ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY REPORT

FOR

PROPOSED UNIVERSITY & OTHER EDUCATIONAL INSTITUTIONS ON PLOT L.R NO. KILIFI/VYAMBANI/21,150,151,152,153 & 588, MAVUENI AREA, KILIFI COUNTY

Project proponent:

NEW LIFE PRAYER CENTRE AND CHURCH
P.O BOX 43273-80100
MOMBASA

GPS Coordinates

3º 41′51.17″S & 39º 46′52.24″E

May 2023

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 University & other educational institutions to be situated on Plot number KILIFI/VYAMBANI/21,150,151,152,153 & 588 in Mavueni area along/off Kilifi-Kaloleni Road, Kilifi North within Kilifi County by New Life Prayer Centre and Church herein referred to as the proponent. The proponent, New Life Prayer Centre and Church, proposes to set up university & other educational institutions 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 a university & other educational institutions comprising of; university block (learning and training facilities), proposed mall and accommodation (student hostels & staff), university hospital with 600 bed capacity, water pan with total estimated water volume of 210,000 cubic metres, waste management system & other associated amenities on Plot number KILIFI/VYAMBANI/21,150,151,152,153 & 588 in Mavueni area along/off Kilifi-Kaloleni Road, Kilifi North within Kilifi County. The proposed project will cover approximately one hundred and twenty-one acres out of the total one hundred- and thirty-acres piece of land spread across six plots. The geo-reference points of the site are Latitude **3º 41′51.17″S** & Longitude **39º 46′52.24″E**. The proponent intends to develop the proposed project with the aim of providing education and training facility within the area.

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 March and May 2023 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/plan included stakeholder consultative meeting that was conducted at the proposed project site and administration of questionnaires to the other Project Affected Parties (PAPs).

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 education facility to the people within Mavueni area and the whole country at large, creation of employment opportunities and generation of revenue to the Kilifi County Government and National 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 university and other educational institutions. These include increased and poor waste handling mechanisms within the facility, accidental falls and air pollution.

Social impacts associated with proposed project include but not limited to the following; Influx of people in the area, cultural diversity, high prevalence of infectious and communicable diseases /HIV & AIDS, social security, gender-based violence, child employment (child abuse) and drug and substance abuse among others.

This ESIA report will provide a detailed and comprehensive environmental and social impact management plan to mitigate the anticipated impacts associated with the project to promotes sustainable development.

Conclusion

The proposed project is considered important and beneficial to the economy as it will create a conducive learning and training environment as well as opening up of the Mavueni area to the outside world through human interactions associated with learning institutions, 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

CBC	Competence Based Curriculum
CBET	Competence Based Education and Training
CBO	Community Based Organizations
CDC	Centre for Disease Control
DCC	Deputy County Commissioner
EA	Environmental Audit
EDL	Effluent Discharge License
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
ESMP	Environmental and Social Impact Plan
GBV	Gender Based Violence
GHGs	Green House Gases
GoK	Government of Kenya
GPS	Geographical Positioning System
HFC	Health Care Facilities
HCW	Health Care Waste
HCWM	Health Care Waste Management
HCWs	Health Care Workers
ICWMP	Infections Control and Waste Management Plan
ILO	International Labour Organization
IPC	Infection Prevention and Control
KNBS	Kenya National Bureau of Statistics
LPG	Liquified Petroleum Gas
MoH	Ministry of Health
MTEF	Medium-Term Expenditure Framework
NEMA	National Environmental Management Authority
OHS	Occupational Health & Safety

OWTP	Onsite Wastewater Treatment Plant
PAPs	Project Affected Parties
PPE	Personal Protective Equipment
PWDs	People Living With Disabilities
SEA	Sexual Exploitation and Abuse
SDS	Safety Data Sheets
SDGs	Sustainable Development Goals
SOPs	Standard Operating Procedures
STI	Sexually Transmitted Infections
SVP	Soil Vent Pipes
TVETs	Technical and Vocational Education and Training
VTT	Vocational and Technical Training
WHO	World Health Organization
WRUA	Water Resource Users Association
WRA	Water Resource Authority
WSP	Water Service Providers
WWDA	Water Works Development Agencies

CHAPTER I: INTRODUCTION

1.1 Background

The provision of meaningful and adequate education and training is fundamental to Kenya's overall development strategy. In this regard, the Education Sector is critical in promoting political, social and economic development of Kenya. Education develops its recipients to enable them to overcome prevailing challenges and therefore play effective role in the society. Similarly, it supports domestic technology development, research and innovation, is expected to lead to industrial diversification and value addition to commodities.

Kenya is aspiring to join the league of industrialized upper mid-income countries by the year 2030. In pursuance of this goal, Vision 2030, a blueprint for national development anchored on three pillars (Economic, Social and Political), guides investments in Kenya. Human capital development is a key component of the social pillar. The Constitution of Kenya 2010 provides for education as an elaborate fundamental human right. It also provides for free and compulsory basic education to ensure no Kenyan is left behind in the walk towards prosperity. With the expected progression as the country achieves its ambition, the sector is expected to make a significant contribution to the economy.

Kenya economic development is mainly driven by agriculture, tourism, services and manufacturing. Also new opportunities may emerge that can change the composition of the Kenyan sources of wealth. The country needs to develop the capacity to not only achieve its development agenda but also exploit the new opportunities that arise.

The Education sector is guided by SDG-4 to plan and programme for inclusive and equitable quality education and lifelong learning opportunities for all citizens. Additionally, SDG 9, aims to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. From a regional perspective, Agenda 2063, adopted by African States in 2013 as a strategic framework for the socio-economic transformation, provides a platform for anchoring the Medium-Term Plan III (2018-2022) which links to the Medium-Term Expenditure Framework (MTEF) 2021/2022 to 2023/2024. The Africa Agenda 2063 outlines the significance of investing in education and training.

The significant investment requires adequate financing based on the facts that education, training and research besides enriching people's understanding of themselves and the world, also improves the quality of their lives and leads to broad social benefits to individuals and

society. It raises people's productivity and creativity and promotes entrepreneurship and technological advances and also plays a crucial role in securing economic and social progress and improving income distribution.

The education sector is Kenya has fully embraced the rollout of the Competence Based Curriculum (CBC) at the Early and Basic education level and Competence Based Education and Training (CBET) curriculum at the higher levels. This new curriculum coupled with the establishment of Post training and skills development functions in the sector will address skills mismatch between training institutions and the job market.

Education sub sectors in Kenya

a) Early learning and basic education

The sub sector facilitates provision of basic education to all deserving citizens while addressing the provisions of the Constitution to the Kenyan people and demands of the Kenya Vision 2030. The sub sector is mandated to develop strategies to address internal inefficiencies in the education system; improve financial management and accountability; and to make education in the country more inclusive, relevant and competitive regionally and internationally. To execute this mandate, the sub sector is organized into four (4) programmes namely:

- primary education
- secondary education
- quality assurance and standards and
- general administration, planning and support services.

b) Vocational and Technical Training (VTT)

The sub-sector is responsible for promoting access, equity, relevance and quality technical and vocational education and training in the country. The sub-sector does this through: registration of TVET institutions; formulation, coordination, and review of policies and strategies in curriculum design, development, implementation, assessment and certification in TVET, provision of quality assurance services to TVET Institutions; setting of trainees' admission criteria to TVET institutions; promoting research, science, technology and innovation in TVET; and oversee the management of National Polytechnics, Technical and Vocational Colleges, Vocational Training Centers and Technical Trainer Colleges. The Vocational and Technical Training sub-sector has a major responsibility of ensuring availability of middle level manpower needed to drive the economy towards the attainment of the Vision 2030.

To execute this mandate, the sub sector is organized into three (3) programmes namely:

- Technical Vocational Education and Training
- Youth Training and Development and;
- General administration, planning and support services

c) University Education

The Sub-sector's responsibilities include; University Education Policy; University Education Management; Management of Continuing Education (Excluding TVETs); Science, Technology and Innovation and; Public Universities and Constituent Colleges. The investment climate is crucial, as are the right incentive structures, to guide the allocation of resources, and to encourage research and development. The institutional, legal and policy reforms and funding in the university sub-sector reaffirms the realization of this crucial role that university education and ST&I play towards making Kenya a knowledge-based economy. In order to execute this mandate, the sub sector is organized into three (3) programmes namely:

- University Education;
- Research, Science, Technology and Innovation; and
- General administration, planning and support services

d) Post Training and Skills Development

The sub-sector is responsible for addressing the mismatch between demand and supply of skilled manpower and compliments the three sub sectors (Early Learning and Basic Education, Vocational and Technical Training and University Education) in developing the prerequisite human capital resource required to catapult Kenya to a globally competitive country. The sub-sector's mandate is to provide an institutional framework to devise and implement National, Sectoral and Workplace strategies to develop and improve the skills of the Kenyan workforce; thus creating a link to the world of work. Further, the sub sector provides development opportunities for those "not in education, employment and training". To execute this mandate, the sub sector is organized into three (3) programmes namely:

- Workplace Readiness services;
- Post-Training Information Management

- General administration, planning and support services

It is in this regard that New Life Prayer Centre and Church here referred to as the proponent is proposing to set up a university and other educational institutions in compliance with existing education and environmental regulations.

1.2 Project Location

Proposed project site is situated Plot numbers KILIFI/VYAMBANI/21,150,151,152,153 & 588 in Mavueni area along/off Kilifi-Kaloleni Road, Kilifi North within Kilifi County. The geo-reference points of the site are Latitude **3º 41′51.17″S** & Longitude **39º 46′52.24″E at an elevation of 162ft above sea level.** The proposed project site land use comprises of agricultural land in the larger Kilifi County. The proposed project site is covered by few trees and shrubs, this is attributed to the low rainfall received in the larger Kilifi County.

Figure 1.1: Location Map (Source: Google map 2023)

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

Figure 1.3: The project site access cabro road (Source; Site Survey/photography)

Project Neighborhood

Some of the adjacent parcels of land neighboring the project site are not developed with either commercial or residential developments. The proposed project site neighborhood land use comprises of agricultural land in the larger Kilifi County.

1.3 Project objective

The overall objective of the proposed project is to set up & operate a university and other educational institutions pursuant to Section 58 of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya

1.4 Project Justification

Kenya is a nation of multi-cultural diversity founded on national values and principles that include sustainable development. The country is committed to integrating the principles and practices of sustainable development into all aspects of education and learning to promote knowledge, values and attitudes with a view to creating a more sustainable and just society for all.

This has been achieved through mobilization of the country's potential and resources to increase access to quality education. Efforts are being made to achieve economic growth without compromising the environmental and natural resource integrity of the country.

The need for this project arises from the fact the proposed education institution will provide a transition to middle school for the kindergarten pupils and subsequent tertiary education since the project will also provide junior school education

Secondly, majority of the schools have not yet provided infrastructure for junior school and university education, the proposed educational institution will bridge this gap and cater for the needs of pupils and students from the Kilifi County and the larger country.

The project area, Mavueni area, is a gradual growing area in terms of urban development and the upcoming residential settlements due to increasing population growth, therefore all the children and students will need to go to school and acquire relevant skills. The proposed project will provide the much need high quality learning amenities.

1.5 Scope and criteria

The study has been conducted to evaluate the environmental impacts of the proposed university and other educational institution. 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 project operation

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 (PAPs);

- Local communities/immediate neighbors within Mavueni area
- Local area administration (DCC/Area chief)
- Government agencies (county & national government)
- 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/stakeholder 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/5/2/567** dated **27th April 2023** 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:

- Assessment and description of location/project site, objectives, scope, nature of the proposed project
- Assessment of 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 proposed
- Assessment of 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.
- Description and analysis of policy legal and institutional framework including but not limited to Kenyan policies, laws, regulation and guidelines which have a bearing on the proposed project and will also serve as benchmarks for monitoring and evaluation, and future environmental audits
- 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

Proposed project site is situated Plot numbers KILIFI/VYAMBANI/21,150,151,152,153 & 588 in Mavueni area along/off Kilifi-Kaloleni Road, Kilifi North within Kilifi County. The geo-reference points of the site are Latitude **3º 41′51.17″S** & Longitude **39º 46′52.24″E**. The proposed project will cover approximately one hundred and twenty-one acres out of the total one hundred- and thirty-acres piece of land spread across six plots.

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.

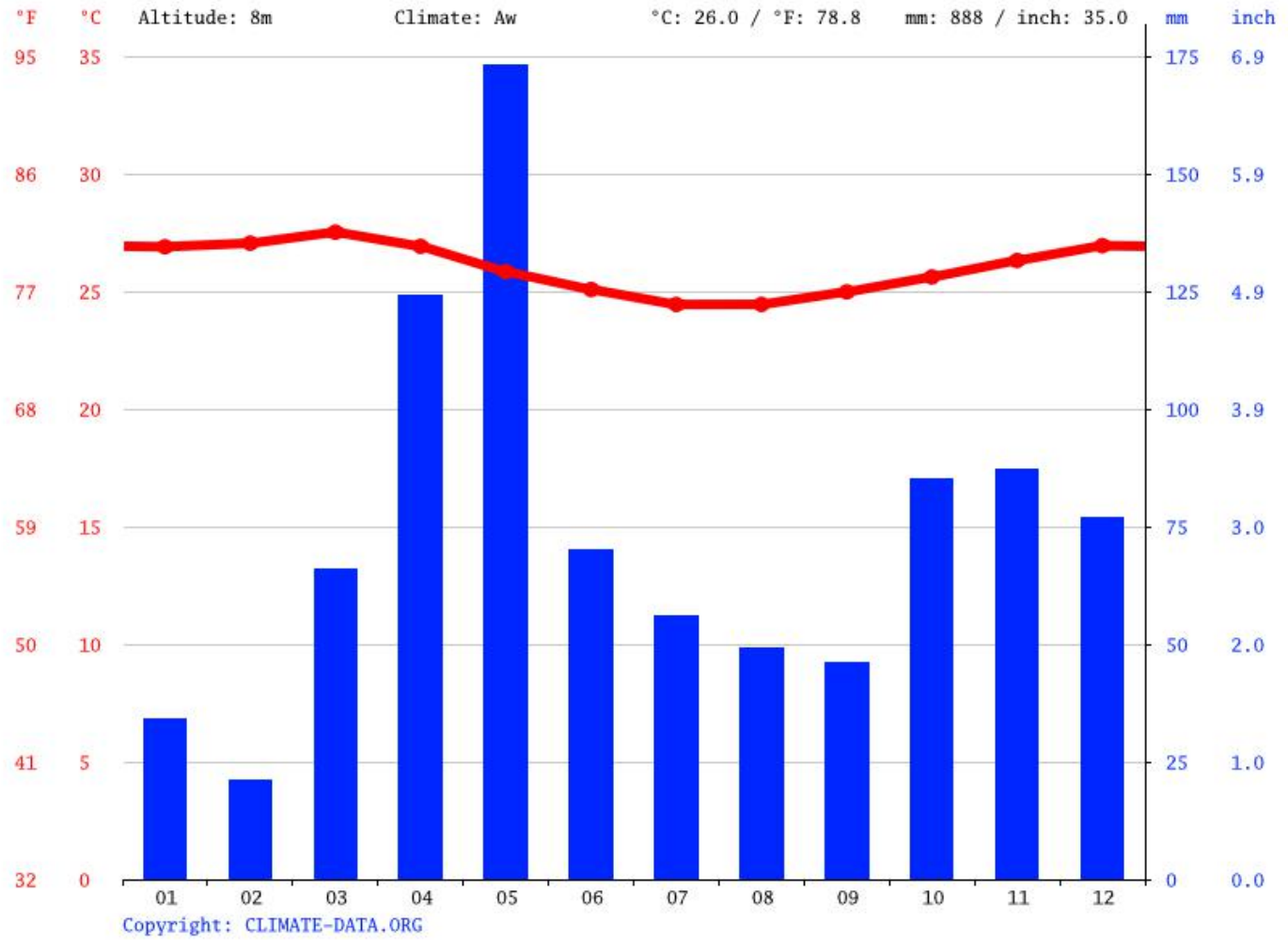


Figure 2.1: Climatic conditions graph (Source: CLIMATE-DATA.ORG)

2.5 Topography and geology

Kilifi County has four major topographical features with marked geological and rainfall characteristics which dictate the resource potential and land use patterns. These are the Coastal Plain, the Foot Plateau, the Coastal Range and the Nyika Plateau. Maveni area lies within the Coastal Plains of Kilifi County.

The geology of Kilifi Town consists of sediments and sedimentary rocks of several types; the Jurassic systems, the tertiary system and the quaternary system and each of these units have several formations. The sedimentary rock systems run parallel to the coastline in a north east-south west direction. The sediments found in Kilifi were deposited at various stages of geological history.

2.6 Water Supply infrastructure

The four main sources of water supply identified in the larger Kilifi County are individual shallow wells, piped water supply scheme, seasonal ponds and a permanent river source. These sources are dwindling in rural areas due to increased demand within the nearby towns such as Kilifi Town and the other larger towns. Seasonal ponds which retain rainwater dry up sometimes in the year due to the changing climatic conditions.

2.7 Land Use Systems

The proposed project site land use comprises of agricultural land in the larger Kilifi County. The proposed project site is covered by few trees and shrubs, this is attributed to the low rainfall received in the larger Kilifi County.

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 flat ground covered with natural growing grass, shrubs, and trees. Therefore, the land lays undisturbed and vegetation grows naturally.

Mavueni area is located within the Coconut-Cassava Agro Ecological Zone: This zone has the highest potential for crop production in the county spreading along the coastal uplands and low-level coastal plains. Major farming activities include tree cropping (mango, citrus, cashew nuts, and coconuts), vegetables (chilli, brinjals, okra etc.), food crops (maize, bananas, cowpeas, green grams etc.) and upland rice. Dairy farming also does well in this zone. It has an average precipitation of 1,300mm per annum and mean annual temperature of 24°C.

Anthropogenic activities within the area and in relation to the larger Kilifi County has led to clearance of indigenous tree cover to provide space for urban development, limited vegetation cover

spotted during the ESIA site inspection include common trees such as Coconut, Mango, baobab trees commonly referred to as 'Mmbuyu' and Mukurudadi which is the Neem tree.

Fig 2.1: Project site vegetation cover (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.

2.10 Waste Management Practices

The proposed project area, Mavueni area 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

2.12 Settlement Patterns

Within the project area, inhabits are Giriama and Chonyi tribe of the larger Mijikenda Community. The population of the area is sparsely distributed, the average density of Kilifi North Sub County being 42 persons per square kilometer while the total population of 178,824 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 along Kilifi-Kaloleni Road and availability of water sources within the area.

2.13 Socio-Economic Profile

The area where the project will be located relies mostly on self-employment and small-scale businesses. Formal employment is very low, 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, LEGISLATIVE AND REGULATORY 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 Kenya Health Policy 2012-2030

The Policy aim is to achieve this goal through supporting provision of equitable, affordable and quality health and related services at the highest attainable standards and minimize exposure to health risk factors to all Kenyans. The Policy calls for the provision and distribution of healthcare services to all people that is commensurate with that of a middle-income country without segregation.

3.2.5 National Plan on Healthcare Waste Management 2016- 2021

Provides a viable technical and management options as well as a roadmap for the domestication of the National HCWM Strategic Plan 2015 -2020. Strategic planning for HCWM covers waste handling, storage, transportation, treatment, and disposal, capacity-building and awareness creation. This prevents, reduces and mitigates the likely risks of transmission of infections.

The proposed university hospital has a potential to generate infectious waste during operation posing danger to the workers, public and environment; thus, the critical need for proper handling and management of healthcare waste associated the proposed hospital operation.

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 fewer 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, the proponent 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 proposed project 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.

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 provide 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 of effluent during project operation*

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

These regulations prohibit 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 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 Basic Education Act, 2013

This is an Act of Parliament to give effect to Article 53 of the Constitution and other enabling provisions; to promote and regulate free and compulsory basic education; to provide for accreditation, registration, governance and management of institutions of basic education; to provide for the establishment of the National Education Board, the Education Standards and Quality Assurance Commission, and the County Education Board and for connected purposes. This Act shall apply to all institutions of basic, education under this Act.

Relevance to the proposed project

- *The proposed project will comply with the requirements of this Act in operating and running of basic education institutions.*

3.4.4 Universities Act, 2012

An Act of Parliament to provide for the development of university education; the establishment, accreditation and governance of universities; the establishment of the Commission for University Education, the Universities Funding Board and the Kenya University and Colleges Central Placement Service Board; the repeal of certain laws, and for connected purposes.

The proponent intends to put up and operate a university, therefore the proponent will comply and adhere to all provisions of this Act during operation of the proposed project.

3.4.5 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 towards 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 project 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*

Climate Change risk and vulnerability assessment

Climate change refers to long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. However, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil and gas), which produces heat-trapping gases.

The purpose of the Climate Risk and Vulnerability Assessment is to develop an understanding of the current and future climate risks that will be attributed to the existence of the proposed project in the larger Mavueni area.

Objectives

- To inform participatory action planning processes that lead to community-driven and owned adaptation mechanisms
- To identify lower risk areas in which climate-resilient infrastructure can be developed
- To develop targeted early warning systems, training programs in environmental management and risk reduction and community capacity building within the project area
- To select, prioritize, and design appropriate resilient infrastructure development options.

Vulnerability assessment is a function of exposure, sensitivity, and adaptive capacity. The proposed project proponent together experts will identify critical assets, sectors, and populations vulnerable to climate

hazards. The adaptive capacity of these assets and population groups to climate change will also be evaluated. The aspects of vulnerability conditions that will be examined include the following; physical, social, economic, and environmental factors.

This assessment involves the following methods;

1. Critical assets, sectors, and services will be identified, organized, and mapped
2. Vulnerable populations will be identified and mapped using area population data and previous studies. This may also involve engaging with community members, vulnerable groups, and climate experts.
3. A vulnerability assessment will be conducted, taking into account the exposure, sensitivity, and adaptive capacity of assets and groups

Risk assessment is a function of the probability of a hazard impact and the overall consequence of the impact. For instance;

Risk = Probability x Consequence

This assessment allows for the prioritization of the most at-risk assets, systems, and groups, focusing on the most vulnerable ones identified during vulnerability assessment.

3.4.6 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*

- *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*

3.4.7 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 operation /occupation of the proposed project*

3.4.8 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.*

3.4.9 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 during operation of the proposed project*

3.4.10 Food, Drugs and Chemical Substances Act (Revised Edition 2013)

This Act provides rules for the placing on the market of food, drugs for man and animal and chemical substances, establishes the Public Health (Standards) Board and makes otherwise provision for the control of the quality and safety of food, drugs and chemical substances to be placed on the market within the Country. The Act prohibits the labelling, packaging, sale, treatment and processing of food that is presented

to the public in a false or deceptive manner or that does not meet a prescribed standard and handling of food in unsanitary conditions. Similar rules are prescribed for drugs and chemical substances.

Relevance to the proposed project

- *The proponent will be required to comply with this regulation during the operation of the university hospital.*

3.4.11 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.

3.4.12 National Infection Prevention and Control (IPC) Guidelines for Health Care Services, 2018

Provides comprehensive standardized information regarding the prevention and control of transmissible infections. It acts as a central reference for all HCF and Health Care Workers. The guideline is intended to provide administrators and Health Care Workers with the necessary information and procedures to implement IPC core activities.

Relevance to the proposed project

- *The guidelines shall be reference for all health care facilities and workers with the necessary information and procedures of managing, which include segregation, handling, transporting, treating and disposal of health care wastes to avoid risk of infections and contamination of the environment. The operationalization of the proposed university hospital will help in the effective treatment of HCW at source.*

3.4.13 HIV/AIDS Prevention and Control Act, 2006

Part 11 Section 7 requires HIV and AIDs education in work places; specifically, provision of basic information and instruction on HIV/AIDS prevention and control.

Relevance to the proposed project

- *During construction phase of the university hospital, the contractor is expected to create awareness to the employees and local community on issues related to HIV/AIDS.*

3.4.14 National Construction Authority Act, 2011

This is an Act of Parliament to provide for the establishment, powers and functions of the National Construction Authority and for connected purposes. The National Construction Authority Act seeks to regulate the construction industry and coordinate its development.

Relevance to the proposed project

- *The project proponent, shall liaise with NCA to ensure licensed contractors are the ones to be awarded contract to construct the university hospital*

3.4.15 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.*

3.4.16 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;

a) 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.

b) Ministry of Health

The proposed project will entail the construction and operationalization of the university hospital, this falls under the mandate of the Ministry of Health (MoH). The MoH aims to provide quality health education and training, research and service delivery that embodies the aspirations of the Kenyan people and global community through creation, preservation, integration, dissemination, and utilization of public health knowledge. The Ministry, will monitor and oversee the operations of the university hospital through periodic auditing.

c) 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 proponent shall need approval from DOSHS. The contractor will also be required to register the work site with DOHS and obtain the required permits

d) The County Government of Kilifi

The County Government of Kilifi has powers to control or prohibit all businesses, factories and other activities including the proposed project which by reason of smoke, fumes, gases, dust, noise, wastes or other

cause, maybe or become a source of danger, discomfort or annoyance to the neighborhood and to prescribe conditions subject to which such activities shall be carried.

The County Government of Kilifi shall supervise project roll out by use of the technical team to ensure no activity being implemented may become a source of danger, discomfort or annoyance to the neighborhood. The relevant county departments will be responsible in the issuance of the approvals (architectural design and drawings) and necessary permits for the proposed project activities.

e) The National Construction Authority (NCA)

The NCA is responsible for issuing permits to construction sites and advising the government of Kenya on construction. The proponent shall liaise with NCA to ensure licensed contractors are the ones to be awarded contract to carry out the project activities.

CHAPTER 4: PROJECT DESIGN & DESCRIPTION

4.1 Project description

The Proposed University & other educational institutions will comprise of; university block (learning and training facilities), proposed mall and accommodation (student hostels & staff), university hospital with 600 bed capacity, water pan with total estimated water volume of 210,000 cubic metres (see attached design), waste management system (biodigester system) & other associated amenities to be situated Plot number KILIFI/VYAMBANI/21,150,151,152,153 & 588 in Mavueni area along/off Kilifi-Kaloleni Road, Kilifi North within Kilifi County. The proposed project will cover approximately one hundred and twenty-one acres out of the total one hundred- and thirty-acres piece of land spread across six plots. The geo-reference points of the site are Latitude **3º 41′51.17″S** & Longitude **39º 46′52.24″E at an elevation of 162ft above sea level**. The proponent intends to develop the proposed project with the aim of providing education and training facility within the area.

Design of the proposed project and components

The proposed university block will comprise of basement, ground to third floor. Upon completion of the proposed development, the basement layout will comprise of two underground water tanks of 3.3m deep and parking space. The ground floor layout will comprise of the following; main entrance & reception, offices (dean of students office, chairman; department of business administration, chairman; department of management science and project planning, chairman; department of finance & accounting, student councilor, administrative assistant/secretary, records/store & exams office), 2 ICT service room/duct rooms, boardroom, kitchen/staff break out room, staff washrooms (ladies/gents), ICT laboratory, lecture common room, student washrooms (ladies/gents), 2 cleaner rooms, store room, 11 tuition rooms, student common room/break out room, parking space and lift shaft to access upper floors. First floor layout and typical will comprise of the following; 2 main lecture halls with the capacity of 240 persons & 380 persons maximum, washrooms, 11 tuition rooms, 2 lecture common rooms, exams office, 2 ICT laboratories, students common room/group discussion, cleaners' room, store room, department boardroom, 3 secretary offices, 2 ICT service rooms and department library. Third floor layout will comprise of multipurpose hall and the rooftop will accommodate overhead water tanks and rain water collection channels. The total build up area will be 13,575.00Sqm. The effluent from the operation of the proposed project will be managed through biodigester system that will be used as waste management system.

Table 4.1: Area reference for the proposed development and components

Floor	Components	Space Area (Sqm)
Basement floor	– 2 underground water tanks – Parking space	1, 057.00
Ground floor	– Main entrance & reception – Offices (dean of students' office, chairman; department of business administration, chairman; department of management science and project planning, chairman; department of finance & accounting, student councilor, administrative assistant/secretary, records/store & exams office) – 2 ICT service room/duct rooms Boardroom – Kitchen/staff break out room – Staff washrooms (ladies/gents) – ICT laboratory – Lecture common room – Student washrooms (ladies/gents) – 2 cleaner rooms – Store room – 11 tuition rooms – Student common room/break out room – Parking space – Lift shaft	3, 850.00
First & Second Floor	– 2 main lecture halls (240 & 380-persons max) – Washrooms – 11 tuition rooms – 2 lecture common rooms – Exams office – 2 ICT laboratories – Students common room/group discussion – Cleaners' room – Store room, department boardroom 3 secretary offices – 2 ICT service rooms – Department library	7,000.00
Third floor	– Multipurpose hall	450.00
Total Build Up area		**Approx 13,575.00**

The proposed project will comprise of the following components;

	Project component	**Area coverage**	
		Square metres	**Acres**
1.	Main parking Gate House/campus security	11,684.20	2.89
2.	University faculties (all inclusive)	105,690.0	28.64
3	Graduate school	10,891.0	2.7
4	Commercial centre (mall)	11,867.0	2.93
5	Diversion	2,641.0	0.65
6	Botanical Garden Park & Farm	75,855.0	18.25
7	Existing water pan	5,700.0	1.4
8	Staff accommodation	16,083.0	3.97
9	Recreational water park	7,150.0	1.7
10	Proposed water pan	35,734.0	8.83
11	Graduation square	16,024.0	3.96
12	Library & administration block	14,121.0	3.49
13	University hospital -600 bed capacity	17,504.0	4.3
14	Dining Hall (2)	9.988.0	2.47
15	Student centre	9.160.0	2.27
16	Sport facilities & complex	48,046.0	11.87
17	Main auditorium	12,297.0	3.06
18	Chapel 500pax	6,676.0	1.68
19	University hostel	62,150.0	15.4
20	University estates	2,023.0	0.5

21	University waste management system		
	Total	481,284.2	121.04

Ongoing;

	Project component
1	Gate A & Guard House
2	Mian parking
3	Primary school
4	Dormitory
5	Dining hall
6	Senior school
7	Main School Hall & parking
8	Junior School
9	School sports field
10	Gate B & Guard House
11	Olympic swimming pool & parking
12	Sewage treatment plant

The Current status

Currently, the proposed project site has an ongoing construction activities. The said project components were found to have no approval from the Authority since no evidence of EIA license was availed to the experts' team during document review process. However, the experts team advised the proponent to stop further project construction/implementation pending undertaking the Environmental Impact Assessment and subsequent issuance of approval from the Authority.

Fig 4.1: The ongoing project activity (Source, Site visit/photography)

4.2 Construction inputs

- Construction raw materials i.e., sand, cement, stones, crushed rock (gravel/ ballast), ceramic tiles and other ceramic fittings, steel and wooden fixtures and fittings, glass, steel metals, timber, roofing materials, painting materials among others. All these should be obtained from licensed dealers, especially those that have complied with the environmental management guidelines and policies.
- Construction machines including machinery such as trucks, concrete mixers, and tools and other relevant construction equipment. These will be used for the transportation of materials, clearing of

the site and construction debris. Most of the machinery will use electrical and petroleum products to provide energy.

- A construction labor force of both skilled and non-skilled workers. These will require services such as energy, water supply and sanitation facilities.
- Water for construction purposes, the water needed for construction is supplied from existing water pan/reservoir within the project site.
- Power from the mains grid or provided by generators.

4.3 Project Activities

4.3.1 Description of the Project's Construction Activities

a) **Pre-construction Investigations**

The implementation of the project 's design and construction phase will start with thorough investigation of the site 's biological and physical resources in order to minimize any unforeseen adverse impacts during the project cycle.

b) **Sourcing and Transportation of Building Materials**

Building materials will be transported to the project site from their extraction, manufacture, or storage sites using transport trucks. The building materials to be used in construction of the project will be sourced from neighboring areas and counties. Greater emphasis will be laid on procurement of building materials from within the local area, which will make both economic and environmental sense as it will reduce negative impacts of transportation of the materials to the project site through reduced distance of travel by the materials transport vehicles.

c) **Site Preparation/Clearance of Vegetation.**

The site has some vegetation cover including grass, shrubs and few trees. The proponent shall ensure as many indigenous trees as possible are used for re-vegetation as well as conserving the trees along the plot boundary.

d) **Storage of Materials**

Building materials will be stored on site. Bulky materials such as rough stones, ballast, sand and steel will be carefully piled on site. To avoid piling large quantities of materials on site, the proponent will order bulky materials such as sand, gravel and stones in bits. Materials such as cement, paints and glasses among others

will be stored in temporary storage structures, which will be constructed within the project site for this purpose.

e) **Excavation and Foundation Works**

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

f) **Masonry, Concrete Work and Related Activities**

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

g) **Structural Steel Works**

The proposed project buildings/blocks will be reinforced with structural steel for stability. Structural steel works will involve steel cutting, welding and erection

h) **Electrical Work**

Electrical work during construction of the proposed project will include installation of electrical gadgets, devices and appliances including electrical cables, lighting apparatus, sockets etc. In addition, there will be

other activities involving the use of electricity such as welding and metal cutting. All the electrical works will be carried out by a licensed electrician contracted by the proponent.

i) **Mechanical works**

The mechanical works shall be done by qualified technicians under the supervision of the Project Mechanical Engineer and shall follow the set standards. The works will include the following;

- Plumbing and drainage
- Service ducts accessible from all floor levels
- Soil vent pipes (SVP) provided on doors and windows
- Storm drains pipes
- Inspection chamber covers and framing
- Underground foul and waste drain pipes

j) **Landscaping**

To improve the aesthetic value or visual quality of the site once construction ceases, the proponent will carry out landscaping. This will include establishment of a theme garden and lush grass lawns where applicable and will involve replenishment of the topsoil. It is noteworthy that the proponent will use plant species that are available locally preferably indigenous ones for landscaping

4.3.2 Project's Operation Activities

The proponent intends to set up University & other educational institutions. The project site shall be used as a learning and training institution for both early learners and tertiary learners within the area and the larger Kilifi County. The site shall only be commissioned once license/approval has been granted by the Authority. The following issues will be handled at the operation phase;

a) Solid Waste

The proponent will provide facilities for handling solid waste generated within the facility. These will include dust bins/skips for temporarily holding waste within the premises before final disposal at the designated dumping site. The solid wastes from each block will be assembled in the garbage collection point ready for disposal by a NEMA licensed waste handler. The university hospital unit wall also generates medical waste from its operation. The hospital shall prepare, operate and maintain an Infection Control and Waste Management Plan (ICWMP) to deal with waste generation. Waste should be identified and segregated at the point of generation.

b) Waste Water and storm water Management

Sewage/effluent generated from each unit will be discharged into the Waste Water Treatment Plant (WWTP), in this case, the facility will install waste biodigester. Storm water will be properly channeled to improve drainage and onsite gardening within the development.

4.3.3 Project's Decommissioning Activities

Decommissioning is an important phase in the project cycle and comes last to wind up the operational activities of a particular project. It refers to the final disposal of the project and associated materials at the expiry of the project lifespan. If such a stage is reached, the proponent needs to remove all materials resulting from the demolition/ decommissioning from the site. The following should be undertaken to restore the environment;

- The general public to be informed of demolition exercise well in advance by placing notices in public places concerning the intended demolition at least two weeks in advance;
- The site must be sealed off from public access;
- The firm commissioned to demolish must have enough relevant machines and equipment such as fleet of dumpers that will enable the work be undertaken smoothly and be completed within stipulated time;
- The firm must have experienced labor force to undertake the exercise;
- Adequate measures to be put in place to minimize environmental degradation;
- Site supervision from relevant County Government Departments throughout the exercise;
- Waste materials resulting from demolished development must be handled and disposed according to environmental requirements and procedures;
- Care must be taken to avoid destruction of trees and other vegetation on site during the exercise.

Site rehabilitation

Once demolition is complete rehabilitation of affected site should be undertaken to its original state or close to original state. Site rehabilitation will include the following: -

- Test and analysis of soil from site should be undertaken before rehabilitation begins;
- Planting of appropriate species of trees (indigenous), shrubs and grasses;
- Ensuring they are regularly watered, weeded in their early stages to ensure survival;
- The area should be fenced off while rehabilitation is in progress.

4.4 Project Cost

The project implementation cost is estimated at Kshs. Nine Hundred and Six Million Two Hundred and Sixty-Five Thousand Two Hundred and Thirty-Five Only. (906,265,235). See the attached project Bill of Quantities. (BoQ)

CHAPTER 5: PUBLIC & STAKEHOLDER CONSULTATION

5.1 Introduction

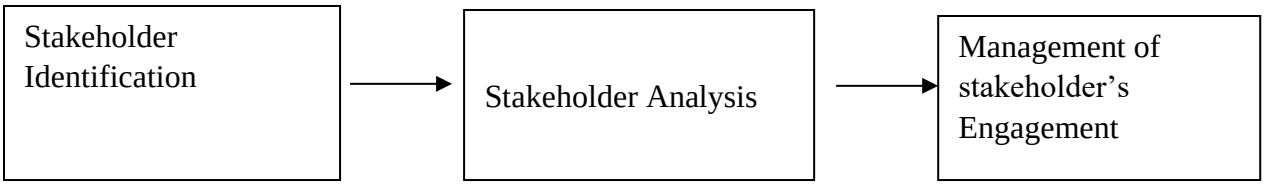
A public consultation process was engaged in gauging the sentiments of a variety of stakeholders. Besides the fact that this is a regulatory requirement under the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019, it was an excellent opportunity to offer the public (PAPs) an opportunity 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 within Mavueni/Vyambani area
- Local area administration (DCC/Area chief)
- Government agencies (county & national government)
- 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.

Stakeholder Management Plan



5.2 Stakeholder Analysis

After the identification of the stakeholders, it is time to analyse who they really are, their level of interest, what power they have, what their expectations are, and if they seem favourable or against the proposed project. This was done through a power-interest matrix, where each stakeholder is plotted in the matrix based on their level of power to impact the project and their level of interest. 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 included the lead and government agencies interested in the proposed project i.e. NEMA. NCA, DOSHS, Ministry of Health among others

- **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 such as the project donors

5.3 Stakeholder engagement plan

Stakeholder identification	**Method of engagement**	**Presentation of the comments/concerns**
Local Communities/immediate neighbours - Local residents	Public gathering/open public meeting to be conducted at the Assistant Chiefs office/Questionnaire	Minutes of the meeting/Filled questionnaires
Local Administration Mzee wa Mtaa/Village elder Area Chief/Assistant Chief Deputy County Commissioner (DCC), Kilifi South Assistant County Commissioner (ACC), Shariani Division	Public meeting (The Public meeting to be chaired by the Deputy County Commissioner or his representative	Minutes of meeting
Government agencies	Questionnaire/public meeting	Minutes/presenting of the filled questionnaire

- County government of Kilifi, Department of Water, Environment & Natural Resources - County government of Kilifi, Department of Lands, Energy, Housing, Physical Planning & Urban Development - National Environment Management Authority (NEMA), County Director of Environment, Kilifi - National Construction Authority (NCA)	Questionnaire/public meeting Public meeting Questionnaire/public meeting	Minutes/presenting of the filled questionnaire Minutes/Site visit comments
Political representatives - Area member of county assembly	Questionnaire/public meeting	Minutes/presenting of the filled questionnaire
Community Based Organizations (CBO's) - Community development organizations within the area	Focus group discussions	Minutes/filled questionnaire

5.4 Public consultation methodology

Public consultative meeting was to be held at the Assistant Chief's office Mavueni/Mjajani Sub Location on 20th June 2013 as per the previous communication from the relevant Authorities. See attached communication letters. However, the meeting did not materialize since the relevant Authorities, Deputy County Commissioner Kilifi South did not convene the meeting as agreed and no communication was received citing the reasons for the postponement of the meeting despite all the preparations/arrangements from the proponent on the same following earlier discussions with the Assistant County Commissioner.

5.5 Stakeholder comments/concerns

The immediate local population around the proposed project was consulted through the administration of the open-ended questionnaires to gather their comments and observations regearing the proposed project. The filled questionnaires have been attached to this report. Issues raised by the Project Affected Parties 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

5.6 Conclusion on findings

Gauging from the responses from the questionnaires collected, the local population could see enormous benefits accruing to them by the coming into being of the proposed project. The local population who was interviewed were in support of 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 is the legit owner of the piece of land under which the proposed project is to be developed. Currently, there are ongoing construction activities at the site already being developed by the client, the proponent therefore intends to expand her development to accommodate the university and other learning institutions, besides there is also availability of adequate piece of land for the development since it requires huge piece of land, the site is also accessible and away from the densely populated areas thus making it suitable for the proposed project. 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 university and other educational institutions 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 the proposed project 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 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.

c) Potential environmental impacts

The proposed project might not generate a lot of wastes other than domestic solid waste, effluent and medical wastes from the treatment facility during operation phase, excess excavated top soil would be used for landscaping purposes. An integrated solid waste management system and an Infection Control and Waste Management Plan (ICWMP) consistent with the National regulations on management of health care wastes is recommended. First, the proponent will give priority to reduction of wastes at the source. This option will demand a solid waste management awareness programme, the facility management and the staff will be involved in implementing the project. Recycling and reuse options of the waste will be the second alternative in priority. This will call for a source separation programme to be put in place.

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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 university and other educational institutions. 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-construction 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.

7.1.3 Negative Impacts

- *Heightened Expectations and Speculations*

The planning and design phase is bound to create heightened expectations and unwarranted speculations. It is expected that before all persons living within the project area are well informed on the objectives of the proposed project, a lot of speculation, lies and half-truths are peddled. This in return creates a lot of heightened expectations.

Proposed Mitigation Measures

- There has been undertaken adequate awareness through a public meeting held within the project site by the ESIA experts
- Other professionals (engineers, architects, and surveyors) should be keen to listen and document any issue that requires to be addressed all through the project implementation cycle.

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 laborers. Machine operators will be engaged for excavation works, site clearance and compaction

work. Several workers including casual laborers, 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 labor 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.

- ***Gains in the local economy***

The economy of the neighborhood will receive a boost especially during the construction phase due to the activities of the workers; buying food, drink and commodities.

7.2.2 Negative Impacts

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

The proposed site lies on a relatively flat land covered with shrubs and a few trees. 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 maintaining some of the already depleted indigenous plant species with the project site
- Restoration of vegetation in the disturbed surfaces should be done after completion of works

In relation to access road to the project site, there will be no vegetation removal as the access road is already paved with cabro and nothing will be changed.

Fig 7.1: The project site access cabro road (Source, Site visit/photography)

- ***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 and the County government of Kilifi

- ***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)such as hearing protection ear muffs to the workers and any other person visiting the construction site
- Construct mainly during the day i.e., between 8am and 5pm;

- Consider labour based construction methodologies; and
- The provisions of EMCA on noise and excessive vibrations should be observed
- Noise suppression measures must be applied to all construction equipment such as installing portable barriers to shield compressors and other small stationary equipment
- Use of quiet equipment (i.e., equipment designed with noise control elements and ensure the equipment used on site are well maintained, and in good working condition.
- Limit pick-up trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage drivers to switch off vehicle engines when off-loading materials whenever possible

- ***Air pollution (Dust and other 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. Gaseous emissions are also expected from the construction vehicles

Proposed Mitigation Measures

- Contractors should wet the surfaces, use dust screens/nets when dusty construction activities are occurring
- Minimizing the number of motorized vehicles on use and vehicle speeds shall be limited to a maximum of 10Km/Hr;
- Periodically service all the equipment and machinery to ensure they are in good working condition to minimize emissions
- Cover the stock piled construction materials and spoil generated from the excavations
- Provide appropriate PPE (dust mask) to workers and enforce on use
- When transporting construction material, ensure vehicles are covered in order to decrease dust emissions
- No burning of materials should be permitted at project site
- Rehabilitate disturbed areas

- ***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

- Contractor shall prepare waste management plan as part of the ESMP to be implemented at the site (storage, provision of bins, site clean-up, bin clean-out schedule, etc.) before commencement of any works, which should promote waste minimization and recycling
- 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

- **Accidental Spills and Leakages**

Some of the potential sources of the possible leakages used at the site include the fuel, lubricants, oil and grease, paint and pest control substances to be applied on the wooden structures and foundations. Spillage of such compounds is likely to have an immediate impact upon the local water resources (storm water).

Proposed Mitigation Measures

Temporal storage in specifically designated areas on site of all hazardous /toxic substance will be in safe containers, labelled with details of composition, properties and handling information including safety data

sheets and away from storm water runways or exposure to weather elements such as rains and for use only for construction works

Ensure proper handling, storage and disposal of waste oil, lubricants, oil filters and fuel from vehicles. Hazardous waste would be contained and properly disposed by licensed hazardous waste handlers to be contracted by the proponent

The contractor should provide appropriate PPE (medical mask, gowns, heavy duty gloves, eye protection and boots) to workers on site and enforce use

Provide adequate signage and communication of risks to workers and visitors

Contractor to have spill prevention and response procedure including all necessary equipment and ensure that all workers are trained

- ***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
- 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

7.2.3 Social Impacts during Construction Phase

- ***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 /HIV/AIDS***

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
- Contractor should guide on promoting behavior change among the workers
- HIV/AIDS Awareness Program and other communicable diseases to be instituted and implemented as part of the Contractor's Health and Safety Management Plan to be enforced by the project engineer

- ***Influx of people in the area***

The proposed project has the potential to contribute to the massive influx/movement of people from different areas both during the construction and operation/occupation phases. This will have an extended impact of

the social setting of the Mavueni area in general. This therefore leads to concentration of people in one area drawn from diverse social and cultural backgrounds often resulting to a number of issues such as;

- Strain on various resources especially water resources, electricity and roads
- Grievances from local community members over job opportunities
- Sexual exploitation and abuse (SEA) and unwanted pregnancies

- ***Social security and conflict***

Construction sites usually attract different kinds of people. These will include workers (both permanent and casual contract workers), food suppliers (to construction workers) and some idlers. A site of this nature can provide temptations to crooked workers and others to engage in theft. The presence of these people can therefore, negatively impact on the area's security. There could be conflict between the contractor or the facility and the surrounding communities due to: labor recruitment, shared resources (road, etc.) and behavior of workers.

Proposed Mitigation Measures

- The contractor should ensure the security personnel are well inducted to address security related issues as they arise
- Prepare labor management plan to guide recruitment of the workers in conjunction with local leaders
- Limit worker's interaction where possible with community members
- Contractor security personnel should discourage the use of force among the workers and community members unless for defensive purposes

- ***Gender based violence and gender inequalities***

Gender-Based violence refers to harmful acts directed at an individual based on their gender. It is rooted in gender inequality, the abuse of power and harmful norms. Gender-based violence (GBV) is a serious violation of human rights and a life-threatening health and protection issue. Schools and other educational institutions are not isolated from traditions, culture, norms, customary laws and governmental policies that exist in the country and the community, nor from individual experiences of students and staff both outside and inside schools and educational institutions. If not addressed properly, schools and other educational institutions can implicitly legitimize and reinforce harmful gender norms.

Gender inequalities may occur during project construction phase when the Contractor fails to comply with the following provisions; gender inclusivity requirements in hiring of workers and entire project management

as required by the Gender Policy of 2011 and gender rule, failure to protect Human Risk Areas Associated with Disadvantaged Groups, interfering with Participation Rights, and interfering with Labor Rights. Women face greater economic vulnerability as their labor participation is often highly informal, without social protection. Low-income women and women migrant workers are especially vulnerable.

Proposed Mitigation measures

- The contractor will mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by the Gender Policy of 2011 and Gender Rule
- The existing community structures headed by local area administration such as chiefs should be involved in local labor hire, emphasize the requirement of hiring women, youth and people with disability
- Protecting Human Risk Areas Associated with, Disadvantaged Groups, interfering with Participation Rights and interfering with Labor Rights to include promotion of rights, including gender equality and equity
- Ensure safe employment for women, including training for all staff on sex-disaggregated latrines, regular consultation with female employees and other measures to ensure physical safety and dignity of female employees
- GBV constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. All forms of GBV including grooming are unacceptable in the work site, the work site surroundings, or at worker's camps (if any). Prosecution of those who commit to be pursued
- Treat women and children (persons under the age of 18) with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status. Do not use language or behavior towards women or children that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate
- Sexual activity with children under 18-including through digital media is prohibited. Mistaken belief regarding the age of a child and consent from the child is not a defense
- Exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior is prohibited
- Sexual interactions between contractor's and consultant's employees at any level and member of the communities surrounding the workplace that are not agreed to with full consent by all parties involved in the sexual act are prohibited. This includes relationships involving the withholding, promise of actual

provision of benefit (monetary or non-monetary) to community members in exchange for sex, such sexual activity is considered "non-consensual" and should not be allowed

- Where an employee develops concerns or suspicions regarding acts of GBV by a fellow worker, whether in the same contracting firm or not, he or she must report such concerns in accordance with Standard Reporting Procedures
- All employees are required to attend an induction-training course prior to commencing work on site to ensure they are familiar with the GBV Code of Conduct
- All employees must attend a mandatory training course once a month for the duration of the contract starting from the first induction training prior to commencement of work to reinforce the understanding of the institutional GBV Code of Conduct.

- ***Child employment (child abuse) and other Labor Related Impacts***

The proposed project will have massive employment opportunities for the locals within the area especially for non-skilled labor. The project area hosts populations living below poverty line, coupled by high illiteracy levels, these vulnerability conditions can lead to employment of the minors who may disguise as adults.

This social impact is prevalent due to the fact that project construction phase attracts various categories of workers from local, national and international markets. This therefore leads to concentration of people in one area drawn from diverse social and cultural backgrounds often resulting to a number of issues such as; strain on various resources especially water resources, electricity and roads. grievances from local community members over job opportunities, sexual exploitation and abuse (SEA) and unwanted pregnancies.

Proposed Mitigation Measures

- The Contractor will ensure effective community engagement and strong grievance mechanisms on matters related to labor with a discrete mechanism for safely and confidentially reporting issues sexual exploitation and abuse and GBV at the community level triggered by the project
- Effective contractual obligations for the contractor to adhere to the mitigation of risks against labor influx, the contractor should engage a local community liaison person in employment issues
- The contractor will ensure proper records of labor force on site while avoiding child and forced labor
- The Contractor will ensure compliance with provisions of the Work Place Injuries and Benefits Act (WIBA) 2007
- The Contractor will develop and implement a Child Protection Strategy; this strategy will ensure that no person under the legal age of 18 years is employed in the project

- The contractors will develop training and sensitization of workers on Sexual Exploitation and Abuse and ensure specific signage on zero tolerance in all work sites
- The contractor will ensure signage on SEA-related rights and safe and confidential reporting mechanisms at the community level
- The contractor shall comply with the International Labor Organization Standards ratified in Kenya which include but not limited to: Prohibition of forced labor (ILO No 29) and Abolition of forced labor (ILO No 159)
- The contractor shall comply with the Kenya's persons with disabilities PWDs Act. The contractor will make reasonable accommodations for qualified individuals with known disabilities. This policy governs all aspects of employment, including selection, job assignment, compensation, discipline, termination and access to benefits and training
- It is the contractor's responsibility to provide all employees with a workplace free of harassment, intimidation, coercion and retaliation as provided by Kenya's Employment Act Cap 226 of 2007
- Any employee(s) who witness or believe they have been subject to discrimination, harassment, retaliation is encouraged to notify their supervisor

- ***Drug & substance abuse***

The proposed project involves the influx of people from various areas. With huge population in one place, drug and substance abuse is a factor. This may also occur during operation of the university since the university students may indulge in drug and substance abuse.

Proposed Mitigation Measures

- The project contractor and the proponent should create awareness among the site workers on the impacts of drug abuse
- The project contractor should discourage the use and abuse of drugs among the workers and the community members
- The contractor should formulate a policy that discourages entrance with drugs on site

- ***Impacts on Traffic and Site accessibility***

The operations of the proposed project are likely impact on the traffic in the area through the access road to the site. The proposed project will come along with increased (vehicle) traffic along the connecting routes especially during construction phase.

Proposed Mitigation Measures

- The trucks carrying construction materials will be advised to access the site at intervals to reduce traffic congestion along the access road
- Develop and implement a traffic management plan
- Control entry and exit of vehicles to and from construction site
- Comply with the provisions of Traffic Act, 2016

7.3 Operation Phase

7.3.1 Impacts on Occupational Health and Safety at Workplace

a) General health hazards at learning institutions

There are potential safety and health risks associated with operations of the facility. These include injuries, accidental falls and general health hazards. 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 facility
- Develop and implement a safety and health policy, and emergency response plan for the facility
- 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

b) Healthcare Workers at the hospital

The hospital environment is a potential source of infectious waste and these could pose unsafe conditions for healthcare staff. Of particular concern are health workers handling infectious waste (including sharps) without adequate protective gear, storage of sharps in containers that are not puncture-proof.

Occupational hazards associated with handling and transport: needle-sticks injuries; injuries due to other sharps such as broken glass; ergonomic issues especially related to lifting; blood splatter during waste handling; aerosolized pathogens (disease-causing microorganisms released as aerosols or tiny droplets suspended in air) during loading, compaction, or break up of untreated waste; breakage and spills of infectious waste bags and chemical exposure among others.

Sources of occupational hazards at healthcare facilities

- Biological hazards (body fluids with potential to cause diseases)
- Lack of adequate lighting in workplaces
- Lack of safe access particularly for disabled employees
- Inadequate ventilation in rooms
- Lack of adequate training (or neglect of safety precautions/ guidelines) in use of medical equipment
- Misuse of equipment and materials for functions they are not designed
- Electrical hazard

Proposed Mitigation Measures

- Ensure the implementation of standard precautions and transmission-based precautions in line with national guidelines for IPC in healthcare facilities taking into account guidance from WHO and/or CDC and Waste Management Plan and the Operational Manual and Procedures for the equipment as provided by Equipment Company. These shall be customized through the development of the health facility specific instruments, among this include facility level infection control and waste management plan that incorporate among others health and safety aspects which must contain appropriate safety measures
- Ensure identification of risks (Job Risk Assessment) and instituting proactive measures
- Update and implement HCF emergency response plan
- Train the healthcare workers on the potential OSH risks
- Provision of a system for disinfection of the multi-use PPE for the healthcare workers
- Implementation of systemic risk management plan comprising risk prevention, evacuation of accident victims, evaluation and improvement measures
- Ensure availing of Safety Data Sheet (SDS) for all chemical use in the lab to the lab technicians
- Limit access to the treatment facility only to authorized persons
- Warning and safety signage to be placed at appropriate areas within the treatment facility
- Regular cleaning and disinfection at the treatment facility

c) Healthcare Waste Handling Operators and Workers

The operators working at the hospital will face daily health and safety risks as a result of uneven walkways during on-site transport of HCW; dust; handling and transportation of contaminated wastes; sharps inflicted injuries, toxic exposure to mercury and dioxins, thermal injuries while operating incinerators, electrocution from loose electrical installations; malfunctioning machine controls; and loose mechanical fixes. These hazards have the potential to cause injury or fatalities to the healthcare workers involved in handling HCW and plant maintenance. In this regard, plant operators/ healthcare workers handling waste should be trained on OSH and expected to implement the prevailing National Health Care Waste Management Plan (2016-2021) applicable to HCW treatment to avoid and minimize injuries or fatalities on their premises.

Proposed Mitigation Measures

- The MoH waste management plan, guidelines and IPC measures should be applied, observed and customized through the development of the facility specific instruments. This should be augmented by guidelines issued by WHO and those that will be provided in Operational Manual and Procedures for the equipment as provided by equipment company/manufacturer
- All the operators should be in the appropriate PPE during operations. Each of the operators should be provided and equipped with: an approved unused disposable overall, safety gumboots, sight grade hand

gloves, the recommended goggles, helmet, right grade respirators and ear plugs and enforce on their use by the management

- Limit access to the waste treatment area only to authorized persons and provide warning and safety signage to be placed at appropriate areas within the hospital facility
- There must be a health and safety plan that is kept on-site which must contain appropriate safety measures
- The operators must be trained on the contents of the health and safety plan
- Provide adequately stocked first aid kit to be placed at strategic locations to allow ease access by workers on-site
- Continue providing serviceable fire safety equipment and continue training workers on their proper use
- Regular fire safety drills should be undertaken to gauge the levels of preparedness of the operators
- Ensure good documentation and inventory on waste received and treated, use NEMA recommended tracking documents in wastes handling
- Maintenance of an accident incident log book on site
- The temporary waste holding area should be well sheltered from direct rainfall and strong winds but should be adequately aired and ensure regular cleaning and disinfection at the waste treatment area
- All machinery and equipment involved in the waste treatment and disposal process should be washed and disinfected prior to leaving the hospital for outside disposal

7.3.2 Community Health and Safety Risks

The proposed project has the potential to impact negatively on the community health. Improper waste disposal can cause public health risks due to environmental pollution from impaired air quality from accumulation of general wastes as well as medical waste (HCW), storm water contamination or when people and scavenging animals and birds rummage through raw waste stockpiles. Unless mitigation recommendations are implemented, this impact may occur at the facility. Air pollution can be exacerbated if open air burning of waste is practiced. Improper handling of effluent can also have negative impacts on the receiving bodies such as land within the project area.

Proposed Mitigation Measures

- Ensure regular monitoring of solid, liquid waste management practices and waste treatment from the facility especially from the treatment facility
- Install appropriate drainage channel within the health facility connecting to the waste management system.

- All cleaning wastewater from the treatment facility and the entire project should be directed into the waste management system within the facility.
- The management of the facility should undertake regular assessment of waste generation quantities and categories to facilitate waste management planning, and investigate opportunities for waste minimization on a continuous basis
- Separate residual chemicals from containers and dispose of the containers to reduce generation of secondary contamination especially on wastewater
- Comply with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006
- Community should be sensitized on infection prevention and control measures within the facility

7.3.3 Fire risks

Without provisions for fire safety, there is a risk of fire outbreak at the project site both in learning premises and the hospital with disastrous life and financial impact. Fires can start from chemical spills, ignitable materials within the hospital, accidents/elevated emissions associated human error and defective electrical connections.

Proposed Mitigation Measures

- Provide adequate firefighting equipment within the facility
- Firefighting equipment should be serviced quarterly by fire service providers
- Train employees /healthcare workers on the use of fire-fighting equipment
- Develop and implement a fire and emergency response plan
- Provide informative fire safety and warning signages within the facility
- Enforce a 'no smoking' rule within the facility
- Conduct fire drills and fire safety audits annually
- Fire emergency telephone numbers should be displayed within the facility

7.3.4 Impact on air quality (air pollution)

Proposed university and other educational institutions will have the potential to affect the general air quality of the environment. For instance, waste management practices within facility may have impacts on the air quality. The use of biogas and Liquid Petroleum Gas (LPG) within the facility will have impacts on the air quality such as release of Green House Gases (GHGs) into the environment. Other sources of potential air pollution will include bad odor gases associated with municipal wastes such as biodegradable wastes.

Proposed Mitigation Measures

- Provision of appropriate and adequate PPE to all workers within the site and enforce on their use
- Conduct air quality monitoring in collaboration with a NEMA designated laboratory
- Comply with the provisions of the Environmental Management and Coordination (Air Quality) Regulations, 2014

7.3.5 Impact on water quality (effluent management)

Once the proposed project is completed, there will be an increased demand and or water use as well as increased liquid wastewater generation. However, it is worth noting that the project area is not sewered. However, the project will waste management system within the facility.

Proposed Mitigation Measures

- Create awareness among the staff/employees on water conservation mechanisms
- Monitor the quality of the domestic effluent 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
- Put roof gutters to collect rainwater from the facility roofs during the rainy season for use in cleaning and landscaping. The facility will have water pan that will be supplying water for gardening around the facility
- Depending on the service level and tasks of the health-care facility, the wastewater might contain chemicals, pharmaceuticals and contagious biological agents, and might even contain radioisotopes. A major part of liquid chemical waste is disposed of via the sink. The most important chemicals in hospital wastewater are an aesthetics, disinfectants, chemicals from laboratory activities, developer and fixer solutions from photographic film processing, and iodinated X-ray contrast media. Note that sludge and sewage from health care facilities generated by a basic wastewater-management system should never be used for agricultural or aquaculture purposes. Effluents from the basic treatment should not be

discharged into water bodies that are used nearby to irrigate fruit or vegetable crops or to produce drinking-water or for recreational purposes.

- Wastes generated from maintenance of health facility should be collected and disposed as per the management and handling guidelines of medical waste including pre-treatment, reuse and recycling

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 domestic waste. 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
- Comply with the provisions of Waste Management Regulations, 2006

Healthcare Waste Management

During operation phase, the hospital will generate medical waste through several clinical activities including; sample collection from patients, laboratory practices and procedures (performing and handling of specimen and chemicals) from activities in treatment area; which need to be treated in an appropriate medical waste treatment facility. Improper disposal of medical waste would have environmental and public health impacts: for example, open burning of medical wastes can result in harmful emissions of dioxins and particulate matter, and result in unacceptable health risks.

Proposed Mitigation Measures

- The hospital shall prepare, operate and maintain an Infection Control and Waste Management Plan (ICWMP) adequate for the scale and type of activities and identified hazards consistent with the National regulations on management of health care wastes.
- Waste should be identified and segregated at the point of generation. Non-hazardous waste, such as paper and cardboard, glass, aluminium and plastic, should be collected separately and recycled. Food waste should be segregated and composted. Infectious and / or hazardous wastes should be identified and segregated according to its category using the colour-coded system at their place of production to

reduce the health risk from the smaller potentially infectious factions (typically waste items contaminated with body fluids and used sharps). Staff should receive instruction on three-bin waste segregation and safe handling and storage of health-care wastes. Staff should be aware of how to protect themselves from injuries and infection from waste; Waste containers and storage areas should be cleaned regularly

- Prevention and minimization of the production of waste
- Reuse or recycling of wastes if possible
- Seal and replace waste bags and containers when they are approximately three quarters full. Full bags and containers should be replaced immediately
- Identify and label waste bags and containers properly prior to removal
- Transport waste to storage areas on designated trolleys / carts, which should be cleaned and disinfected regularly
- Waste storage areas should be located within the hospital and sized to the quantities of waste generated
- Instructions on how to handle the infectious waste from treatment centers should be made available to the waste handlers
- Ensure safety and health of the health care waste handlers through provision of appropriate PPEs
- Packaging containers for sharps should be puncture-proof
- Unless refrigerated storage is possible, storage times between generation and treatment of waste should not exceed 48 hours during cool season, 24 hours during hot season
- Train treatment plant operators on general functioning of the treatment facility
- Seek operational license of the facility from NEMA to ensure compliance with the Waste management regulations, 2006 if needed

7.3.7 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.

7.4 Decommissioning Phase

Decommissioning is an important phase in the project cycle and comes last to wind up the operational activities of a particular project. It refers to the final disposal of the project and associated materials at the expiry of the project lifespan. If such a stage is reached, the proponent needs to remove all materials resulting from the demolition/ decommissioning from the site and the proponent is also required to prepare a

decommissioning management plan that will guide the decommissioning process and seek approvals/ permits from all the relevant government agencies.

7.4.1 Occupational health and safety

Proposed Mitigation Measures

- 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 facilities
- 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

7.4.2 Waste generation and management

Proposed Mitigation Measures

- 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

7.4.3 Socio-economic impacts

Proposed Mitigation Measures

- 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

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/occupation phase and decommissiong phase.

8.2 ESMP for Proposed university and other educational institutions

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 construction site – Provide employees with correct equipment tools 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 – To reduce on the workers accidents and hazards, the contractor is expected to comply with OHS rules and regulations as stipulated in the Occupational Safety and Health Act, 2007 – 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 – All construction workers should be sensitized on the health and safety requirements while at project site – Provision of clean and accessible sanitary facilities and water to workers	Project Manager/Contractor	80,000.00

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
	– Barricade the active work sites to limit entry of unauthorized persons, use of screens and nets to avoid flying debris and ensure good housekeeping in the construction site – An environmental health and safety officer shall be designated at the site and shall maintain a record of incidents/accidents (safety register) on site and report any fatalities related to the project		
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	50,000.00
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 and the county government of Kilifi – Ensure compliance with Waste Management Regulations, 2006 in disposing the excavated soil	Site Manager/proponent	40,000.00

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
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 PPEs (hearing protection ear muffs) 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 – Noise suppression measures must be applied to all construction equipment such as installing portable barriers to shield construction equipment, cover engine of generators where necessary – Construction workers should be made aware of the sensitive nature of the work place and advised to limit verbal and other forms of noise	Proponent/contractor	80,000

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
Dust Emissions (Air pollution)	– Minimizing the number of motorized vehicles on use and periodically service all the equipment and machinery and ensure they are in good working condition to minimize emissions – Rehabilitate disturbed areas – Wet all active construction areas as and when necessary to reduce dust, use dust screens/nets during dusty construction activities – Dry materials should be kept dump or covered at all time – Install gadgets to intercept the particulate matter as well as controlling gaseous emissions – Provide appropriate PPE (dust mask) to workers and enforce on their use – When transporting construction material, ensure vehicles are covered in order to decrease dust emissions – No burning of solid waste materials should be permitted at project site	Proponent/contractor	60,000.00
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 solid waste should be disposed in accordance to waste management regulations	Proponent/site supervisor/contractor	50,000.00

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
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. – Encourage prompt maintenance of temporal water pipeline leaks within the site – Documentation of amounts of water used will be helpful in minimizing wastage. Alternatively, the contractor should source water from licensed water vendors who can supply by use of water browsers – Comply with Water Quality Regulations, 2006	Proponent/contractor	100,000.00
Accidental Spills and Leakages	– Temporal storage in specifically designated areas on site of all hazardous /toxic substance will be in safe containers, labelled with details of composition, properties and handling information including safety data sheets and away from storm water runways or exposure to weather elements such as rains and for use only for construction works – Ensure proper storage of chemicals / materials, and if possible, in secondary containers just in case of accidental puncturing – Ensure proper handling, storage and disposal of waste oil, lubricants, oil filters and fuel from vehicles. Hazardous waste would be contained and properly disposed by licensed hazardous waste handler – The contractor should provide appropriate PPE (mask, gowns, heavy duty gloves, eye protection and boots) to workers on site – Contractor to have spill prevention and response procedure including all necessary equipment and that of workers are trained	The project contractor	50,000.00
Social impacts			

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 – The contractor should develop and implement **a chance find procedure** that should be approved by the relevant government body	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	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

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
Gender based violence and gender inequalities	– The contractor will mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by the Gender Policy of 2011 and Gender Rule – The existing community structures headed by local area administration such as chiefs should be involved in local labor hire, emphasize the requirement of hiring women, youth and people with disability – Protecting Human Risk Areas Associated with, Disadvantaged Groups, interfering with Participation Rights and interfering with Labor Rights to include promotion of rights, including gender equality and equity – Ensure safe employment for women, including training for all staff on sex-disaggregated latrines, regular consultation with female employees and other measures to ensure physical safety and dignity of female employees – GBV constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. All forms of GBV including grooming are unacceptable in the work site, the work site surroundings, or at worker's camps (if any). Prosecution of those who commit to be pursued – Treat women and children (persons under the age of 18) with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status. Do not use language or behavior	The project contractor/proponent	100,000.00

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
	towards women or children that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate – Sexual activity with children under 18-including through digital media is prohibited. Mistaken belief regarding the age of a child and consent from the child is not a defense – Exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior is prohibited – Sexual interactions between contractor's and consultant's employees at any level and member of the communities surrounding the workplace that are not agreed to with full consent by all parties involved in the sexual act are prohibited. This includes relationships involving the withholding, promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex, such sexual activity is considered "non-consensual" and should not be allowed – Where an employee develops concerns or suspicions regarding acts of GBV by a fellow worker, whether in the same contracting firm or not, he or she must report such concerns in accordance with Standard Reporting Procedures – All employees are required to attend an induction-training course prior to commencing work on site to ensure they are familiar with the GBV Code of Conduct – All employees must attend a mandatory training course once a month for the duration of the contract starting from the first induction training prior to commencement of work to reinforce the understanding of the institutional GBV Code of Conduct.		

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
Child employment (child abuse) and other Labor Related Impacts	– The Contractor will ensure effective community engagement and strong grievance mechanisms on matters related to labor with a discrete mechanism for safely and confidentially reporting issues sexual exploitation and abuse and GBV at the community level triggered by the project – Effective contractual obligations for the contractor to adhere to the mitigation of risks against labor influx, the contractor should engage a local community liaison person in employment issues – The contractor will ensure proper records of labor force on site while avoiding child and forced labor – The Contractor will ensure compliance with provisions of the Work Place Injuries and Benefits Act (WIBA) 2007 – The Contractor will develop and implement a Child Protection Strategy; this strategy will ensure that no person under the legal age of 18 years is employed in the project – The contractors will develop training and sensitization of workers on Sexual Exploitation and Abuse and ensure specific signage on zero tolerance in all work sites – The contractor will ensure signage on SEA-related rights and safe and confidential reporting mechanisms at the community level – The contractor shall comply with the International Labor Organization Standards ratified in Kenya which include but not limited to: Prohibition of forced labor (ILO No 29) and Abolition of forced labor (ILO No 159) – The contractor shall comply with the Kenya's persons with disabilities PWDs Act. The contractor will make reasonable accommodations for qualified individuals with known disabilities. This policy governs all aspects of employment, including	The project contractor/proponent	80,000.00

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
	selection, job assignment, compensation, discipline, termination and access to benefits and training – It is the contractor's responsibility to provide all employees with a workplace free of harassment, intimidation, coercion and retaliation as provided by Kenya's Employment Act Cap 226 of 2007 – Any employee(s) who witness or believe they have been subject to discrimination, harassment, retaliation is encouraged to notify their supervisor		
Drug and substance abuse	– The project contractor and the proponent should create awareness among the site workers on the impacts of drug abuse – The project contractor should discourage the use and abuse of drugs among the workers and the community members – The contractor should formulate a policy that discourages entrance with drugs on site	The project contractor/proponent	Nil
Impacts on traffic and site accessibility	– The trucks carrying construction materials will be advised to access the site at intervals to reduce traffic congestion along the access road – Develop and implement a traffic management plan – Control entry and exit of vehicles to and from construction site – Comply with the provisions of Traffic Act, 2016	The project contractor	30,000.00

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 facility – Ensure the implementation of standard precautions and transmission-based precautions in line with national guidelines for IPC in healthcare facilities – Formulate and implement HCF emergency response plan – Ensure identification of risks (Job Risk Assessment) and instituting proactive measures – Train the healthcare workers on the potential OSH risks in relation to their work and possible mitigation measures – All facility employees and healthcare workers to be provided with the appropriate Personal Protective Equipment and Clothing (PPE & C) and enforce their use – Ensure availing of Material Safety Data Sheet for all chemical use in the lab to the lab technicians during operations – Warning & Safety signage to be displayed at strategic areas within the facility and within the treatment hospital – 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)
Occupational Health and Safety for Health care Workers	– Ensure the implementation of standard precautions and transmission-based precautions in line with national guidelines for IPC in healthcare facilities taking into account guidance from WHO and/or CDC and Waste Management Plan and the Operational Manual and Procedures for the equipment as provided by Equipment Company. These shall be customized through the development of the health facility specific instruments, among this include facility level infection control and waste management plan that incorporate among others health and safety aspects which must contain appropriate safety measures – Ensure identification of risks (Job Risk Assessment) and instituting proactive measures – Update and implement HCF emergency response plan – Train the healthcare workers on the potential OSH risks – Provision of a system for disinfection of the multi-use PPE for the healthcare workers – Implementation of systemic risk management plan comprising risk prevention, evacuation of accident victims, evaluation and improvement measures – Ensure availing of Safety Data Sheet (SDS) for all chemical use in the lab to the lab technicians – Limit access to the treatment facility only to authorized persons – Warning and safety signage to be placed at appropriate areas within the treatment facility – Regular cleaning and disinfection at the treatment facility	The proponent/hospital management	100,000.00

Occupational Health and Safety for Healthcare Waste Handling Operators and Workers	– The MoH waste management plan, guidelines and IPC measures should be applied, observed and customized through the development of the facility specific instruments. This should be augmented by guidelines issued by WHO and those that will be provided in Operational Manual and Procedures for the equipment as provided by equipment company/manufacturer – All the operators should be in the appropriate PPE during operations. Each of the operators should be provided and equipped with: an approved unused disposable overall, safety gumboots, sight grade hand gloves, the recommended goggles, helmet, right grade respirators and ear plugs and enforce on their use by the management – Limit access to the waste treatment area only to authorized persons and provide warning and safety signage to be placed at appropriate areas within the hospital facility – There must be a health and safety plan that is kept on-site which must contain appropriate safety measures – The operators must be trained on the contents of the health and safety plan – Provide adequately stocked first aid kit to be placed at strategic locations to allow ease access by workers on-site – Continue providing serviceable fire safety equipment and continue training workers on their proper use – Regular fire safety drills should be undertaken to gauge the levels of preparedness of the operators – Ensure good documentation and inventory on waste received and treated, use NEMA recommended tracking documents in wastes handling – Maintenance of an accident incident log book on site – The temporary waste holding area should be well sheltered from direct rainfall and strong winds but should be adequately aired and ensure regular cleaning and disinfection at the waste treatment area	The proponent/hospital management/MoH	150,000.00

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
	– All machinery and equipment involved in the waste treatment and disposal process should be washed and disinfected prior to leaving the hospital for outside disposal		
Community Health and Safety Risks	– Ensure regular monitoring of solid, liquid waste management practices and waste treatment from the facility especially from the treatment facility – Install appropriate drainage channel within the health facility connecting to the waste management system. – All cleaning wastewater from the treatment facility and the entire project should be directed into the waste management system within the facility. – The management of the facility should undertake regular assessment of waste generation quantities and categories to facilitate waste management planning, and investigate opportunities for waste minimization on a continuous basis – Separate residual chemicals from containers and dispose of the containers to reduce generation of secondary contamination especially on wastewater – Comply with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006 – Community should be sensitized on infection prevention and control measures within the facility	The proponent	50,000.00
Fire Risks and hazards	– Provide firefighting equipment within the site/facility – Firefighting equipment should be serviced regularly 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	Proponent	80,000

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
	– Enforce a 'no smoking' rule within the facility – Conduct fire drills and fire safety audits annually		
Impacts on air quality (Air pollution)	– Conduct air quality monitoring in collaboration with a NEMA designated laboratory in compliance with air quality regulations – Direct observation of particulate matter from the facility – 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	80,000.00
Water quality and effluent management	– Create awareness among the staff/employees on water conservation mechanisms – Monitor the quality of the domestic effluent 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	Proponent/Accredited laboratories	150,000.00

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
	– Comply with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006 – Put roof gutters to collect rainwater from the facility roofs during the rainy season for use in cleaning and landscaping. The facility will have water pan that will be supplying water for gardening around the facility – Depending on the service level and tasks of the health-care facility, the wastewater might contain chemicals, pharmaceuticals and contagious biological agents, and might even contain radioisotopes. A major part of liquid chemical waste is disposed of via the sink. The most important chemicals in hospital wastewater are an aesthetics, disinfectants, chemicals from laboratory activities, developer and fixer solutions from photographic film processing, and iodinated X-ray contrast media. Note that sludge and sewage from health care facilities generated by a basic wastewater-management system should never be used for agricultural or aquaculture purposes. Effluents from the basic treatment should not be discharged into water bodies that are used nearby to irrigate fruit or vegetable crops or to produce drinking-water or for recreational purposes. – Wastes generated from maintenance of health facility should be collected and disposed as per the management and handling guidelines of medical waste including pre-treatment, reuse and recycling		

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
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	80,000
Healthcare waste management	– The hospital shall prepare, operate and maintain an Infection Control and Waste Management Plan (ICWMP) adequate for the scale and type of activities and identified hazards consistent with the National regulations on management of health care wastes. – Waste should be identified and segregated at the point of generation. Non-hazardous waste, such as paper and cardboard, glass, aluminium and plastic, should be collected separately and recycled. Food waste should be segregated and composted. Infectious and / or hazardous wastes should be identified and segregated according to its category using the colour-coded system at their place of production to reduce the health risk from the smaller potentially infectious factions (typically waste items contaminated with body fluids and used sharps). Staff should receive instruction on three-bin waste segregation and safe handling and storage of health-care wastes. Staff should be aware of how to protect themselves from injuries and infection from waste; Waste containers and storage areas should be cleaned regularly – Prevention and minimization of the production of waste – Reuse or recycling of wastes if possible	The proponent/hospital management	100,000.00

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
	– Seal and replace waste bags and containers when they are approximately three quarters full. Full bags and containers should be replaced immediately – Identify and label waste bags and containers properly prior to removal – Transport waste to storage areas on designated trolleys / carts, which should be cleaned and disinfected regularly – Waste storage areas should be located within the hospital and sized to the quantities of waste generated – Instructions on how to handle the infectious waste from treatment centers should be made available to the waste handlers – Ensure safety and health of the health care waste handlers through provision of appropriate PPEs – Packaging containers for sharps should be puncture-proof – Unless refrigerated storage is possible, storage times between generation and treatment of waste should not exceed 48 hours during cool season, 24 hours during hot season – Train treatment plant operators on general functioning of the treatment facility – Seek operational license of the facility from NEMA to ensure compliance with the Waste management regulations, 2006 if needed		
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 facilities – 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	Proponent	Nil

Anticipated Impacts/environmental aspect	Recommended Mitigation Measures	Responsible Party	Estimated Cost (Ksh)
	– 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		
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/effluent quality monitoring plan
- Solid waste monitoring plan
- Air quality 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 university and other educational institutions 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 proposed project 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 proposed project.

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 National Plan on Healthcare Waste Management 2016- 202, 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

The proposed project will be significant and will play a big role in enhancing the access to quality education and training facilities as well as providing healthcare services close to the people within Kilifi County and its environs. The proposed project is considered important and beneficial to the economy as it will 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 Land Policy, 2009
5. Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019,
6. Environmental Management and Coordination (Air Quality) Regulations, 2014
7. Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003
8. Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulation, 2009
9. Environmental Management and Coordination (Waste Management) Regulations, 2006
10. Environmental Management and Coordination (Water Quality) Regulations, 2006
11. The Constitution of Kenya, 2010
12. The Occupational Safety and Health Act, 2007
13. The Climate Change Act, 2016
14. The County Government Act, 2012
15. The Water Act, 2016
16. Basic Education Act, 2013
17. Universities Act, 2012
18. Food, Drugs and Chemical Substances Act (Revised Edition 2013)
19. The Energy Act, 2019
20. National Construction Authority Act, 2014
21. The Physical and Land Use Planning Act, 2019
22. The Public Health Act, 2012
23. Occupiers Liability Act Cap 34
24. Health Care Waste Management Training Guide, 2015, MoH (K)
25. National Guidelines for Safe Management of Health Care Waste, 2011, MOH (K)
26. National Health Care Waste Management Strategic Plan (2016 – 2021), MOH (K)

27. National Infection Prevention and Control Guidelines for Health Care Services in Kenya, 2014, MOH (K)

APPENDICES

Appendix 1: Certificate of registration

Appendix 2: Copy of KRA PIN certificate

Appendix 3: Copy of land ownership documents

Appendix 3: Architectural plans

Appendix 4: Public participation questionnaires

Appendix 5: Approval of TOR

Appendix 6: Bill of Quantities

Appendix 7: Copy of EIA /EA experts' practising licenses