ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED NIGHTINGALE MEDICAL CENTRE ON PLOT No. KSM/MANYATTA "B"/3566, MIGOSI ESTATE, KISUMU CITY.

Location:	MIGOSI ESTATE, KISUMU CITY.
Plot No: Site GPS Coordinates:	No. KSM/MANYATTA "B"/3566 Site Gps coordinates: S 0° 4'.446, E 34°47'9.94"

Proposed hospital construction site

MARCH 2022

This Report has been prepared in accordance with the requirements of the Environmental (Impact Assessment and Audit) Regulations, 2003 and Environmental Management and Co-ordination (Amendment) Act, 2015

CERTIFICATION

I submit the following Environmental Impact Assessment Project Report for the Proposed hospital construction project on Plot No. KSM/MANYATTA “B"/3566

To my knowledge all information contained in this report is accurate and a truthful representation of all findings as relating to the project.

SUBMITTED BY:

Consultants

LAKERS CONSULTANCY LTD

NEMA Reg: 9125

KEVIN MUSIEGA

Lead Expert, Environmental Impact Assessment/Audits

Reg. No. ……1682……. …….

Signed:……Date:……

PROJECT PROPONENT

DR. PHILIP KAI CHEK,

P.O. BOX 1971- 40100,

KISUMU.

Signature…… Date …….

ACKNOWLEDGEMENT

I would like to acknowledge the support of the Proponent who appointed me to prepare this EIA report. I would in particular like to thank DR. PHILIP KAI CHEK who went further and assisted in the site visit, organized for public meeting, and gave the background and the relevant information regarding the proposed project.

I would further like to acknowledge support and co-operation which I received from the members of migosi and general community who contributed their roles generously during the public consultations.

Mr. KEVIN MUSIEGA

EIA/EA Expert

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EXECUTIVE SUMMARY

This report addresses both environmental and socioeconomic issues related to the development, operation or decommissioning of the proposed medical centre. The proposed facility has been designed on the basis of the client brief and the additional information collected during the site visits.

The site has an efficient road network and waste water management. However, there will be a septic tank, incinerator and a soak pit for the hospital. Electricity is available from Kenya power and lighting company while water is available from Kiwasco, in addition, the facility will also benefit from rain water harvesting. The facility is to be constructed to a standard hospital as provided in the designs, as a result, construction work will be undertaken and it is a known fact that construction activities impact adversely on the environment in one way or another, be it the social, economical, biological or physical environments. Such impacts should be checked to avoid or reduce any negative effects to the inhabitants.

As well, with the provision of improved infrastructure such as health facilities, there is bound to be a rise in health services demand and business/economic opportunities leading to increased population within the development site and its surrounding. Increase of population; be it temporary (during construction as a result of labor import) or permanent is likely to stretch services and other facilities around the project area. Measures should be put in place to ameliorate against any negative impacts and maximize on any positive ones.

Referring to the environmental law of the country and in accordance with Section 58 of the Environmental Management and Coordination Act (1999) and Legal Notice No. 101 of 2003, a project of this magnitude is supposed to be subjected to an Environmental Impact Assessment (EIA). Procedural guidelines on the EIA are spelt out in Legal Notice No. 101. The procedural steps involved in this assessment included the Identification of key stakeholders; Scoping and development of the Terms of References (ToRs) using a variety of methods and tools; Baseline Studies; Consultation and public participation; Impacts identification and analysis; Development of mitigation measures; Analysis of project alternatives and Development of Social and Environmental Management Plan.

The objectives of the EIA are to Consider all possible positive and adverse impacts to the environment, critical habitats, wildlife, aquatic ecosystems and the overall fauna and flora; Determine socio-economic impacts of the project; Assess environmental hazards and risks associated with the project; Design and prepare mitigation measures and action plans to address all possible significant negative environmental impacts.

In Kenya, the Environmental Impact Assessment (EIA) has to be conducted according to the requirements of the Environmental Management and Co-ordination Act (1999). An EIA document submitted to the enforcement authority, National Environmental Management Authority (NEMA) The terms of reference for the EIA were to establish baseline conditions, impact assessment, development of mitigation measures and an Environmental Management Plan (EMP) with respect to habitat and vegetation, socio-economic and community participation, demography and settlement, historical, archeological monuments and cultural heritage, physical environment, wildlife and fisheries, forest and forest products, energy, community environmental/public health and safety, analysis of legislative and institutional framework for environmental management in Kenya, and analysis of project and technology alternatives. It was also required to establish institutional needs to implement the recommended action plans.

A number of institutions, professional individuals/groups, local people and their leaders and academicians were consulted for their inputs to the assessment. Many individuals were

consulted through one-to-one meetings, to collect views from as many stakeholders as possible. The preliminary findings during public consultations with stakeholders indicated that the public support the project. Following is an outline of issues that were raised during the consultation and public participation process:

Safety of the public during the construction period.

Occupational health and safety during the operation phase

Concern of increased dust around the project site especially during the construction period

Increased traffic jam in Kibos road , especially during the construction period

What plans are in place to address, Biomedical/clinical, solid and liquid waste management in and around the project area

A number of project alternatives were considered in the assessment. These included the "no project" alternative. Although this would lead to preservation of the environmental conditions, this alternative was the least favorable because it would mean people will not benefit from the much needed jobs and the improved health care services.

Decommissioning phase impacts include loss of direct and indirect employment, large amounts of demolition waste, noise pollution, dust and exhaust emissions, likely occupational health and safety hazards. The EMP that was developed for this EIA project report outlines the actions that are required to address the identified negative impacts, responsibility, implementation stage, costs and relevant regulations/ standards to guide monitoring and auditing of the effectiveness of the proposed mitigation measures.

When properly designed and implemented, EIA is a powerful tool for ensuring that environmental issues are given due consideration during project design, allowing the benefits of the project to be maximized, while reducing the environmental and social costs of development. Thus, all due care should be taken into account to ensure that the environment of the project area is not disturbed in a way that could affect the living standards and styles of the surrounding people in a negative manner.

The proponent has submitted professionally drawn plans to the County government of Kisumu, for approval. The proposed designs are attached in the appendices. The quality of construction materials will be verified by a qualified and licensed structural engineer while the construction itself will be carried out by a qualified contractor at high levels of workmanship. From the EIA study, the neighbours, members of the public and other stakeholders expressed no reservations with implementation of the project and would like it to proceed to completion to meet the increasing demand for health care services.

The location of the proposed project is ideal as it is within a high density medium income generating population and easily accessible not only from the nearby estates but from the whole Kisumu city and beyond. Some negative environmental impacts anticipated from the proposed development project include noise and air pollution during construction; mitigation measures for these are captured in the study.

The project however has numerous positive impacts including provision of accessible, efficient and quality health care services especially for delivery, enhanced security in the neighbourhood, creation of local employment opportunities during construction and operation, promotion of local businesses through purchase of materials for construction and availability of customers due to increase population, contribution to development of the local infrastructure and growth of the local and national economies. These benefits can only be realized with the completion of this occurring mainly during construction require that the proponent and contractors strictly adhere to the Environmental Management Plan and the Health, Safety and Accident Prevention Action Plan. The proponent also needs to ensure that the legal and policy requirements and local authority by-laws that apply to this project are

complied with. In view of the above, the Consultants recommend that NEMA issues an EIA licence to the project Proponent so that the project can commence.

Once construction begins, there will be dust generation, air pollution and noise generation. Most of these impacts are temporary occurring at the demolition and construction stages of the project; they are important however given that the site is within a residential neighbourhood. Mitigation measures have been highlighted in the EMP in the main body of the report.

Other impacts include generation of solid waste and waste water (during construction), increased water demand for construction and during operation, and occupational safety and health effects. Solid and liquid waste management (including sewerage) is also critical since it could pollute the environment, if not properly managed. Project alternatives considered include site, design and building technology with the preferred options being based on availability, the proponent's requirements, cost, market trends and demand, minimal environmental impacts and area land use zoning

Some of the mitigation measures proposed for these negative impacts include; reduction of vegetation destruction, proper disposal of sewage wastes, controlling soil erosion, adherence to occupational safety and health rules and regulations, preparing contingency plans for accident responses, traffic management and planning . It was evident from this study that the construction and operation of maternity and theatre will bring positive effects in the project area. However, some negative impacts will also be experienced hence the need to mitigate them appropriately. On the basis of the above, it is our recommendation that the project be allowed to go on provided the mitigation measures outlined in this report are adhered to and the Environmental Management Plan (EMP) is implemented adequately.

This EIA reveals that the project does not have significantnegative environmental impacts and that most of the impacts are positive. The few negative impacts are of a temporary nature.

ABBREVIATIONS & ACRONYMS

CGK	County Government of Kisumu
KIWASCO	Kisumu Water and Sewerage Company
EIA	Environmental Impact Assessment
EA	Environmental Audit
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
MDG	Millennium Development Goals
NEAP	National Environmental Action Plan
NEMA	National Environment Management Authority
WRM	Water resources Authority
MoH	Ministry of Health
PPE	Personal Protective Equipment
WSSD	World Summit for Sustainable Development
GDP	Gross Domestic Product
KPLC	Kenya power and lighting company
WDU	Wood Dust Unit

1 INTRODUCTION

There has been a remarkable and refreshing interest in environmental issues in the recent past with the publication of the 1987 Report of the World Commission on Environment and Development (the Brundtland Report titled, "Our Common Future"). This is particularly so due to increasing realization that man's unsustainable production and consumption patterns are largely responsible for the unprecedented rate of environmental degradation that is threatening mankind. Some of the negative consequences of mankind's irresponsible interaction with the environment include: climate change, desertification, loss of biological diversity, pollution of air, water and land/soil; diminishing indigenous forest cover and loss of natural habitats; among others. The concern for environment made evident the necessity for the planning authorities to count on sound information about possible environmental consequences of development actions[1].

Dr. Philip Kai Chek intends to construct a medical centre at Migosi Estate (next to Migosi police station), Kisumu City County. The medical centre will cover 0.006 hectares of land owned by the proponent. The plot is currently an open area with grass and shrub vegetation. The proposed site is currently unoccupied and planned for this facility. The neighboring area is mainly occupied by human settlement. Majority of people in this area are ordinary workers residing in this area and engaged in employment, formal and informal businesses, or local commercial activities. The proposed site has enough space for the proposed development, while the existing service infrastructure (water supply, power supply and solid waste management) are adequate to accommodate uses of the intended facility. The main activities during the construction of the proposed facility will include masonry work and installation of service lines as well as utilities relevant to a health facility. It is expected that materials to be used during construction are the typical ones (mainly cement, metal, stones and timber) used in the county and the area in particular.

According to Sections 58 and 138 of the Environmental Management and Coordination Act (EMCA) of 1999 and Part II and III of the Environmental (Impact Assessment and Audit) Regulations 2003 (Legal No. 101), implementation of the proposed project requires an Environmental Impact Assessment (EIA) study and preparation of an EIA Comprehensive Project Report (CPR). The CPR should be submitted to the National Environment Management Authority (NEMA) for review and eventual licensing before the commencement of proposed project activities.

To ensure environmental with Environmental Management and Coordination Act, Cap 387, Dr. Philip Kai Chek, has contracted Lakers Consultancy Limited, an Environmental Impact Assessment (EIA) Firm of Experts, to undertake the EIA study for the proposed Nightingale Medical Centre and submit report to NEMA for licensing.

1.1 EIA Objective

The objective of this EIA is to ensure that the proposed hospital development takes into consideration appropriate measures to mitigate any adverse impacts to the environment. It will also ensure that the related operations will be in full compliance with the EMCA, 1999.

[1] Singh et al., 2007. In: Environmental bioremediation technologies, Singh, S. N.;Tripahti, R. D. (Eds) Springer, 223-258

1.2 Terms of Reference

The terms of reference for the EIA were to: establish baseline conditions, impact assessment, and develop mitigation measures and an Environmental Management Plan (EMP) with respect to habitat and vegetation, socio-economic and community participation, demography and settlement, historical, archeological monuments and cultural heritage, physical environment, wildlife and fisheries, forest and forest products, energy, community environmental/public health and safety, analysis of legislative and institutional framework for environmental management in Kenya, and analysis of project and technology alternatives. It was also required to establish institutional needs to implement the recommended action plans.

1.3 EIA Outputs

EIA outputs will include:

1. Provide a description of the proposed project with a focus on potential impacts to the surrounding environment;
2. Carry out a systematic environmental assessment following the gazetted regulations;
3. Produce an EIA report that should contain among other issues identification of key environmental aspects, recommendations on appropriate mitigation measures to minimize or prevent any adverse impacts; and
4. Develop an environmental management plan outline.

1.4 EIA Methodology

The proposed site is in conformity with existing land use, namely, urban development through establishment of a hospital. However, for EIA purposes, methodology that was used involved scientific assessment of the proposed site for significant physical (e.g. noise, air, etc.) and biological (e.g. current biodiversity status) properties, and modeling possible changes that may arise as a result of the proposed development. Equally, community consultation were done in accordance with NEMA's (Environmental Impact Assessment: review guide for communities (2014).

1.4.1 Biophysical Assessment

The objectives of this assessment were:

1. To take an inventory of the existing biophysical conditions at the proposed site;
2. To evaluate or model the possible environmental impacts and change that may arise as a result of the project; and
3. To determine environmental restoration actions needed

The proposed site is an undeveloped grassy area located at Migosi Estate along Kibos road, Next to Migosi Police Station, Kisumu City County. The study was accomplished through a series of steps which include:

- Preliminary assessment of the general and existing land use and biophysical conditions. This assessment reaffirmed the need for an environmental impact assessment as provided under EMCA, 1999. During the field investigations, and scoping, information on biophysical and socio-economic environment of the proposed development area and its environs were collected. Measurements included measurements and analysis of the existing physical (e.g air quality, site elevation,

etc.) and biodiversity occurring at the site. Land use aspects of the surrounding were also taken into account.

- To ensure comprehensiveness on the assessment, desktop studies and interviews were held. This involved the proponent and the consultants. Relevant studies and reports on the construction including design works and other related sources of information were critically reviewed.

1.4.2 Community Participation

Human well-being is dependent upon healthy environments that are able to sustain ecosystems, which in turn provide the much needed food, goods and ecosystem services. It is against this background that when putting up development projects, well developed community involvement programs in the EIA process is important for bringing people/stakeholders together and allow them to share issues and ideas.

Since their introduction in the 1970s, participatory methods and techniques have become central tools for community development. Participatory methods may be applied in a variety of contexts and sectors, including environmental management, urban sanitation provision, impact assessments, among others.

The main objective of the Community involvement was to provide an opportunity to get "grassroots"/stakeholders participation in the development of the medical centre. Specific objectives of engaging stakeholders and the community during the EIA process and beyond included, to:

- Ensure understanding – stakeholders were informed about the project through disclosure of pertinent information (e.g. activities, inputs, outputs, etc.);
- Involve stakeholders in the assessment – After informing the stakeholders about the project, they were invited to offer their views, opinions or suggestions that included potential positive and negative environmental and social impacts, enhancement, mitigation and management measures;
- Build relationships – stakeholders were invited to partner with the proponent to ensure that all project positive impacts during construction and operation phases are realized and project ESMP is implemented;
- Engage vulnerable people – apart from key informants, the engagement included potential Project Affected Persons (PAPs). PAPs within 500m radius of the project site were engaged through questionnaires;
- Manage expectations – the engagement was also used for understanding and helping to manage stakeholder and community expectations, e.g., inputs, outputs, proponent, activities, budget, etc. was accurately disseminated in an accessible way; and
- Ensure compliance – engagement process was designed to ensure compliance with both local regulatory requirements and international best practice.

The stakeholder engagement was guided by three universal ethical principles; *respect for participants*, *beneficence* and *justice*[2] ensuring a free, prior and informed consultation.

[2] The Nuremberg Code; The Declaration of Helsinki; Belmont Report; U.S. Code of Federal Regulations, etc.

2 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Introduction

This Chapter outlines the existing national environmental and social legislation, policies and institutions applicable to the Project that will guide the development of the Project, which is subject to this EIA Project Report.

2.2 Policy Framework

2.2.1 Sessional Paper No.10 of 2014 on the National Environment Policy, 2014

The overall goal of this Paper is to ensure better quality of life for present and future generations through sustainable management and use of the environment and natural resources.

Section 5.6 of this Sessional Paper focusses on infrastructure development and environment and makes explicit policy statements to ensure sustainable management and use of the environment and natural resources during the construction and operation of infrastructure developments including roads and pipelines. These policy statements require the commitment of the Government to:

- Ensure Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA), Social Impact Assessment (SIA) and Public Participation in the planning and approval of infrastructural projects;
- Develop and implement an environmentally friendly national infrastructural development strategy and action plan; and
- Ensure that periodic Environmental Audits are carried out for all infrastructural projects.

Relevance

In line with the above policy statements, this EIA has been conducted for Nightingale Medical Centre Project to ensure that environmental and social issues are appropriately addressed.

2.2.2 National Environment Policy, 2013

The National Environment Policy aims to provide a holistic framework to guide the management of the environment and natural resources in Kenya. It further ensures that the linkage between the environment and poverty reduction is integrated into all government processes and institutions to facilitate and realize sustainable development at all levels. This is done in the context of a green economy enhancing social inclusion, improving human welfare and creating employment opportunities, and maintaining the healthy functioning of the ecosystem. The main goal of this Policy is "*A better quality of life for present and future generations through sustainable management of the environment and natural resources*."

Relevance

The project shall be guided by this policy to minimize environmental degradation whilst ensuring development of the medical centre.

2.2.3 Kenya Health Policy, 2016-2030

This Policy gives directions to ensure significant improvement in overall status of health in Kenya in line with the Constitution of Kenya, the country's long- term development agenda, Vision 2030 and global commitments. It demonstrates the health sector's commitment, under

the government's stewardship, to ensuring that the country attains the highest possible standards of health, in a manner responsive to the needs of the population.

The policy is designed to be comprehensive and focuses on the two key obligations of health:

1. Realisation of fundamental human rights including the right to health as enshrined in the Constitution of Kenya and;
2. Contribution to economic development as envisioned in Vision 2030.

Relevance

The proposed project shall contribute to realization of this policy and key obligations thereof.

2.2.4 National Policy on Injection Safety and Medical Waste

This policy seeks to ensure safety of health workers, patients, and the community and to maintain a safe environment through the promotion of safe injection practices and proper management of related medical waste. This is the first document of the Ministry of Public Health and Sanitation that is explicit on the need to address health waste management problems. The policy objectives spell out the need to advocate for support and implementation of proper management of medical waste among others.

Some of the guiding principles for the implementation of this policy include: Establishment of organizational structures at all levels for all the implementation of injection safety and related medical waste. The policy also addresses the need for environmental protection through appropriate waste disposal methods. Minimization of risks to patients, health workers, communities and the environment through application of safer injection devices and sharps waste disposal methods. Advocating for the strengthening of the necessary human resource capacity through training and sensitization for safe waste disposal. The provision of sustained supplies and equipment for waste management through strengthened logistics system addresses the need for commensurate investment in waste handling requirements. A unique strategy recommended also is the advocacy of best waste management practices through behavior change communication as a key element in the strategy.

Relevance

The proponent has agreed to adhere to the policy adequately.

2.3 Legal and Institutional Framework

2.3.1 The Constitution

Kenya Constitution is the supreme law in Kenya. This constitution gives a lot of emphasis on environmental conservation and sustainable development. In the Preamble, the Constitution states that **"We, the people of Kenya will be respectful of the environment, which is our heritage, determined to sustain it for the benefit of future generations"**.

Article 2(5) of the Constitution states that the general rules of international law shall form part of the laws of Kenya. For the purposes of protection of the environment, several principles of international environmental law which act as a guide on the development of environmental legislation have been incorporated:

- the polluter pays principle;
- principle of public participation;
- principle of sustainability;
- principle of inter & intra-generational equity;
- principle of prevention; and
- precautionary principle

The principle of sustainable development is entrenched in Article 10 2(d) of the Constitution as one of the national values and principles of governance.

Article 26 (1) Every person has a right to life.

The Constitution guarantees the right to a clean and healthy environment at **Article 42**. Article 42 further guarantees the right to have the environment protected for the benefit of present and future generations through legislative and other measures particularly those contemplated in **article 69** and the right to have obligations relating to the environment fulfilled under **Article 70**. Article 69 imposes obligations on the state. The state is required to;

a) ensure sustainable exploitation, utilization, management, and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
b) work to achieve and maintain a tree cover of at least ten percent of the land area of Kenya;
c) protect and enhance the intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;
d) encourage public participation in the management, protection, and conservation of the environment;
e) protect genetic resources and biological diversity;
f) establish systems of environmental impact assessment, environmental audit, and monitoring of the environment;
g) eliminate processes and activities that are likely to endanger the environment; and
h) Utilize the environment and natural resources for the benefit of the people of Kenya.

Article (69) (2) imposes obligations on every person, to cooperate with state organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

Article 70 provides an avenue for redress for any person who alleges that the right to a clean and healthy environment has been or is likely to be denied, violated, infringed, or threatened. The Court is empowered to issue preventive, cessation, or compensatory orders.

Article 70 relaxes the rule on locus standi as a result of which, there is no need to prove loss or injury by an applicant. Anyone may institute a claim seeking to enforce the environmental rights and obligations stipulated in the Constitution.

Enforcement contemplated by Article 70 will be done through the Environment and Land Court established under Article 162 (2) (b). The Court has the same status as the High Court. This effectively denies High Court jurisdiction over environmental matters under Article 165 (5) (b).

Relevance

The project shall be undertaken within the provision of the Constitution. The proponent shall ensure that the project activities do not compromise the right to a clean and healthy environment. Requisite measures shall be put in place to guarantee the sustainability of the project. Such measures shall include but not limited to pollution prevention and control, protection of biodiversity, sustainable utilization of natural resources, among others.

2.3.2 Environmental Laws

2.3.2.1 Environmental Management and Coordination Act, 1999 (Revised 2015)

The Environmental Management and Coordination Act (EMCA), 1999, is the framework law on environmental management and conservation. The National Environment Management Authority (NEMA) was established as the principal instrument of government charged with

the implementation of all policies relating to the environment, and to exercise general supervision and coordination over all matters relating to the environment. In consultation with the lead agencies, NEMA is empowered to develop regulations, prescribe measures and standards and, issue guidelines for the management and conservation of natural resources and the environment. The Act provides for environmental protection through:

- Environmental impact assessment;
- Environmental audit and monitoring; and
- Environmental restoration orders, conservation orders, and easements.

Part VI under Section 58 of the Act directs that any proponent for any project listed on the Second Schedule of the Act undertake and submit to NEMA an Environment Impact Assessment (unless exempted by NEMA), who in turn issue a license as may be appropriate.

Relevance

- *The proponent has contracted Lakers Consultancy Ltd to undertake the EIA and prepare the report for submission to NEMA.*
- *The proponent shall obtain an EIA license before the commencement of works.*

Below are a set of regulations developed under EMCA.

The Environmental (Impact Assessment and Audit) Regulations, 2003

These regulations outline the procedures and guidelines for carrying out environmental impact assessments and audits. The regulation requires that the EIA/EA be conducted by a registered lead or firm of experts in accordance with the terms of reference developed during the scoping exercise.

These regulations have been amended by the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019. The amendment list projects into Low, Medium, and High Risk. For the low -risk projects, an environmental impact assessment Summary Project Report (SPR) is prepared while for medium-risk projects Comprehensive Project Report (CPR) must be prepared. For the high-risk projects, a Full Study Report (FSR) is prepared and submitted to NEMA.

Relevance

The environmental consultant shall undertake an EIA study in accordance with the general environmental impact assessment guidelines provided for in Part III of the regulations.

EMCA (Water Quality) Regulations, 2006

The regulations provides for sustainable management of water resources including prevention of water pollution and protection of water sources (lakes, rivers, streams, springs, wells and other water sources). It is an offence under Regulation No. 4 (2), for any person to throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution.

The First Schedule of these Regulations provides the quality standards for sources of domestic water as shown in the table 2-1 below:

Table 2-1 Quality Standards for Sources of Domestic Water

Parameter	Guide Value (max allowable)
pH	6.5 – 8.5
Suspended solids	30 (mg/L)
Nitrate-NO3	10 (mg/L)
Ammonia –NH3	0.5 (mg/L)

Parameter	Guide Value (max allowable)
Nitrite –NO2	3 (mg/L)
Total Dissolved Solids	1200 (mg/L)
Scientific name *(E.coli)*	Nil/100 ml
Fluoride	1.5 (mg/L)
Phenols	Nil (mg/L)
Arsenic	0.01 (mg/L)
Cadmium	0.01 (mg/L)
Lead	0.05 (mg/L)
Selenium	0.01 (mg/L)
Copper	0.05 (mg/L)
Zinc	1.5 (mg/L)
Alkyl benzyl sulphonates	0.5 (mg/L)
Permanganate value (PV)	1.0 (mg/L)

*Nil means less than limit of detection using prescribed sampling and analytical methods and equipment as determined by the Authority.

Relevance

The project treat wastewater to meet national standards before discharge to municipal sewerage system.

EMCA (Air Quality) Regulations, 2014

The objective of the Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources such 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 Cabinet Secretary in consultation with the Authority. Emission limits for various areas and facilities have been set. The regulations provide the procedure for designating controlled areas, and the objectives of air quality management plans for these areas.

Relevance

Proposed project has undertaken air quality measurements at the project as part of the baseline information. Air emissions during construction and operation phases shall be done against the pre-project air quality results.

2.3.2.2 Climate Change Act, 2016

This Act provides a legal framework for enhanced response to climate change; to provide for mechanism and measures to achieve low carbon climate development; and other matters that relate to climate change. The Act provides incentives for the promotion of climate change incentives. This is to encourage persons to put in place measures for elimination of climate change including reduction of greenhouse emission and use of renewable energy and put in place measures to mitigate against adverse effects of climate change.

Relevance

While designing the project, low carbon technologies should be evaluated and considered where feasible to minimise greenhouse gas emissions (GHGs).

2.3.3 Water and Sanitation Laws

2.3.3.1 Water Act, 2016

Part II section 9 of this Act denotes that every person has a right to access water resources whose administration is the function of the national government.

Part III section 21 of this Act provides for national monitoring and information systems on water resources. Following on this, sub-section 2 allows the Water Resources Authority to demand from any person or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may require to be kept by a owner of the project and the information thereof furnished to the authority.

Section 85 (3) of the Act of the Act allows a person with license (licensee) to supply water to make regulations for purposes of protecting against degradation of water sources. Section 110 (2) (b) allows the licensee to construct and maintain drains, sewers and other works for intercepting, treating or disposing of any foul water arising or flowing upon land for preventing pollution of water sources within his/her jurisdiction.

Section 143 (2) (b) states that no person shall discharge any trade effluent from any trade premises into sewers of a licensee without the consent of the licensee upon application indicating the nature and composition of the effluent, maximum quantity anticipated, flow rate of the effluent and any other information deemed necessary.

Relevance

The project shall be guided by this Act to avoid or minimize water resources degradation whilst ensuring development of the medical centre.

2.3.4 Health Laws

2.3.4.1 Public Health Act, Cap 252

Part IX section 115 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires Local Authorities to take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health.

Such nuisance or conditions are defined under section 118 waste pipes, sewers, drains or refuse pits in such a state, situated or constructed as in the opinion of the medical officers of health to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into a public street or into the gutter or side channel or watercourse, irrigation channel or bed not approved for discharge is also deemed as a nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.

On the responsibility of local authorities, Part XI section 129 of the Act states in part "It shall be the duty of every local authority to take all lawful, necessary and reasonably practicable measures for preventing any pollution dangerous to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes...".

Section 130 provides for making and imposing regulations by the local authorities and others the duty of enforcing rules in respect of prohibiting use of water supply or erection of structures draining filth or noxious matter into water supply as mentioned in section 129. This provision is supplemented by Section 126A that requires local authorities to develop by-laws for controlling and regulating among others private sewers, communication between drains and sewers and between sewers as well as regulating sanitary conveniences in connection to buildings, drainage, cesspools, etc. for reception or disposal of foul matter.

Part XII Section 136 states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitate the breeding or multiplication of pests shall be deemed nuisances and are liable to be dealt with in the manner provided by this Act.

Relevance

The project shall be implemented in accordance with the precepts of this Act during construction and operation phases.

2.3.4.2 The Standards Act, Cap 496

This Act promotes the standardization of the specification of commodities and provides for the standardisation of commodities and codes of practice to ensure public health and safety. It establishes the Kenya Bureau of Standards (KEBS) and defines its functions as related to:

- Promotion of standardization in industry and commerce; and
- Making arrangements or provision of facilities for the testing and calibration of precision instruments, gauges and scientific apparatus, for the determination of their degree of accuracy by comparison with standards approved by the Minister on the recommendation of the Council, and for the issue of certificates in regard thereto.

Relevance

Proponent and contractor shall ensure all materials and equipment in use during construction as well as operation of the water supply infrastructure adheres to the highest standards and do not pose any human health and safety risk.

2.3.4.3 Radiation Protection Act, Cap 243

This Act provides for protection of the public and radiation workers from the dangers arising from the use of devices or materials capable of producing ionizing radiation and for connected purpose. The Act prohibits the unauthorized manufacture, production, possession or use, sale, disposal, lease, loan or dealership, import, export of any irradiating device or radioactive material. All authorized buyers, sellers, users, of such device must be properly licensed.

Relevance

Proponent will get license to operate radiation equipment.

2.3.4.4 Kenya National Guidelines on Safe Disposal of Pharmaceutical Waste, 2001

The provisions of these guidelines describe a series of steps that need to be followed in order to dispose unwanted pharmaceuticals. The steps required include; identification of pharmaceutical waste, sorting of pharmaceutical waste by category, filling the relevant forms to seek authority from the DHMT and the Chief Pharmacist among other persons to dispose such waste. Upon obtaining all the relevant approvals, the disposal of the pharmaceutical waste shall be effected under the supervision of the local pharmaceutical waste disposal team or the Waste Management Team (WMT).

The recommended methods for disposing of unwanted pharmaceuticals include:

- The use of either medium temperatures incineration at a minimum of 850°C or high temperature incineration exceeding 1200°C with two chamber incinerator for solids, semi- solids and powders for controlled substances e.g. anti-neoplastic.
- Engineered sanitary landfill to be used for disposal of expired or unwanted pharmaceuticals.
- Sewer disposal for diluted liquids, syrups, intravenous fluids, small quantities of diluted disinfectants and antiseptics.

The proponent will conform to the regulations there under.

2.3.4.5 The National Construction Authority Act, 2012

This is an Act of parliament that provides for the establishment, powers and functions of the National Construction Authority (NCA) and for connected purposes. Under this Act is established the NCA which all construction contractors are expected to comply with by June 30th 2013. This Authority as per this law is supposed to reign in rogue contractors and establish order within which the construction industry does its business.

Relevance

Since the proposed project works involves construction activities which falls squarely under the authority established, it is expected that the hired contractor will have registered with the Authority. The construction site should also be registered with NCA before construction commences.

2.3.5 Occupational Safety and Health Laws

2.3.5.1 The Occupational Health and Safety Act, 2007

This is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes.

Part VI of this Act provides for general health provisions while Part X provides for the general welfare of the workers with respect to supply of drinking water, washing facilities and first aid among other aspects. Section 53 of this Act requires that for workers employed in a process involving exposure to any injurious or offensive substances, suitable protective clothing and appliances (gloves, footwear, goggles, and head coverage) shall be provided.

Relevance

The contractor and the proponent will ensure for the safety and health of those to be employed at the site in all its phases. They shall also be held responsible for any other matter in contravention of this Act. The ESMP advises the proponent and the contractor on safety and health aspects, potential impacts, personnel responsible for implementation and monitoring, frequency of monitoring, and estimated costs.

2.3.5.2 Work Injury Compensation Benefit Act 2007

This Act provides for compensation for employees on work related injuries and diseases contacted in the course of employment and for connected purposes. The Act includes compulsory insurance for employees. The Act defines an employee as any worker on contract of service with employer.

Relevance

This Act is relevant to the proposed project thus it is recommended that all workers contracted during the project implementation phase have the required insurance cover so that they can be compensated in case they get injured while working.

2.3.5.3 The Employment Act No 11, 2007

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

Relevance

The contractor and proponent, being the primary employer, during the construction and operation phases of the project, are bound by this law to abide to its stipulations on employee management and relations.

2.3.6 Other *Relevant* Laws

2.3.6.1 County Government Act No. 17 of 2012

Part II of the Act empowers the county government to be in charge of function described in Article 186 of the constitution, (county roads, water and Sanitation, Health), Part XI of the Act 27 vest the responsibility of planning and development facilitation to the county government with collaboration with national government, this arrangement has been adopted for interventions in order not to conflict with provisions of the Kenyan Constitution.

Relevance

Project activities are aligned with the Kisumu Cicty county's development plans on healthcare.

2.3.6.2 Physical and Land Use Planning Act, 2019

This is an Act of Parliament to make provision for the planning, use, regulation and development of land and for connected purposes. Section 58(7) states that "any person applying for development permission shall also notify the public of the development project being proposed to be undertaken in a certain area in such a manner as the Cabinet Secretary shall prescribe". Section 58(8) states that "the notification referred to under sub-section 58 (7), shall invite the members of the public to submit any objections on the proposed development project to the relevant county executive committee member for consideration".

This provision is consistent with the requirements of EMCA Cap 387. Third Schedule (Development Control) identifies water and sewerage networks as one of the services that requires easements and way leaves.

Relevance

The project will comply with this Act.

2.3.6.3 The Penal Code, Cap 63

Section 191 of the Penal Code makes it an offence for any person or institution that voluntarily corrupts, or foils water for public springs or reservoirs rendering it less fit for its ordinary use. Similarly, section 192 of the same Act prohibits making or vitiating the atmosphere in any place to make it noxious to health of persons/institution in dwellings or business premises in the neighbourhood or those passing along a public way.

Relevance

The proponent shall ensure strict adherence to the environmental and social management and monitoring plan (ESMP) throughout the project implementation cycle in order to mitigate against any possible negative impact.

2.4 List of Environmental and Social Permits Required for the Project, as per the Requirements of Kenyan Law

Table 2-2 provides a summary of the environmental and social permits and licences required for the Project for both the construction and the operation phases.

Table 2-2 Environmental and Social Permits and License Required

Phase	Sector	Legislation	Authority	Permit/License	Comments
Construction	Environment	EMCA	NEMA	EIA license	The EIA licence will give the decision criteria for NEMA and associated conditions of approval, which will need to be met. An annual audit report to NEMA will be required to indicate conformance to these permit conditions are achieved.
	Land	NCA Act	NCA	Construction Permit	Prior to construction.
	Occupational Health and Safety	Occupational Health and Safety, 2007	DOSHS	Registration of the workplace	Prior to construction.
		WIBA	DOSHS	WIBA insurance	Prior to construction.
Operation	Environment	EMCA	NEMA	Environmental Audit Acknowledgement Letter and Self-Audit Acknowledgement thereafter	An annual NEMA audit is required throughout the operations phase.
	Water	Water Act	WRA	Eflluent discharge license	

2.5 Institutional Framework

The overall authority for implementation of the environmental and social mitigation measures and management plans will be the project proponent which will have an oversight of the Environmental and Social Management Plan (ESMP) implementation on a day-to-day basis.

A summary of other organisations relevant to the proposed project are provided in table 2-3.

Table 2-3 Institutional framework

Organization	Responsibilities
National Environmental Management Authority (NEMA)	• General supervision and, co-ordination of all matters relating to the environment. NEMA is the principal instrument in Government in the implementation of all policies relating to the environment. • NEMA is also responsible for monitoring compliance with all the environmental regulations. • NEMA annual audit report required to be submitted.
Directorate of Occupational Safety and Health Services (DOSHS)	Monitor the implementation of health and safety plans for construction and operation workers and members of public coming into contact with construction activities.
County Government	Collaborate with proponent in the project licensing and supervision.
NCA	Licensing

3 PROJECT DESCRIPTION

3.1 Introduction

This chapter provides detailed description of the proposed project [location, components, materials and their sources, equipment required, waste and emissions, project activities (construction, operation and decommissioning phases)], and project alternatives.

3.2 Project Location

The project location is Migosi Estate next Kenya Police Migosi Patrol Base and Grace Baptist Church, along Kibos Road, Kisumu Central Sub-county, Kisumu City County.

The project site is defined by the following GPS coordinates: 0°4'46.45"S, 34°47'9.94"E.

3.3 Project Overview

The proposed project entails construction a four-storey medical centre sub-divided into various sections designed to address the movement related to patients, personnel and equipment. The design plan clearly indicates type of services offered in each room and in each floor of the building

The proposed project will consist of: general wards, private wards, children wards, nurse's station, doctor's room, consultation room, examination room, mortuary wing on the ground floor, CT scan section, radiology services, ultrasound sound services, MRI area, sterile room, ICU services, sample collection point, diagnostic section, laboratory services, pharmaceutical services, changing room, anesthetics area, operation theatre, offices, cashier, separate male and female washrooms,wheelchairs and an incinerator will be constructed for waste management at the site. (See appendix for project designs and elevations).

3.4 Project Justification

The project is intended on establishing an efficient, high quality, accessible private hospital to meet the high demand for quality healthcare services in the Kisumu county and Kenya at large. Other objectives of the project are to:

- Enhance access to clean and efficient health care within the county.
- Improve capacity to provide specialized operation services like ICU services
- Conduct mortuary services
- Strengthen maternal care services
- Support training and capacity building for doctors, nurses and mid wife personnel.
- Increase pool of experts in the region.
- Improve the effectiveness of private hospital services in the region.
- Create a platform to share information regionally on medical research and treatment
- Create job opportunities for the medical personnel and non medical staff.
- To provide revenue to the county government of Kisumu
- To bring the land into proper use
- To provide income for the proponent

3.5 Materials and Sources

Table 4-1 details some of the construction materials to be used and their sources[3,4]

Table 3-1 Materials and sources

Item	Local/Imported	Description
Underground Masonry Rainwater Harvesting and Storage Tank		
Cement	Local	Preparation of concrete for foundation.
Cement mortar	Local	Finishing works of the wall and base joints (inner and outer)/plastering
Water proof cement	Local	Preparation of plaster for inner and outer wall plastering.
Sand	Local	Input in preparing concrete and mortar for joinery purpose and making ballast for reinforcement concrete.
Labour	Local	Skilled and unskilled manpower
Bituminous paint	Local	Painting wall and joints.
Cement slurry	Local	Smoothening inside surface of the tank (floor base).
Rust proof paint	Local	Outer surface tank curing.
Ribbed steel reinforcement bars	local	For reinforcement.
Water	Local	Input in the construction works for dust suppression during excavation and preparation of concrete and cleaning.
BRC wire mesh	Local	Tying over skeletal frame for the roof and plastered with mortar during tank roof making.
Aggregate/Stone	Local	Preparation of cement concrete for foundation
Water	Local	Curing.
Quarry bricks	Local	Walling.
Wet gunny bags/ Polythene	Local	Covering the tank wall for curing.
Pegs & Nails	Local	Marking the inside of the tank wall.
Red Oxide	Local	Tank painting.
Granite and ceramic tiles	Local	Floor tiling.
Finishing items	Local	Paints, lubricants, etc.
Other materials		
Binding wire, Brackets, Stakes, Timber, Plastic formwork, Aluminum CAT Ladder, Granular backfill, G1 breather valve, Over flow pipe, Drain pipe, Tap, etc.		

[3] http://www.rainwaterharvesting.org/Urban/Construction.htm retrieved March, 2022

[4] Government of Uganda, Handbook on rainwater harvesting storage options.

3.6 Equipment and Tools Required

Table 4-2 details equipment that will be used during all phases of the project[5,6].

Table 3-2 Equipment and tools required

Equipment/Tool	Local/Imported	Description
Excavators	Local	Excavating project site.
Wheelbarrow	Local	Carrying/transporting materials onsite.
Spade	Local	Scooping and mixing materials, i.e., mortar and concrete.
Trowel	Local	Filling vertical interlocks
Spirit levels	Local	Ensure for accurate vertical and horizontal levels of tank masonry wall.
Measuring tape	Local	Measuring size or distance.
Mortar pans	Local	Holding or carrying sand, cement, mortar and concrete, etc.
Steel float	Local	Smoothing the surface of concrete prior to it setting.
Wooden float	Local	Smoothening both sides of vertical interlocks/ smoothening and pressing the plaster.
Building line string	Local	Marking the inside of the tank wall
Pliers	Local	Used for splicing, tuning, bending, tripping, pulling, gripping and holding wires and smaller objects.
Wire cutter	Local	Cutting copper, brass, iron, aluminium, and steel wire.
Hack saw	Local	Cutting metal pipes, rods, brackets, plastics, etc.
Claw Hammer	Local	Driving nails/ pounding nails.
Bow saw	Local	Cross-cutting timber.
Plumb bob	Local	Ensure vertical alignment of masonry walling.
Line bar	Local	Levelling plaster.
Coir brush	Local	Smoothening inside surface of the tank.
Painting brush	Local	Applying coat of cement slurry over the mesh.
Other tools and equipment		
1 No. Total Station, 1 No. First Aid Kit, Full set of survey equipment, Hand tools, Backhoe, Other construction equipment e.g. shovel, etc.		

[5] Government of Uganda, Handbook on rainwater harvesting storage options.

[6] http://www.rainwaterharvesting.org/Urban/Construction.htm retrieved March, 2022

3.7 Waste and Emissions

Table 4-3 details some waste and emissions from the project.

Table 3-3 Waste and emissions

Waste Category	Description
Packaging	General construction packaging waste including pallets and plastics from construction materials.
General construction waste	Metal shavings, plastic off-cuts and soil.
General household waste	From presence of construction workforce onsite.
Sanitary effluents	From employees on worksites. Comprises all wastes containing bodily fluids.
Hazardous waste	Paints/lubricants/solvents used for finishing.
Emissions	Emissions to air from the transportation of equipment and trenching activities including NOx[7], CO2[8], CO[9] and PM[10]/dust.

3.8 Project Implementation in Phases

The project shall be implemented in phases as detailed in this section.

3.8.1 Description of Project's Pre-Construction Phase Activities

The following activities will be implemented in this phase:

- Obtaining EIA license from NEMA
- Approval of designs by relevant authorities
- Recruitment of necessary staff as per the scope of work
- Training of staff especially on occupational safety and health
- Sensitization of staff on HIV/AIDS; sexually transmitted diseases; other communicable diseases such as COVID-19; substance and drug abuse
- Procurement of necessary materials and equipment/machinery.
- Mobilization of personnel, plant and equipment to the site.
- Setting up site camp with provisions for water, sanitary facilities and other necessary amenities.
- Installation construction sign post.

3.8.2 Description of Project's Construction Phase Activities

3.8.2.1 Site Clearance and Excavation

Site clearing will be done to prepare the ground especially at points where the building will stand with the help of hired labour. Building materials will be sourced and deposited on site as directed by the contractor. A foundation will then be dug to a depth recommended by the engineer on site to provide for a stable base for the main building given that the hospital is four floors.

[7] Nitrogen Oxides
[8] Carbon Dioxide
[9] Carbon Monoxide
[10] Particulate Matter

3.8.2.2 Landscaping

To improve the aesthetic value or visual quality of the site once construction ceases, landscaping will be carried out by the proponent. This will include ground leveling and planting of grass and trees so as to replenish the topsoil. The proponent will use water friendly plant species that are available locally preferably indigenous ones for landscaping.

3.8.2.3 Construction

This will involve first digging and laying the foundation followed by construction of ground floor to the forth floor and the roofing ,metal works, plumbing works , electrical installation ,wood works , fixing of beds and other medical equipment will follow. Once the construction is completed, the finishing work will then be carried out to avoid any material that may soils.

3.8.2.4 Fencing the Compound

The project area is already fenced with cedar poles and iron sheets to prevent unauthorized persons and or livestock from entering the compound. No vehicle or moving machine will be allowed to enter the construction site through the main gate entering in the hospital.

3.8.3 Description of Project's Operation Phase Activities

3.8.3.1 Project Administration and Management

Once the construction work is completed, the project will be handed over to the hospital administration and management committee.

The role to be played by the unit includes:-

- Overseeing the smooth operation of the day to day functions of the maternity and theatre activities,
- Creating relevant operation and maintenance committees,
- Ensure efficient and effective operation of the unit
- Ensure operation standards are maintained
- Planning and participating in project monitoring and evaluation amongst other functions.
- Ensure provision of security within and around the building

3.8.3.2 Hospital Services

The operations will include admitting patients, recording their bio data, diagnosis, taking samples for analysis in the laboratory, taking the patients for care and management in the recommended wards until such a time they will be fit to be discharged as per the doctor's recommendation. The hospital will also offers mortuary services for the dead bodies.

3.8.3.3 General Repairs and Maintenance

The project and associated facilities will be repaired and maintained regularly during the operational phase of the project. Such activities will include repair of cracked walls, painting and maintenance of surrounding gardens/grass lawns, and replacement of worn out materials among others.

3.8.4 Description of Project's Decommission Phase Activities

3.8.4.1 Demolition Works

Upon decommissioning, the project components will be demolished. This will produce some solid waste, which will be reused for other construction works.

3.8.4.2 Site Restoration

Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through replenishment of the top soil and re-vegetation using indigenous plant species and other fast growing water friendly tree species such as Gravillea robusta.

4 PROJECT ALTERNATIVES

4.1 Introduction

This chapter analyses the project alternatives in terms of site, technologies and non-implementation. The purpose of including alternatives in the EIA is to identify and evaluate alternate actions that accomplish similar goals and promote sustainable development.

Alternatives should be economically feasible with minimal adverse environmental impacts and time delays. Diverse alternatives to the proposed action must be included in the EIA. Alternatives may include both design and location options.

In most cases, the EIA process often occurs too late in decision-making to consider a full range of alternatives. This can undermine EIA goals to encourage more environmentally sound and publicly acceptable solutions. Allowing new alternatives and objectives to evolve in relation to environmental conditions and public preferences may be a solution to most of the environmental and socio-economic problems associated with the implementation of new projects (Anderson et al., 2003).

4.2 No-action Alternative

The 'no-action' alternative, which serves as a baseline for comparative analysis, must be included where the environmental impacts of taking the proposed action is too high compared to the impact of not taking the proposed action. The No project alternative option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This is not recommended in this case because there will no serious irreversible environmental impact to the surrounding.

4.3 No Project Option

Under No project option, the proponent's proposal would not receive necessary approval from Authorities. The proposed construction would not be implemented. This option would however, involve several losses both to the proponent and the community as a whole. The No Project Alternative option is the least preferred from the socio-economic and partly environmental perspective due to factors such as the economic status of the Kenyans would remain unchanged;

The local skills would remain under utilized (in terms of labor provision); Increased poverty and crime in Kenya due to lack of job opportunities; and the health sector would continue to suffer due to lack of enough and high quality health services in the area. The project is recommended for approval by the Authority.

4.4 Relocation Option

Relocation of the proposed project is also one of the alternatives in ensuring the environmental status of the area is not affected. But, it is quite clear that as per the current situation, the proposed project cannot be relocated because the proponent currently owns the proposed project site, hence getting an alternative site could be a very expensive venture. Hence this is not an economically viable alternative.

4.5 Wastewater Treatment Systems

The proponent has a variety of waste water treatment systems to choose from, which include the construction and utilization of bio-digesters, septic tanks, bio-box technologies or connecting to a sewer line, construction of incinerator.

4.5.1 Bio-digesters

The main physical features, the principles and process of bio-digestion are basically the same, regardless of the type of digester used. All bio-digesters degrade organic wastes to give methane which can be burnt to give energy. According to studies by Brown (1987), Silayo (1992) and Lekule (1996) the following advantages of the biogas technology were cited:

- It provides an alternative source of energy thus reducing the rate of deforestation
- It is a relatively cheap source of energy
- It improves crop-livestock-tree system through nutrient cycling
- It reduces time and workload of collecting fuel wood
- It reduces kitchen smoke-pollution thereby promoting human health
- It promotes good health through safe treatment of organic waste
- As a renewable source of energy, it provides a reliable power supply that is environmentally friendly
- It is a rich source of nitrogen, phosphorus (P), potassium (K) and other macro- and micronutrients

But it needs a lot of care. It is highly involving and needs a highly committed community that is cooperative. No detergents/chemicals should find their way into the bio-digester. This is difficult to monitor in a population characterized by people of different culture and values to such systems. This means the chances of a bio-digester failing are high. Once it fails, it can easily lead to environmental pollution.

4.5.2 Septic Tank

This also one of the commonly utilized methods of treating sewage in urban set ups. But for a large urban population, it could be expensive to maintain and thus become an unsustainable way of handling wastewater. For this project, a septic tank and a soak could be appropriate option and sustainable way of managing wastewater provided it is built to the specified standards and well maintained.

4.5.3 Bio-box Technology

Bio-box is a complete waste water treatment system (typically known as a packaged plant), suitable for establishments producing from 2m³ up to 320m³ (320,000 Litres) of sewage per day. Typically, the establishment is not connected to a municipal sewerage system, and is thus responsible for disposing of its own effluent by means of a conservancy tank, septic tank or French drain.

A Bio-box sewage treatment plant treats the effluent on-site and produces clear, odourless and environmentally safe water for the irrigation of lawns, sports fields, golf courses and agricultural plots – or for filling dams where wildlife comes to drink, such as below a game lodge viewing platform, or simply to return it to the environment in streams, rivers or dams. The system is modular in design and can thus be replicated to meet increasing demands for treatment from 2m³ to 320m³ (320,000litres) per day if required. Bio-box can treat both grey water (from laundries, baths, basins, kitchen sinks) and black water (toilet water). However,

the technology needs electricity energy to run efficiently, hence if one can access a technology that needs no power to run, it becomes cheaper in the long run.

4.5.4 Connection to a Sewer Line

Following an assessment of the area, it was noted that it is served by Kisumu Water and Sewerage Company (KIWASCO) and this will serve the facility. Additionally, incinerator and septic tank will be constructed in the site for proper waste management practices.

5 BIOPHYSICAL AND SOCIOECONOMIC BASELINE

This chapter provides the main features of the baseline biophysical and socio-economic information of the project area. Environmental description, also known as baseline studies, is intended to establish the present state of the environment, taking into account changes resulting from natural events and from other human activities (Glasson, 1994; Canning et al., 2003). If an environmental description is flawed, this will reduce the accuracy of subsequent predictions and mitigation measures (Canning et al., 2003).

5.1 Biophysical Baseline

5.1.1 Climatic Conditions

The climate of the County is generally warm with minimal monthly variation in temperatures between 23°C and 33°C throughout the year. The rainfall is determined by a modified equatorial climate characterized by long rains (March to May) and short rains (September to November). The average annual rainfall varies from 1000-1800mm during the long rains and 450-600mm during the short rains. The altitude in the County varies from 1,144 meters above the sea level on the plains to 1,525 meters above sea level in the Maseno and Lower Nyakach areas. This greatly influences temperatures and rainfall in the County.

5.1.2 Topography

The county's topography is undulating and characterized by Kano-Plains which is a flat stretch lying on the floor of the Rift Valley, the Nyabondo Plateau and the over-hanging huge granite rocks at Riat hills, Maseno and Seme areas. Due to flash flooding, the Kano-Plains have rich alluvial soils which favour agricultural production in horticulture and rice. Granites on the other hand, find their use essentially in the building and road construction industry.

5.1.3 Hydrology

The county is endowed with the second largest freshwater lake in the world; L. Victoria with two major rivers; Nyando and Sondu-Miriu and seven permanent rivers, Awach-Kano, Oroba/Ombeyi, Kibos, Awach-Seme, Kisian, and Mugru, in its catchment. These resources provide a big potential for development of blue economy. Impala sanctuary, Ndere is land, the legendary Luanda Magere and Kit-Mikayi sites are among the unique topographical features.

5.1.4 Soil Analysis

The county is characterized by a variety of soils, the dominant of which are alluvial loamy and sandy soils.

Soil samples laboratory testing was carried out to complement information obtained from the field to help characterize the ground material and determine the relevant design parameters. The homogeneous soil section samples recovered from the digging during the field work were submitted in the laboratory for particle size distribution, Atterberg limit and specific gravity tests to be carried out on disturbed samples following the BS 1377 standard. The purpose of the tests was to give an indication as to the composition of the overburden soil as well as that of the underlying layers.(See Appendix for laboratory soil analysis)

5.1.5 Biodiversity

Various types of natural vegetation are recognized in the area. Evergreen or semi evergreen tree bushes and grasses generally cover the hilly lands. The lowlands are mostly grassland

with shrubs and often swampy and flood prone areas along Kano plains. The specific flora in the project area include: Accacia species: Balamites aegyptica (otho); Ficus tonmingii sycomora and natalansis; Markhamia lutea and platy calyx; Lamea spp: Euphorbia trichi callii; Chlorophora excelsa; and Ficus species.

The project area is endowed with several small mammals, avifauna, reptiles, fish, amphibians, insects, arthropods. Animals that are associated with human-wildlife conflicts include birds, monkeys and hippos. The locals are known for hunting wild game too.

5.2 Socioeconomic Baseline

5.2.1 Project Location

Kisumu County lies between longitudes 33°20'E and 35°20'E and latitude 0°20' South and 0°50' South. The County is bordered by Homa Bay County to the South, Nandi County to the North East, Kericho County to the East, Vihiga County to the North West, Siaya County to the West and surrounded by the second largest freshwater lake in the World; Lake Victoria. Kisumu County covers approximately 567km^2 on water and 20,86km^2 land area, representing 0.36% of the total land area of Kenya's 580,367km^2.[11]

The project site is located at Migosi Estate in Migosi Ward, Kisumu Central Sub-County, Kisumu County.

5.2.2 Demographic Profile

According to the 2019 Kenya Population and Housing Census, Kisumu County had total population of 1,155,551 persons in 169,013 households.

Kisumu Central Sub-County had a total population of 174,140 persons in 52,331 households.

Migosi Ward had a total population of 23,892 persons in 6,777 households.

5.2.3 Land Use and Land Tenure

Land is the most important natural resource that the county is endowed with. It is critical to economic, social, political and cultural development. It is also considered as the principal source of livelihood and material wealth by playing host to natural resources.

Commercial, residential, government, recreation, and religion are predominant land use practices in the project area.

The land tenure system is both government and private. The project site is owned by the proponent (see attached title deed).

5.2.4 Economic Activities

The project area and site is an urban area with typical urban economic activities such as general trade, car wash, hardware stores, petrol station, residential, etc.

5.2.5 Water and Sanitation

The water coverage for the county currently stands at 58 percent. Seme Sub-county has the lowest water coverage at 29 percent against Kisumu Central Sub-county which has the highest water coverage at 72 percent. In terms of wards Nyalenda "A" has the highest share of residents using improved sources of water at 88 per cent as opposed to South West Nyakach with the least coverage at 22 percent. The county has gazetted water supplies covering a total area of 956 Km^2 with an average water production of 38,308.8m^3/ day. The

[11] Kisumu County Integrated Development Plan 2018-2022

gazetted water supply includes: Kisumu rural, Nyakach, Muhoroni, Ahero, Dunga, Kajulu, Koru Mnara, Tamu, Kibigori and Awasi. The key component of each water source supply scheme includes; Raw water intake sourced by either river or spring or lake; Treatment plants either full or partial; Storage reservoirs for both raw and potable water and Pipeline network with requisite communal water points.

The project area water is supplied by Kisumu Water and Sewerage Company (Kiwasco).

According to the Wash and Sanitation Programme (WSP) report of 2014, 30.4% of people in Kisumu use improved latrine, 31.3% use unimproved latrines while 25.9% use shared latrines and 12.4% practice Open Defecation (OD). Lack of access to improved sanitation coupled with poor hygiene practices result in huge burden of disease and the associated economic, human, social, health burden. Access to acceptable sanitation services is important to discourage open defecation which is detrimental to the environment and health of the general population.[12]

Every development near the project site has latrines.

5.2.6 Education and Religion

Ogango primary school is the nearest educational institution.

Grace Baptist Church and Jerusalem Healing are within 50m of the project site.

5.2.7 Health

Malaria remains the leading cause of morbidity in all age groups despite interventions put in place such as testing (microscopy and RDTs) and provision of LLINs. The top 5 causes of morbidity in Kisumu in all age groups are malaria, upper respiratory tract infection, diarrhea, diseases of the skin and other diseases of the respiratory system. Similar causes of morbidity are noted at the national level over the same period for the age groups.[13]\

The proposed project will contribute to the treatment of these diseases.

5.2.8 Infrastructure

Roads – Kibos Road passes infront of the project site. Kisumu-Kakamega Road is 1.5km to the South-west of the project site.

Telecommunication – All telecommunication networks are available in the project area.

Airport – Kisumu Internation Airport is approximately 10km West of the project site.

Electricity supply – Project area is connected to the national grid.

[12] Kisumu County Integrated Development Plan 2018-2022

[13] Kisumu County Integrated Development Plan 2018-2022

6 CONSULTATIONS AND PUBLIC PARTICIPATION (CPP)

This chapter presents a summary of stakeholder engagement undertaken and to be undertaken as part of the EIA process for the proposed project. The stakeholder engagement process is designed to meet Kenyan legal requirements for public participation.

6.1 Objectives of the EIA CPR Stakeholder Engagement

The objectives of engaging stakeholders and the community during the EIA process and beyond included, to:

- Ensure understanding – stakeholders were informed about the project through disclosure of pertinent information (activities, inputs, outputs, etc.);
- Involve stakeholders in the assessment – After informing the stakeholders about the project, they were invited to offer their views, opinions or suggestions that included potential positive and negative environmental and social impacts, enhancement, mitigation and management measures;
- Build relationships – stakeholders were invited to partner with the proponent to ensure that all project positive impacts during construction and operation phases are realized and project ESMP is implemented;
- Engage vulnerable people – apart from key informants, the engagement included potential PAPs. PAPs within one kilometer radius of the project site were engaged through questionnaires;
- Manage expectations – the engagement was also used for understanding and helping to manage stakeholder and community expectations, e.g., inputs, outputs, proponent, activities, budget, etc. was accurately disseminated in an accessible way; and
- Ensure compliance – engagement process was designed to ensure compliance with both local regulatory requirements and international best practice.

The stakeholder engagement was guided by three universal ethical principles; *respect for participants*, *beneficence* and *justice*[14] ensuring a free, prior and informed consultation.

6.2 Project Stakeholders

A stakeholder is any individual or group potentially affected by the project, or one with an interest in the project and its potential impacts. Different issues are likely to concern different stakeholders and as such, stakeholders have been grouped based on their connections to the project.

Table 5-1 below presents the range of stakeholder groups identified and engaged during the EIA CPR process to date.

Table 6-1 Project Stakeholders

Stakeholder Category	Stakeholder Group	Connection to the Project	Stakeholders Consulted	Comment
National Government	National Regulatory Bodies Government	National Government is of primary importance in terms of establishing policy, granting permits or other approvals for	Chief	Area Chief participated in the community meeting on March 10 2022.

[14] The Nuremberg Code; The Declaration of Helsinki; Belmont Report; U.S. Code of Federal Regulations, etc.

Stakeholder Category	Stakeholder Group	Connection to the Project	Stakeholders Consulted	Comment
	Agencies	the project, and monitoring and enforcing compliance with law throughout all stages of the project life cycle.		Remarks, key issues and questions raised by these stakeholders are detailed in Section 5.3.2.
County Government	Kisumu County	The County Government is also important to the project as it is responsible for implementation of legislation, and development plans and policies at the County level. The County Government also has a role in issuing permits and processing applications. Finally, the County Government has a role in ensuring the views of the communities it represents are presented to the project.	Department for Lands, Housing, Physical Planning and Urban Development	A county planner participated in the community meeting on March 10 2022. Remarks, key issues and questions raised by these stakeholders are detailed in Section 5.3.2.
Neighbours	Project Affected Persons (PAPs)	People living within 1km of the project site that may be directly or indirectly affected by Project activities.	Project Area residents.	These were engaged through the community meeting and questionnaires with the findings briefly reported in Section 5.3.2.
Proponent	Project Design Team	Possess knowhow of the proposed project, community expectations and preliminary designs	Architet	Provided information on project design and emphasized environmental compliance.

6.3 Approach to Stakeholder Engagement

Stakeholder engagement for the proposed Project both will be and was undertaken (for the EIA) using a staged approach in line with the various phases of project development, as follows:

1. EIA process engagement; and
2. Post EIA process engagement.

6.3.1 EIA Process Engagement

Table 6-2 presents a summary of the stakeholder engagements conducted during the EIA CPR process, while a summary of the key issues raised/comments made is presented in Subsection 6.3.2. The results of the stakeholder consultations have been incorporated into the impact assessment chapter's the baseline information.

Table 6-2 Details of EIA Stakeholder Engagement Undertaken

Stakeholder	Mode of Engagement	Engagement Date	Venue
National government administrative officers	Community Meeting	March 10 2022	Carwash Area, Kisumu
County government administrative officers	Community Meeting	March 10 2022	Carwash Area, Kisumu
Project Affected Persons (PAPs)	Community Meeting	March 10 2022	Migosi Estate
	Questionnaires	March 10 2022	Migosi Estate
Project Design Team	Community Meeting	March 10 2022	Carwash Area, Kisumu

6.3.2 Outcomes of Stakeholder Engagement to Date

Remarks, key questions and concerns raised by stakeholders during the EIA CPR process are outlined in Table 6-3 below, with detailed minutes of the stakeholder engagement meeting conducted, meeting photos, attendance registers and the stakeholder engagement database developed all attached as Annexes.

Table 6-6-3 Outcomes of EIA CPR Process Engagement

Stakeholder Category	Stakeholder	Key Questions, Remarks and Concerns
Project Design Team	Architect	• Emphasized the importance of the proposed medical centre to the area • Gave a presentation of the proposed project detailing the components, inputs, outputs and the construction process.
National Government	Chief	• The chief introduced the proponent to the partcipants and encouraged him to give an overview of the proposed project. • He encourage the participants to freely give their views about the project.

Stakeholder Category	Stakeholder	Key Questions, Remarks and Concerns
County Government	County Planner	• The county planner began by thanking all the attendees and gave a detailed explanation on the Spatial Structured Plan and the Proposed Plan. He mentioned the number of floors the building has, the type of the facility and the bed capacity it holds. • The planner appreciated the aspect of the hospital being closer to the highway and the Miwani road. He also talked of the increasing population in the area of which will benefit from the hospital. • The planner expounded on the spatial structured plan in his description of the parking space.
Neighbours	PAPs	The community members welcomed the project in the community while citing the benefits of job opportunity, economic growth to be achieved and development to be realized during the operation of the project.

6.3.3 Post EIA CPR Engagement

The project is committed to continuous engagement with stakeholders throughout its life, from the current stages of planning and design, through construction into operation and eventually to closure and decommissioning.

Plans and activities implemented during the next planning and development stages will therefore feed into and inform on-going stakeholder engagement, ensuring that dialogue with those potentially affected, both positively and/ or negatively by the project, is maintained. At each stage, a detailed schedule of activities and events will be developed and widely disseminated so people know how to interact with and participate in the project as fitting.

In particular, post EIA CPR stakeholder engagement is expected at the following stages:

- Design feedback – in this activity, information about the final design of the proposed project will be shared with key stakeholders for validation.
- Mobilization phase – at this stage, information about the construction schedule and expected construction team (including employment opportunities) will be shared with key project stakeholders.
- Construction phase – periodic project updates as well as any changes in plans will be shared with project stakeholders.
- Construction demobilization phase – notifying stakeholders of the end of construction activities and close-out of any outstanding construction phase-related grievances; which is expected to mark the start of the operations phase.
- Operations phase – periodic updates to project stakeholders on operations issues and sharing operational information where required or deemed necessary, as well as communicating any changes to operation plans.
- Decommissioning/ sustainability/ next stage Phase – Engage stakeholders through EIA at the end of the project life (approximately 50 years).

7 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

7.1 Introduction

A summary of the potential impacts on the socio-economic and biophysical environment is given below. Impacts are assessed in terms of their magnitude (size) and significance (importance). Actions necessary to mitigate potential impacts are given. Impacts' monitoring requirements are summarized in a section of this report.

7.2 Construction Phase

7.2.1 Potential Negative Environmental and Social Impacts and Mitigation

Construction phase potential negative impacts would include: stress on infrastructure as a result of increased population and vehicle traffic, soil erosion, possible surface and ground water hydrology changes and water quality degradation, solid waste generation, noise pollution, dust emissions, generation of exhaust emissions, increased water demand, increased energy consumption, increased use of building materials, likely accidents; physical and economic displacement and diseases.

To ameliorate against the potential negative effects:

- Awareness creation and education of the project communities regarding HIV/AIDS and other diseases.
- The contractor will ensure that all machines are well tuned and maintained to reduce amount of exhaust emission.
- We recommend that delivery of construction materials to the site be well coordinated to reduce vehicle traffic jams in the area as well as possible accidents. By reducing traffic jam, the amount of engine idling of transportation trucks and other vehicles will be reduced considerably thus reducing on the exhaust emission released to the atmosphere.
- All materials will be ordered as per need to avoid over piling on site which leads to destruction of materials and unnecessary obstruction.
- Roof water harvesting will also lead to the reduction of the amount of runoff within the area hence controlling the flooding that afflicts parts of the city during the rain seasons.
- Emergency escape routes will also be incorporated during this stage.
- To safeguard against accidental falls, all balconies and staircases will be fitted with metal rails and grills.
- Waste handling cubicles will also be constructed during this stage.
- To protect the health of workers on the site, they should be provided with protective gears and the contractor ensures that they make full use of them. Workers should not be forced or allowed to lift heavy loads. All materials on site should not be piled to heights that are prone to accidental falls. First Aid kits and emergency numbers should be conspicuously displayed. This means that someone trained in administering first aid should be present at the construction site all the time of the work. An insurance cover by the contractor should be acquired to compensate for any unforeseen medical emergencies and injuries or destructions

- Provisions should be included during the construction period to allow for greening of public places. The proponent is committed to this.

7.2.2 Potential Positive Environmental and Social Impacts

On the other hand the anticipated positive impacts include:

- Creation of alternative employment opportunities,
- Improving growth of the economy,
- Improved health services, and
- Provision of market for supply of construction materials and other services.

7.3 Operational Phase Potential Environmental and Social Impacts

It has already been indicated severally that the proposed medical centre is within a surrounding which has a high population density, (Migosi Estate and Kisumu City) and who will therefore contribute the bulk of the facility users.

Effluent wastes from the proposed project will enter into a properly constructed drainage channels. On the other hand solid wastes will be collected using on-site bins, and be removed through contracted services, use of either for off-site recycling or further management in authorized grounds. Anticipated impacts resulting from the project will be predicted through process description and aspect checklists.

Some details on the anticipated impacts have been presented under the following paragraphs.

Table 7-1 Operation phase impacts and mitigation

Aspect	Impact/Concern	Mitigation
Safety	Likely open areas	Such holes should be filled with soil or covered with a concrete cover that is heavy enough not to be lifted by children to prevent accidental fall
Safety	Fire outbreak Preparedness	• Place sand filled buckets in strategic places; Install a fire hydrant preferably near the main entrances; • Train all workers in fire fighting and subject them to • frequent fire grills; • All windows should be fitted with openable grills
Health and Safety	Accidents	Reporting all incidents and accidents to include details of: • The nature of the accident or incident; • The place and time of the accident or incident; • The staff who were directly involved; • Any other relevant circumstances
Health and safety	Spillage	• Vacate the contaminated area; • Decontaminate the eyes and skin of exposed personnel • immediately; • Inform the designated person(usually the Waste • Management Officer), who should coordinate The

		necessary actions.; • Determine the nature of the spill; • Evacuate all the people not involved in cleaning up if the spillage involves a particularly hazardous substance; • Provide first aid and medical care to injured individuals; Secure the area to prevent exposure of additional individuals; • Provide adequate protective clothing to personnel involved in cleaning up; • Limit the spread of the spill; Neutralize or disinfect the spilled or contaminated material if indicated; • Collect all spilled and contaminated material. [Sharps should never be picked up by hand; brushes and pans or other suitable tools should be used. Spilled material and disposable contaminated items used for cleaning should be placed in the appropriate waste bags or containers. Decontaminate or disinfect any tools that • were used. • Remove protective clothing and decontaminate or disinfect it if necessary. • Seek medical attention if exposure to hazardous material has occurred during the operation
Sanitation	Latrine and other public areas	The walls and floors of the latrines and walls of public areas should be fitted with white smooth tiles for easy cleaning
Water	Water harvesting and storage facilities	Initiate roof water harvesting and install water storage tank
Waste	Poor waste disposal	• Construct a well functioning incinerator -sort waste at source • Connect all laboratory sink to a functioning biomedical liquid waste treatment system.
Vegetation	Lack of enough vegetation cover around the health facility	The management should plan for the establishment of trees and other aesthetic plants within and around the facility
Noise	Noise when bodies leave mortuary	No moaning of the loved ones at the mortuary entrance

7.4 Decommissioning Phase

7.4.1 Overview

During the decommissioning stage, demolition or renovations will be done, creating job opportunities for the youth. As well, rehabilitation works will be undertaken for the proposed project site to restore it to its original state. This will include replacement of the topsoil and re-vegetation, which will enhance the aesthetic value of the area.

There will be need to employ people who will be involved in the reclamation of the site to near its original state.

7.4.2 Negative Decommissioning Impacts

Noise, Vibration and Dust

The earth moving works during top soil replacement will lead to significant deterioration of the acoustic environment within the area and the surrounding areas. This will be as a result of the noise and vibration that will be experienced from machines and workforce being utilized. Dust will also be emitted affecting the surrounding environment. The proponent will put in place mitigation measures for noise and dust pollution during the decommissioning phase. The following noise containment techniques could be employed to minimize the impact of temporary destruction noise at the site:

- Use of equipment designed with noise control elements
- Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage workers to switch off engines whenever possible.
- Wetting the development in case of demolition to reduce dust

8 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

8.1 Environmental Monitoring and Auditing Program

There will be environmental management of any implications of the project that may not have been foreseen, which will include the administrative and production staff, the management, the public, the government and environmental experts.

Once a year, the project management will submit to the National Environment Management Authority (NEMA):

- A compilation of all monitoring data;
- A highlight of the activities related to environmental protection, environmental health, public health and safety and
- If the project has been cited for violation of environment and safety standards or regulations, certification from relevant authorities showing that the defect has been corrected or an acceptable plan of action is in place to correct the defect.

This can be termed as the Annual Environmental Audit. The following tables provide a summary of the monitoring that could be utilized.

The following tables form the core of this EMP for the construction, operational and decommissioning phases of this project. In general, the Tables outline the potential safety, health and environmental risks associated with the project and detail all the necessary mitigation measures, as well as the persons responsible for their implementation and monitoring. The EMP will be used as checklist in future environmental audits of the project.

Table 8-1 Occupational, Public Safety and Health Issues

Issues	Recommendations	Type of action
Undercutting and tunneling (digging foundations) and presence of loose hanging rocks	No undercutting and tunneling should be allowed in or around the project site so as to cause collapse or result to damage to property, injury or loss of life. No loose hanging rocks/material shall be allowed near or on the face of construction so as to endanger the safety of public.	Administrative
Poor site management; no fencing, no warning notices/signage	Warnings notices/signs of appropriate font size and in national and local languages should be erected in appropriate places to warn the public of any danger e.g. 'Danger, no smoking'.	Administrative
Working from heights, use of ladders and conveyance of materials from heights	Where use of ladders is required, they should be strong, firmly secured and have a hand rail; where materials are conveyed down slope by gravity, there should be adequate barriers to check material rolling down slope.	Administrative/ Management
Disaster preparedness and response	Enhance training of the project workers on Disaster preparedness and response	Management / Administrative

Table 8-2 Environmental issues

Issues	Recommendation	Types of Actions
Negative landscape effects due to Presence of abandoned construction materials, pits and heaps of debris/wastes	Project proponent should establish site rehabilitation and/or after use plan. The after use plan should identify suitable beautification and landscaping plans to be implemented within and around the site.	Administrative
Dust emissions	The use of PPEs is recommended for both manual and mechanized operations while watering of the aggregates within the project site should be mandatory for mechanized operations	Administrative
Excessive noise and vibration	Adherence to the noise and excessive vibration regulation 2009	Administrative

Table 8-3 Socio-economic issues

Issues	Recommendations	Type of Action
Underage persons working in the site	Ensure that no minors work in the site	Administrative
Alcoholism and drug abuse	Ensure no alcohol or drugs are available on the site	Administrative
Inadequate advisory services by relevant governments departments	Schedule regular inspections and site meetings/barazas	Administrative
HIV and AIDS and Covid-19 prevelance	• Awareness creation on HIV/AIDS and Covid-19 in and around the construction site • Get vaccinated against Covid-19 • Wear musk • Wash hand frequently	Administrative

8.2 Environmental Management Plans (EMP)

For the effective implementation of the mitigation measures, monitoring and remedial requirements presented in the EIA, a systematic Environmental Management Plan (EMP) should be set up. Environmental Auditing of the project will be done against the EMP and advise the necessary remedial actions required. The proponent and the Environmental Consultant through contractual means could enforce these remedial actions.

An Environmental Assessment has been completed for the proposed maternity theatre project, according to the requirements given in the EMCA 1999 and its Subsequent Legal Notice No. 101 of 2003.

The environmental aspects that have been thoroughly studied include Air quality impact;

8.2.1 Baseline Ambient Air Quality Assessment

Lakers consultancy acknowledges ambient air as a key environmental component that is likely to be influenced by the proposed activities. In line with this, the proponent contracted CSI international limited to conduct a baseline air quality assessment at their proposed construction site at Migosi, Kisumu County and generate a baseline report on the ambient air quality, as part of the ESIA study for the proposed construction project, and further provide basis for subsequent environmental assessment. Baseline air quality assessment was conducted.

The parameters studied in this assessment report were determined based on the requirements of the ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION (AIR QUALITY) REGULATIONS 2014, THE ENVIRONMENTAL (IMPACT ASSESSMENT AND AUDIT) REGULATIONS, 2003 and anticipated parameters of concern for a gas storage plant. The primary parameters of concern are particulate matter (PM2.5 & PM10) and gaseous contaminants. The parameters evaluated in this assessment included the following: Nitrogen oxides (NOx), Sulfur dioxide (SO2), Carbon monoxide (CO), Total Volatile Organic Compounds and Particulate matter (PM2.5 & PM10). Active sampling was used for monitoring of present gaseous and particulate matter parameters.

8.2.2 Ambient air quality monitoring report

This Ambient Air Quality Monitoring Report has been carried out to the best of our knowledge and ability and within the terms of the contract with the client and is limited to the exercise of reasonable care. This report is not intended to relieve the establishment from their contractual obligations. This report reflects findings as at the time and place of intervention and is issued under the CSI International Limited terms and conditions of service. (See appendix forAmbient air quality results)

Table 8-4 Environmental monitoring/Management plans for the construction phase

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
High Demand of Raw materials	Source building materials from local suppliers who use environmentally Friendly processes in their operations.	Resident Project Manager & Contractor	Throughout construction period	Part of the main budget
	Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered. Resident Project Manager & Contractor Throughout construction period	Resident Project Manager & Contractor	Throughout construction period	
	Ensure that damage or loss of materials at the construction site is kept minimal through proper storage	Resident Project Manager & Contractor	Throughout construction period	
	Use of some recycled/refurbished or salvaged materials to reduce the use of raw materials and divert material from landfills	Resident Project Manager & Contractor	Throughout construction period	
	Specify locations for trailers and equipment, and areas of the site that should be kept free of traffic, equipment, and storage.	Civil Engineer, Architect and Resident Project Manager	1 month	120,000
	Designate access routes and parking within the site	Civil Engineer, Architect and Resident Project Manager	1 month	
	Introduction of vegetation (trees, shrubs and grass) on open spaces and their maintenance, especially at	Architect, Resident Project	Monthly to	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	the front side of the development	Manager & Landscape specialist	Annually	
	Design and implement an appropriate landscaping programme to help in re-vegetation of part of the project area after construction	Architect & Landscape specialist	specialist During the beginning phase of the project	
Increased storm water, runoff and soil erosion	Roof water to harvested, stored in underground tanks for use in cleaning and toilet. To ensure use of such water for the stated purpose, the building should be fitted dual water distributing system.	Civil engineer, mechanical engineer and resident project manager.	During the beginning phase of the project.	130,000
	A storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structure will be designed	The Civil Engineer, Mechanical Engineer and Resident Project Manager	1 month	70,000
	Apply soil erosion control measures such as leveling site and planting of flowers to reduce run-off velocity and increase infiltration of storm water into the soil.	The Civil Engineer, Mechanical Engineer and Resident Project Manager	1 month	30,000

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	Ensure that construction vehicles are restricted to the existing road to avoid soil compaction within and around the project site	The Civil Engineer, Mechanical Engineer and Resident Project Manager	Throughout construction period	80,000
	Ensure that any compact area is ripped to minimize run-off	The Civil Engineer, Mechanical Engineer and Resident Project Manager	2 months	
	Open drains all connected will be provided on the project site	Civil engineer	Throughout the project period	
	Roof catchment will be used to collect water for some uses such as cleaning floors and landscaping	Civil engineer	Throughout the project period	
Increased solid waste generation	Use of an integrated solid waste management system i.e. through a hierarchy of options: reduction, sorting, re-use, recycling and proper disposal	Resident project manager	Throughout construction period	80,000
	Through accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed, rather than cutting them to size, or having large quantities of residual materials.	Resident project manager and contractor	One-off	
	Ensure that construction materials left over at the end of construction will	Resident project manager and	One-off	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	be used in other projects rather than being disposed of	contractor		
	Ensure that damaged or wasted construction materials including cabinets, doors, plumbing and lighting fixtures, marbles and glass will be recovered for refurbishing and use in other projects	Resident project manager and contractor	One-off	
	Donate recyclable/reusable or residual materials to local community groups, institutions and individuals.	Resident project manager and contractor	One-off	
	Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time	Resident Project Manager & Contractor	Throughout the project	
	Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure.	Resident Project Manager & Contractor	One-off	
	Purchase of perishable construction materials such as paints should be done incrementally to ensure reduced spoilage of unused materials	Resident Project Manager & Contractor	Throughout the project	
	Use building materials that have minimal or no packaging to avoid the generation of excessive packaging waste	Resident Project Manager & Contractor	Throughout the project	
	Use construction materials containing recycled content when possible and in accordance with accepted standards.	Resident Project Manager & Contractor	Throughout construction period	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at the site	Resident Project Manager, Mechanical Engineer & Contractor	Throughout construction period	
	Dispose waste more responsibly by dumping at designated dumping sites or landfills only.	Resident Project Manager, Mechanical Engineer & Contractor	Throughout construction period	
	Waste collection bins to be provided at designated points on site	Resident Project Manager, Mechanical Engineer & Contractor	Throughout construction period	
	Private waste disposal company to be contracted to transport and dispose the solid waste from site	Resident Project Manager, Mechanical Engineer & Contractor	Throughout project life	
Dust emission	Ensure strict enforcement of on-site speed limit regulations	Resident Project Manager & Contractor	Throughout construction period	120,000
	Avoid excavation works in extremely dry weathers if and when possible	Resident Project Manager & Contractor	Throughout construction period	
	Sprinkle water on graded access	Resident Project	Throughout	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	routes when necessary to reduce dust generation by construction vehicles	Manager & Contractor	construction period	
	Personal Protective equipment to be won	Resident Project Manager & Contractor	Throughout construction period	
Exhaust emission **Noise and Vibration**	Vehicle idling time shall be minimized	Resident Project Manager & Contractor	Throughout construction period	60,000
	Alternatively fueled construction equipment shall be used where feasible; equipment shall be properly tuned and maintained	Resident Project Manager & Contractor	Throughout construction period	
	Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas, and to switch off engines at these points	Resident Project Manager & Contractor	Throughout construction period	
	Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.	Resident Project Manager & Contractor	Throughout construction period	60,000
	Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, residential areas and hospital	Resident Project Manager & Contractor	Throughout construction period	
	Ensure that construction machinery are kept in good condition to reduce noise generation	Resident Project Manager & Contractor	Throughout construction period	
	Ensure that all generators and heavy duty equipment are insulated or placed in enclosures to minimize ambient	Resident Project Manager &	Throughout construction	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	noise levels.	Contractor	period	
	The noisy construction works will entirely be planned to be during day time when most of the neighbors will be away at work	Resident Project Manager and site foremen	Throughout construction period	
Increased energy consumption	Ensure electrical equipment, appliances and lights are switched off when not being used	Resident Project Manager & Contractor	Throughout construction period	Part of main budget
	Install energy saving fluorescent tubes at all lighting points instead of bulbs which consume higher electric energy	Resident Project Manager & Contractor	Throughout construction period	
	Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts	Resident Project Manager & Contractor	Throughout construction period	
	Monitor energy use during construction and set targets for reduction of energy use.	Resident Project Manager & Contractor	Throughout construction period	
High water demand	Harness rainwater for some uses such as general cleaning, in the toilets & gardening, hence the need for a dual water distribution system within the building	Mechanical Engineer, proponent and Resident Project Manager	Throughout construction period	150,000
	Install water conserving taps that turn-off automatically when water is not being used as wells low flush toilets and waterless urinals	Resident project manager, proponent and contractor	One-off	
	Promote recycling and reuse of water as much as	Resident project	Throughout	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	possible (need for a dual water distribution system within the building)	manager and contractor	construction period	
	Install a discharge meter at water outlets to determine and monitor total water usage	Resident project manager and contractor	One-off	
Machinery/Equipment safety	Arrangements must be in place for the medical examination of all construction employees before, during and after termination of employment	Resident Project Manager, Developer & Contractor	Continuous	
	Ensure that machinery, equipment, personal protective equipment, appliances and hand tools used in construction do comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded	Resident Project Manager	One-off	
	Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain	Resident Project Manager	Continuous	
	All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury	Resident project manager	One-off	
	Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery use and other procedures/operations	Resident project manager	Continuous	
	Equipment such as fire extinguishers must be examined by a government authorized person. The equipment may only be used if a certificate of examination has	Resident project manager	Continuous	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	been issued			
	Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register	Resident project manager	Continuous	
Incidences, accidents and dangerous occurrences	Ensure that materials are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse	Resident project manager	Continuous	130,000
	Ensure that items are not stored/stacked against weak walls and partitions	Resident project manager	Continuous	
	All floors, steps, stairs and passages of the premises must be of sound construction and properly maintained	Resident project manager	Continuous	
	Securely fence or cover all openings in floors	Resident project manager and contractor	One-off	
	Ensure that construction workers are not locked up such that they would not escape in case of an emergency	Resident project manager	Continuous	
	All ladders used in construction works must be of good construction and sound material of adequate strength and be properly maintained	Resident project manager and contractor	One-off	
	Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency	Resident project manager and contractor		
	Such procedures must be tested at regular intervals	Resident project manager and contractor		
	Ensure that adequate provisions are in place to	Resident project		

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	immediately stop any operations where there is an imminent and serious danger to health and safety and to evacuate workers	manager and contractor		
	Ensure that the most current emergency telephone numbers posters are prominently and strategically displayed within the construction site	Resident project manager and contractor		
	Provide measures to deal with emergencies and accidents including adequate first aid arrangement	Resident project manager and contractor		
	Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms Obtainable from the local Occupational Health and Safety Office (OHSO) are in place.	Resident project manager, proponent and contractor		
	Enforcing adherence to safety procedures and preparing contingency plan for accident response in addition to safety education and training shall be emphasized	The Contractor, Resident Project Manager& Site Safety Officer	Continuous	
	Ensure that the premises are insured as per statutory requirements (third party and workman's Compensation	Developer	Annually	
	Develop, document and display prominently an appropriate SHE policy for construction works	Resident project manager, proponent and contractor	One-off	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	Provisions must be put in place for the formation of a Health and Safety Committee, in which the employer and the workers are represented	Resident project manager	One-off	
Generation of waste water	Provision of means for handling sewage generated by construction workers	Mechanical engineer and resident project manager	One-off	Part of project budget
	Conduct regular checks for sewage pipe blockages or damages since such vices can lead to release of the effluent into the land and water bodies	Mechanical engineer and resident project manager	Throughout construction period	
	Monitor effluent quality regularly to ensure that the stipulated discharge rules and standards are not violated	Mechanical engineer and resident project manager	Throughout construction period	
Occupational health and safety risks during construction period and occupational phase	Well stocked first aid box which is easily available and accessible should be provided within the premises	Resident Project Manager & Contractor	One-off	70,000
	Provision must be made for persons to be trained in first aid, with a certificate issued by a recognized body	Resident Project Manager and contractor	One-off	
	Fire fighting equipment such as fire extinguishers and hydrant systems should be provided at strategic locations such as stores and construction areas.	Resident project manager & Contractor	One-off	
	Regular inspection and servicing of the equipment must be undertaken by a reputable service provider	Resident Project Manager and	Every 3 months	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	and records of such inspections maintained	contractor		
	Signs such as "NO SMOKING" must be prominently displayed within the estate, especially in parts where inflammable materials are stored	Resident project manager& Contractor	One-off	
	Enough space must be provided within the premises to allow for adequate natural ventilation through circulation of fresh air	Resident project manager, proponent and contractor	One-off	
	There must be adequate provision for artificial or natural lighting in all parts of the premises in which persons are working or passing	Resident and contractor	One-off	
	Circuits must not be overloaded	Resident project manager, proponent and contractor	Continuous	
	Distribution board switches must be clearly marked to indicate respective circuits and pump	Resident project manager and contractor	One-off	
	There should be no live exposed Connections	Project contractor and proponent	Continuous	
	Electrical fittings near all potential sources of ignition should be flame proof	Project manager, proponent and contractor	One-off	
	All electrical equipment must be earthed	Project manager, proponent and contractor	One-off	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	Develop a suitable system for the safe collection, recycling and disposal of chemical wastes, obsolete chemicals and empty chemical containers to avoid their reuse for other purposes and to eliminate or minimize the risks to safety, health and environment	Project manager, proponent, contractor and residents	One-off	
	Ensure that all chemicals used in construction are appropriately labeled or marked and that material safety data sheets containing essential information regarding their identity, suppliers classification of hazards, safety precautions and emergency procedures are provided and are made available to employees and their representatives	Project manager, proponent, contractor and residents	One-off	
	Keep a record of all hazardous chemicals used at the premises, cross-referenced to the appropriate chemical safety data sheets	Project manager, proponent, contractor and residents	Continuous	
	There should be no eating or drinking in areas where chemicals are stored or used	Project manager, proponent, contractor and residents	Continuous	
	Provide workers in areas with elevated noise and vibration levels, with suitable ear protection equipment such as ear muffs	Project manager, proponent, contractor and residents	One-off	
	Ensure that construction workers are provided with an adequate supply of wholesome drinking water that should be maintained at suitable and accessible	Project manager, proponent and contractor	One-off	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
	points.			
	Ensure that conveniently accessible, clean, orderly, adequate and suitable washing facilities are provided and maintained in within the site	Project manager, proponent and contractor	One-off	
	Provision for repairing and maintaining of hand tools must be in place	Project manager, proponent, and contractor	One-off	
	Hand tools must be of appropriate size and shape for easy and safe use	Project manager, proponent, and contractor	One-off	
	• Height of equipment, controls or work surfaces should be positioned to reduce bending posture for standing workers • Get vaccinated against Covid-19	Project manager, proponent, and contractor	One-off	
Oil Spills	A designated garage section of the site fitted with oil trapping equipment to be planned for changes. Such an area will be well protected from contaminating the soil	Resident project manager	Continuous	7,000 per month
Increased food supply and demand	During construction workers will be given lunch break to go feed	Resident project manager and contractor	Continuous	60,000
	On site canteen to supply food is possible	Resident project manager and contractor	Continuous	
Security	Appoint security personnel	Security officer,	Continuous	Part of

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
		residents, police and project manager		general safety
	Body-search the workers on entry, to avoid getting weapons on site, and leaving site to ensure nothing is stolen.	Security officer	Continuous	
	Ensure only authorized personnel get to the site	Security officer	Continuous	
Air pollution	Suitable wet suppression techniques need to be utilized in all exposed areas	Contractor and site safety officer	Continuous	Part of dust control
	All unnecessary traffic must be strictly limited on site; speed controls are to be enforced	Contractor and site safety officer	Continuous	
Hydrology and water quality degradation	Hazardous substance control and emergency response plan that will include preparations for quick and safe clean up of accidental spill	Mechanical engineer, resident manager, contractor and proponent	Continuous	Part of soil erosion control
	Hazardous-materials handling procedures to reduce the potential for a spill during construction	Mechanical engineer	Continuous	
Vector/water borne disease incidence	Complete refuse collection and handling service to be provided	Mechanical engineer	Continuous	80,000
Possible exposure disease	Shall be mitigated by occupational health and safety standards enforcement	Contractor and all foremen	Continuous	
Increased pressure on infrastructure	Coordinate with other planning goals and objectives for region	Contractor and proponent	Continuous	
	Upgrade existing infrastructure and services, if and where feasible	Contractor and proponent	Continuous	

Expected negative impacts	Recommended mitigation measures	Responsible party	Time frame	Estimated Cost (Kshs.)
Emergence of new environmental concerns during construction period	Due to the nature of the project, the Firm of experts shall carry out monitoring and evaluation. More so an initial environmental audit will also be carried within a period of 12 months after commencement of the operations	Firm of expert	Continuous	200,000

8.3 Operational Phase EMP

The necessary objectives, activities, mitigation measures and allocation of responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the operational phase of proposed Health Care

Project are outlined in the table below

Table 8-5 Environmental management plan for operational phase

Environmental concern	Mitigation	Responsibility	Monitoring means	Monitoring frequency	Monitoring by:	Budget
Safety **Likely open areas**	Such holes should be filled with soil or covered with a concrete cover that is heavy enough not to be lifted by children to prevent accidental fall	Management	Observation to ensure that any open pits are covered	One-off activity	EIA expert and management	50,000
Safety **Fire outbreak** **Preparedness**	Place sand filled buckets in strategic places; Install a fire hydrant preferably near the main entrances; Train all workers in fire fighting and subject them to frequent fire grills; All windows should be fitted with openable grills	Management	Observation to ensure that all fire fighting mechanisms are put into place	Continuous	An EIA expert and management	50,000
Health and Safety within the facility **Accidents**	Reporting all incidents and accidents to include details of: - The nature of the accident or incident; The place and time of the accident or incident; The staff who were directly involved; Any other relevant circumstances	Management	Observation to ensure that this is implemented	Continuous	An EIA expert and manager	30,000
Health and safety **Spillage**	vacate the contaminated area; Decontaminate the	Management	Observation to ensure that this is	Continuous	An EIA expert and manager	30,000

Environmental concern	Mitigation	Responsibility	Monitoring means	Monitoring frequency	Monitoring by:	Budget
	eyes and skin of exposed personnel immediately; Inform the designated person (usually the Waste Management Officer), who should coordinate The necessary actions.; Determine the nature of the spill; Evacuate all the people not involved in cleaning up if the spillage involves a particularly hazardous substance; Provide first aid and medical care to injured individuals; Secure the area to prevent exposure of additional individuals; Provide adequate protective clothing to personnel involved in cleaning up; Limit the spread of		implemented			

Environmental concern	Mitigation	Responsibility	Monitoring means	Monitoring frequency	Monitoring by:	Budget
	the spill; Neutralize or disinfect the spilled or contaminated material if indicated; Collect all spilled and contaminated material. [Sharps should never be picked up by hand; brushes and pans or other suitable tools should be used. Spilled material and disposable contaminated items used for cleaning should be placed in the appropriate waste bags or containers. Decontaminate or disinfect any tools that were used. -Remove protective clothing and decontaminate or disinfect it if necessary. -Seek medical attention					

Environmental concern	Mitigation	Responsibility	Monitoring means	Monitoring frequency	Monitoring by:	Budget
	if exposure to hazardous material has occurred during the operation					
Latrine and other public areas	The walls and floors of the latrines and walls of public areas should be fitted with white smooth tiles for easy cleaning	Management	Observation to ensure that this is implemented	One-off activity	An EIA expert and manager	430,000
Water harvesting and storage facilities	Initiate roof water harvesting and install water storage tank	Management	Observed are fixed	One-off activity	EIA expert and management	300,000
Poor waste disposal	Construct a well functioning incinerator -sort waste at source -connect all laboratory sink to a functioning biomedical liquid waste treatment system.	Management	Observation	A continuous activity to ensure that appropriate solid and liquid waste management is established	EIA Expert and manager	850,000
Lack of enough vegetation cover around the health facility	The management should plan for the establishment of trees and other aesthetic plants within and around the facility	Management	Observation	Continuous activity	EIA expert and management	30,000 per month

Environmental concern	Mitigation	Responsibility	Monitoring means	Monitoring frequency	Monitoring by:	Budget
Noise when bodies leave mortuary	No moaning of the loved ones at the mortuary entrance	Management	Observation	When bodies leave the mortuary	Management	20,000 per month.

8.4 Decommissioning Phase

In addition to the mitigation measures provided in the tables above, it is necessary to outline some basic mitigation measures that will be required to be undertaken once all operational activities of the health care project have ceased. The necessary objectives, mitigation measures, allocation of responsibilities, time frames and costs pertaining to prevention, minimization and monitoring of all potential impacts associated with the decommissioning and closure phase of the project are outlined in the table 9 below.

Table 8-6 Environmental Management/Monitoring Plan for the decommissioning phase

Recommended Mitigation Measures	Responsible party	Time frame
Demolition waste management		
All buildings, machinery, equipment, structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible	Contractor, proponent	One-off
All foundations must be removed and recycled, reused or disposed of at a licensed disposal site	Contractor, proponent	One-off
Where recycling/reuse of the machinery, equipment, implements, structures, partitions and other demolition waste is not possible, the materials should be taken to a licensed waste disposal sit	Contractor, proponent	One-off
Donate reusable demolition waste to charitable organizations, individuals and institutions	Contractor, proponent	One-off
Rehabilitation of project site		
Implement an appropriate re-vegetation programme to restore the site to its original status	Contractor, proponent	One-off
Consider use of indigenous plant species in re-vegetation	Contractors, Proponent	One-off
Trees should be planted at suitable locations so as to interrupt slight lines (screen planting), between the adjacent residential area and the development.	Contractor, proponent	One-off

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APPENDICES

1. Practicing License for EIA/EA Expert
2. Copy of ID card
3. Copy of KRA certificate
4. Copy of title deed
5. Ambient air quality laboratory results
6. Soil analysis laboratory test
7. Risk assessment report
8. Traffic management plan report
9. Minutes of public participation
10. Public participation attence list
11. List of Participants
12. Public consultation questionnaires
13. Site plan
14. Funeral home plan
15. Kitchen and restaurant section plan
16. Hospital Gto 1st floors
17. Hospital 2nd to 6th floors
18. Hospital elevation
19. Hospital section