Anticipated Impacts/environmental aspect	**Recommended Mitigation Measures**	**Responsible Party**	**Estimated Cost (Ksh)**
Impacts of oil spill and leakages and management of waste oil	− Construct a bund wall around the storage tanks, and loading and offloading area to prevent accidental oil leaks and spills from flowing to other areas − Conduct regular tests on the waste oil tanks to curb possible tank failure − Pave the loading and offloading area with an impervious material to prevent any spills from contaminating ground water and soil − Ensure that adequate spill containment is provided at all times in case of severe leakage of oils. The containment should be of at least 20% the capacity of the storage tanks − Regularly de-sludge and maintain the oil interceptor in good working condition − The sludge should be managed through incineration in in accordance with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006 − Comply with the Technical Guidelines on the Management of Used Oil and Oil Sludge in Kenya, 2016	Proponent/ contractor	Within estimated project cost
Fire Risks and hazards	− Provide firefighting equipment within the site/facility − Firefighting equipment should be serviced quarterly by fire service providers − Develop and implement a fire and emergency response plan − Train employees on the use of fire-fighting equipment − Develop and implement a fire and emergency response plan − Provide informative fire safety and warning signage within the facility − Enforce a ‘no smoking’ rule within the facility − Conduct fire drills and fire safety audits annually	Proponent	80,000

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
Impacts on air quality (air& noise pollution)	− Conduct air quality monitoring in collaboration with a NEMA designated laboratory especially for the incinerator − Conduct annual stack emission assessment for the incinerator through NEMA accredited laboratories − Direct observation of particulate matter from the facility − The existing incinerator has been compliance with Air quality regulations − Choosing advanced combustion designs and emission-control technologies − Having well-trained and certified employees that ensure that the combustor is operated to maximize combustion efficiency and that the emission control devices are operated to optimize conditions for pollutant capture or neutralization − Comply with the provisions of the Environmental Management and Coordination (Air Quality) Regulations, 2014 − Provision of appropriate and adequate PPE to all workers within the site and enforce on their use − Sensitize the drivers to avoid unnecessary hooting and running of vehicle engines	Proponent	100,000.00
Water quality and effluent management	− Create awareness among the staff on water conservation mechanisms − Monitor the quality of the domestic effluent and the discharge from the oil/water interceptor and onsite treatment plant to ascertain conformity to the standards stipulated under the Third Schedule of Environmental Management and Coordination (Water Quality) Regulations, 2006 − Apply for and obtain an Effluent Discharge License (EDL) from NEMA − Comply with the provisions of the Environmental Management and Coordination	Proponent/Accredited laboratories	70,000

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
	(Water Quality) Regulations, 2006		
Impacts on solid waste generation & management	− Provide adequate solid waste collection bins with a capacity for segregation within the facility − Sensitize workers on the process of solid waste collection, segregation and proper disposal − Procure a sizeable central solid waste collection bin with chambers to accommodate separated waste − Contract a NEMA licensed waste handler to dispose solid waste − Comply with the provisions of Waste Management Regulations, 2006	Proponent	20,000
Traffic management & site accessibility	− The trucks carrying wastes will be advised to access the site at intervals to reduce traffic congestion along the access road − The operations of the site will be on contractual basis hence reducing the potential impacts of heavy traffic − Develop and implement a traffic management plan − Control entry and exit of vehicles to and from the facility − Comply with the provisions of Traffic Act, 2016	Proponent	Nil
Increased energy demand	− Sensitize workers to switch off lights when not in use − Ensure regular servicing and maintenance of electrical appliances − Use of renewable energy sources such as solar energy	Proponent	Nil

Anticipated Impacts/environmental aspect	**Recommended Mitigation Measures**	**Responsible Party**	**Estimated Cost (Ksh)**
Heritage, Cultural and Historical values	− Prevention and restoration of cultural and heritage values of the community in the proposed project site − The site for the proposed project does not possess any cultural and heritage sites − The project should be in harmony with the cultural and social aspect of the community	Proponent	Nil
Prevalence of Infectious and Communicable diseases	− Education and sensitization of workers and the local communities on STIs including provision of condoms to the project team and the public − The contractor has to institute HIV/AIDS awareness and prevention campaign amongst workers for the duration of the contract e.g. erect and maintain HIV/AIDS information posters at strategic locations within the site. − The proponent has to ensure that staff are made aware of the risks of contracting or spreading sexually transmitted diseases	Proponent	Nil
The community involment	− Make sure all stakeholders and the local population is comfortable with project implementation. − Provision of employment opportunities to the local community	Proponent	Nil

8.2.3 Decommissioning phase

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
Occupational Health and Safety	− The process of demolition is supervised by competent personnel − Seek the services of a licensed construction company to carry out demolitions − Ensure the protection of infrastructural facilities within the site during the decommissioning phase such as water facility − Provision adequate and appropriate PPE's and Clothing and enforce on their use for people involved − Seek demolition permit from the relevant authorities − Ensure compliance with the Occupational Safety and Health Act, 2007	Proponent/contractor	80,000.00
Waste generation	− Ensure compliance with the Waste Management Regulations, 2006 in disposing of the demolition wastes − Contract a NEMA licensed waste handler to dispose waste generated from the demolition activities − Waste recovery should be encouraged, reusable and recyclable components from the site should be conserved for secondary use	Proponent/ contractor	Within estimated project cost
Social and economic concerns	− Train employees on alternative livelihoods prior to decommissioning of the project − Prepare and issue recommendation letters to the workers to seek alternative employment opportunities elsewhere − Ensure compliance with labor laws and other statutory regulations in decommissioning phase − Economic decline within the project area, look for an alternative site to set up the facility and realize the associated economic benefits	Proponent	Nil

Anticipated Impacts/environmental aspect	**Recommended Mitigation Measures**	**Responsible Party**	**Estimated Cost (Ksh)**
Land degradation	− Ensure environmental rehabilitation and restoration of the project site through planting of indigenous tress − Proper handling of wastes on site to reduce environmental degradation	Proponent	Contracted cost

CHAPTER 9: ENVIRONMENTAL MONITORING PROGRAM

9.1 Overview of monitoring program

Throughout the operation phase, regular monitoring intended for proper safety and protection of the environment will be undertaken. The monitoring system will assist in observation, evaluation, assessment and reporting on the performance of different/various variables with regard to the environment.

Environmental Monitoring Plans is required to ensure full and systematic implementation of the Environmental Management Plan. It entails assessment of environmental performance of the proposed project by documenting, tracking and reporting any changes in environmental parameters in space and time. The objective of the monitoring plans is to enhance the environmental performance of the project by providing data and information on compliance with legislative standards and determining the levels of deviation from the values obtained during the baseline monitoring. This in turn informs the corrective measures if any that need to be implemented to comply with the legislative standards. For the proposed project, the following monitoring plans/parameters will be looked at;

- Occupational safety and health monitoring plan
- Wastewater quality monitoring plan
- Solid waste monitoring plan
- Air quality monitoring plan
- Noise monitoring plan

9.2 Environmental Management System

An environmental management system (EMS) is a comprehensive approach to managing environmental issues, integrating environment-oriented thinking into every aspect of development management. An EMS ensures environmental considerations are a priority with other concerns such as costs, product quality, investments, productivity and strategic planning.

The proposed waste management facility will require that a comprehensive safety, occupational and public health and environmental system be formulated and maintained in accordance with the relevant legislative and regulatory requirements.

9.3 Environmental Institutional Framework

The project proponent will work with EIA/EA experts' team in identifying ways to improve environmental performance of the waste management facility setting objectives and targets, monitoring and evaluating implementation.

9.4 Monitoring schedule

The proponent will follow the monitoring schedule that will assist in observation, evaluation assessment and reporting on the performance of different/various variables. The following table summarizes the suggested monitoring schedule of the integrated waste management site.

Table 9.1: Summary of monitoring schedule

Description of parameter	**Method of monitoring**	**Monitoring schedule and duration**
Compliance by contractor and contractor staff to HSE requirements	Visual inspections against checklists containing requirements	Review daily to determine impact on quality
Public health and safety	Visual inspection and complaints from neighbors/workers Test quality of the environmental parameters such as air quality & water quality through NEMA accredited laboratories	Daily Quarterly assessments

9.5 Waste tracking

As per the Waste Management Regulations of 2006 and the Technical Guidelines on the Management of Used Oil and Oil Sludge in Kenya, 2016, the proponent must ensure that tracking documents are in place and that necessary notifications to the authority are done.

CHAPTER 10: CONCLUSIONS & RECOMMENDATIONS

10.1 Conclusion

Waste management in the country requires collective responsibility and collaboration between different sector players. The proposed project will therefore be significant and will play a big role in enhancing the environmental protection and occupational safety and health benefits from poor and illegal waste management practices within Kilifi County and its environs. The proposed project is considered important and beneficial to the economy as it will ensure proper waste management and promote socioeconomic growth of the area through employment creation and revenue generation to the government. Mitigation measures and Environmental Management Plans have been proposed to address the scope of the predicted adverse environmental and social impacts to the highest degree. The findings of the ESIA carried out for this project indicate that possible environmental impacts generated can be addressed effectively by the proponent through the effective mitigation measures proposed.

10.2 Recommendations

This ESIA report recommends issuance of a license/approval subject to the conditions that NEMA may impose during the decision making process. The following recommendations should however be considered:

- The project does not pose any serious/irriversable environmental concerns, other than those of a minor scale that accompany similar projects
- The positive impacts of the project outweigh the negative ones, which will be adequately contained by following the prescribed environmental and social impact management plans
- As such, the project could be allowed to commence, and activities be managed within the provided ESMP and sound environmental management practices that are locally and internationally recognized.
- Comply with all pieces of regulations as documented in this report.

REFERENCE

1. Kenya National Bureau of statistics, Kenya Population and Housing Census 2019
2. National Environment Policy, 2013
3. National Health Policy, 2014 – 2030
4. National Energy and Petroleum Policy, 2018
5. National Land Policy, 2009
6. Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019,
7. Environmental Management and Coordination (Air Quality) Regulations, 2014
8. Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003
9. Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulation, 2009
10. Environmental Management and Coordination (Waste Management) Regulations, 2006
11. Environmental Management and Coordination (Water Quality) Regulations, 2006
12. The Constitution of Kenya, 2010
13. The Occupational Safety and Health Act, 2007
14. The Climate Change Act, 2016
15. Technical Guidelines on the Management of Used Oil and Oil Sludge in Kenya
16. The County Government Act, 2012
17. The Water Act, 2016
18. The Energy Act, 2019
19. National Construction Authority Act, 2014
20. The Physical and Land Use Planning Act, 2019
21. The Public Health Act, 2012
22. Occupiers Liability Act Cap 34

APPENDICES

Appendix 1: Company Certificate of Incorporation

Appendix 2: Copy of KRA PIN certificate

Appendix 3: Copy of land lease agreement

Appendix 4: Public participation minutes

Appendix 5: Approval of TOR

Appendix 6: Copy of EIA /EA experts' practising licenses