ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT STUDY REPORT FOR THE PROPOSED TWO- AND THREE-BEDROOM APARTMENTS ON L.R NO. 2/31/3, KIRICHWA ROAD KILIMANI FOR KENYA POWER PENSION FUND (KPPF) IN KILIMANI, NAIROBI COUNTY

PROJECT PROPONENT

KENYA POWER PENSION FUND

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CONSULTANT

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OCTOBER 2020

CERTIFICATION

This ESIA study report has been prepared by **ECO PLAN MANAGEMENT LIMITED** Company a firm of NEMA registered EIA/EA experts. We the undersigned certify that the content of this report is righteous and correct to the best of our knowledge.

EIA/EA Lead Expert:

Date: ……..

Signature: ……

Ms. Irene Keino

Registration number: 0447

PROPONENT:

Name: ……

Designation: …….....

Signature: …….....

Date: …….....

ACRONYMS

BAT	Best Available Technology
GHG	Green House Gases
EA	Environmental Audit
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act, 1999
EHS	Environmental Health and Safety
EMP	Environmental Management Plan
EM&MP	Environmental Management & Monitoring Plan
IEC	Information Education and Communication
KPLC	Kenya Power & Lighting Company
NEMA	National Environmental management Authority
NGOs	Non-Governmental Organizations
OSHA	Occupational Safety & Health Act
TIA	Traffic Impact Assessment
PC	Public Consultation
UN	United Nations
WB	World Bank

EXECUTIVE SUMMARY

Environmental Impact Assessment is a tool for environmental conservation and has been identified as a key component in new project implementation. Early identification of possible development impacts to the environment enhances and promotes environmental sustainability as anthropogenic factors are balanced with natural environmental needs.

According to the legal notice 150 of 16th June 2016, the L N 8/2003 EMCA 1999 (second Schedule) was amended and Projects categorized as low risk, medium risk and High risk according to their potential impacts to the environment.

Screening of the proposed project was done and according to the classification described in the above legislation as "…Urban development including establishment of new housing estate developments exceeding one hundred housing units", the project is categorized a high-risk project. A scoping exercise was therefore done and acknowledged that Project's potential impact on the natural environment and human environment are significant but can be addressed and mitigated as described in this ESIA.

JUSTIFICATION OF THE PROJECT

The Government of Kenya has defined the "Big Four" transformation agenda for the nation which identifies four priority initiatives to be implemented over the next five years 2017-2022. The big four agenda include food security, affordable housing, manufacturing and affordable healthcare. In Kenya, the government intends to construct 500,000 housing units distributed all over the 47 counties by 2022 and this involves a number of incentives and support to enable the delivery of affordable housing by various stakeholders and private investors.

The Government of Kenya has defined the "Big Four" transformation agenda for the Nation which identifies Four Priority initiatives to be implemented over the next five years 2017 – 2022. The big four agenda include food security, affordable housing, manufacturing and affordable healthcare.

Kenya's Affordable Housing Programme is one of the national government's four pillars of growth, in the President's Big Four Plan. The government recently unveiled its plan to ensure that all Kenyans enjoy their right to decent housing through an initiative dubbed 'The National Affordable Housing Programme' in the Big Four Agenda. Its aim is to enable the low to middle income citizens of Kenya acquire homes at subsidized prices. The government intends to construct 500,000 housing units distributed all over the 47 counties by 2022 and this involves a number of incentives and support to enable the delivery of affordable housing by various stakeholders and investors in Kenya

However, the jurisprudence on the right to housing, as indeed on other economic and social rights remains thin. The proposed project attempts to address this challenge by providing decent and affordable housing targeting middle income earners and especially first-time home owners.

The project proponent is developing a high-rise residential property of 16 floors comprising of 288 units, two and three-bedroom apartments on plot L.R No. 2/31/3**,** Kirichwa Rd. Kilimani, Nairobi. The plot measures approximately 1.666 acres.

The development will include;

- Three-bedroom apartments with DSQ – 96 No.
- Two-bedroom apartments with DSQ – 124 No.
- Two-bedroom apartments without DSQ- 68 No.
- Car parking for 450 cars each on four levels that is- Ground floor, lower ground floor, upper ground floor and basement floor, thus 16 floors and 4 basements.
- A restaurant with a swimming pool
- A gymnasium
- On ground recreation and children's play area
- Care takers two bedroom flat
- Roof deck for drying clothes and for solar water heating panels
- Solid waste management rooms
- Water supply from Nairobi Sewerage water and complemented with Borehole
- Effluent system will be connected to main sewer line
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The proponents are aware that an Environmental Impact Assessment (EIA) is a statutory requirement under Environmental Management and Coordination Act No. 8 of 2015 Cap 387, and the Integrated Environmental Impact Assessment Regulations, 2018. The expert undertook the study with the objective of identifying both positive and negative impacts of the proposed project; provide counter measures for the negative impacts and optimize the positive ones and come up with an Environmental Management Plan (EMP) as per the terms of reference (TOR).

The EMP will be useful in managing the activities at the site so that potential and actual impacts to the environment are addressed. The EMP will also be an excellent reference tool for compliance audits in future. This is in line with the statutory requirements and the guidelines issued by NEMA. The report has also provided guidelines on how to mitigate the negative environmental impacts and is confident that they will be implemented by the proponent.

Scope Objective and EIA criteria for the Study

The scope of the assessment covered the construction works of the proposed development, which include ground preparation, Excavation, masonry, and installation of service lines as well as the other necessary utilities. The output of this work was a comprehensive Environmental Impact Assessment study report for the purposes of applying for an EIA license

The consultant on behalf of the proponent conducted the study by incorporating but not limited to the following terms of reference:

- The proposed location of the proposed development and its associated infrastructure.
- A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
- The objectives of the proposed project.
- The technology, procedures and processes to be used, in the implementation of the project.
- The materials to be used in the construction and implementation of the project.
- The products, by-products and waste to be generated by the project.
- A description of the potentially affected environment.
- The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
- To recommend a specific environmentally sound and affordable wastewater management system.
- Analysis of alternatives including project site, design and technologies.
- An environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.
- Provide an action plan for the prevention and management of the foreseeable accidents and hazardous activities in the cause of carrying out the development activities.

- Propose measures to prevent health hazards and to ensure security in the working environment for the employees, residents and for the management in case of emergencies.
- An identification of gaps in knowledge and uncertainties, which were encountered in compiling the information.
- An economic and social analysis of the project.

Such other matters as the Authority may require.

Methodology Outline

The general steps followed during the assessment were as follows:

- Environment screening, in which the project was identified as among those requiring environmental impact assessment under schedule 2 of EMCA, cap387

- Environmental scoping that provided the key environmental issues

- Desk Stop studies and interviews

- Physical inspection of the site and surrounding areas

- EIA Public participation Meetings and Reporting.

Anticipated Environmental Impacts

As with any other physical development, both positive and negative impacts are anticipated to arise from the proposed project, during the construction phase, operation phase as well as the decommissioning phase. In general, the following positive and negative impacts are expected to be associated with the proposed project.

Positive Impacts

- Increase of housing facilities
- Creation of employment opportunities
- Improved growth of the economy
- Increased business opportunities
- Revenue to national and local governments amongst others
- Improved local security
- Area transformation
- Improved Road infrastructure

Negative Impacts

- Increased runoff from new impervious areas,
- Soil erosion,

- Solid Waste generation,
- Noise pollution,
- Traffic Congestion
- Air pollution from dust emissions and exhaust emissions,
- Increased water demand,
- Increased energy Consumption,
- Increased demand for building materials extracted from the natural resource base,
- Workers accidents and hazards during construction.

Mitigation Measures

In order to alleviate the potential negative impacts associated with the proposed project the proponents shall take several measures, among these are;

Dust emissions will be controlled by the following measures:

- Watering all active construction areas when necessary;
- Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard;

- Apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites; and

- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.

The following noise-suppression techniques will be employed to minimize the impact of temporary construction noise at the project site.

- Install portable barriers to shield compressors and other small stationary equipment where necessary;

- Use quiet equipment (i.e. equipment designed with noise control elements);

- Co-ordinate with relevant agencies regarding all substation construction activities in portions of the property bordering areas;

- Install sound barrier for pile driving activity;

- Limit pickup trucks and other small equipment to an idling time when necessary and encourage workers to shut off vehicle engines when not in use.

In order to control exhaust emissions the following measures shall be implemented during construction:

- Vehicle idling time shall be minimized;

- Alternatively fueled construction equipment shall be used where feasible; and

- Equipment shall be properly serviced and maintained.

The proponent will prepare a hazardous substance control and emergency response plan that will include preparations for quick and safe clean-up of accidental spills. It will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response programme to ensure quick and safe clean-up of accidental spills. The plan will identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted.

The proponent will also ensure adequate collection and storage of solid waste on site and safe transportation to the disposal sites and disposal methods at designated area shall be provided. In addition, the proponent shall also provide covers for refuse containers and appropriate personal protective equipment's.

Conclusion

The proposed project will contribute to significant positive impacts in the area during its construction and operation phases. These positive impacts include: creation of employment, optimal use of land, incorporation of collective waste management practices, increase in revenue to the proponent and the County Government among others.

It is equally evident that, although the project will contribute to various positive impacts, some negative impacts are inevitable and the purpose of conducting this EIA is to outline measures to mitigate them or where possible eradicate them completely. The negative impacts of this project include increased pressure on infrastructure, noise pollution, and air pollution, generation of solid and liquid, pressure on existing infrastructure, wastes among others.

It is our recommendation that the proponent be allowed to proceed with the implementation of the proposed project, provided the outlined mitigation measures in this report are adhered to and the Environmental Management Plan (EMP) is implemented effectively.

Contents

CHAPTER 1: INTRODUCTION

This Environmental Impact Assessment study report has been prepared as per the provision of Environmental Management and Coordination Act Cap 387 and more specifically to environmental (Impact Assessment and Audit) Regulation 2003, Legal notice No. 101.

The proposed project site is situated on a plot **L.R No. 2/31/3,** Kirichwa Rd. Kilimani, Nairobi. The plot measures **1.666 acres** on which the Trustees intend to develop a high-rise residential property comprising approximately 288 two- and three-bedroom apartments.

The Kenya Government policy on all new project, programmes or activities requires that an environmental impact assessment is carried out at the planning stages of the proposed project to ensure that significant impacts on the environment are taken into consideration during the design, construction, operation and decommissioning of the facility. The scope of this study, therefore include:

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

The overall objective of the study is to ensure that all environmental concerns are integrated in all the development activities of the proposed development project in order to enhance sustainable development. The specific objectives are:

- To identify potential environmental impacts, both direct and indirect.

- To assess the significance of the impacts

- To assess the relative importance of the impacts of relative plans designs, and sites

- To propose preventive mitigation and compensative measures for the significant negative impacts of the project on the environment.

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

- To present information on impact of alternative.

- present the results of the EIA that can guide informed decision making and

- To prepare EMP for the proposed project and decommissioning plan.

The scope of the assessment covered site preparation works, excavation, construction works of the proposed development that included ground preparation, masonry and installation of service lines as well as the necessary required utilities. The output of this work was a comprehensive study report for the purposes of applying for an EIA license.

It is stipulated in EMCA, Cap387 that a form of development such as the proposed housing development and associated facilities is likely to impact the site and the surrounding environment hence, before commencement of any work; an Environmental Impact Assessment should be undertaken in compliance with the principal environmental Act and Environmental Impact Assessment/Audit Regulations 2003.

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

The main objective of the assignment was to assist the proponent to prepare report for the proposed project so to ensure that the proposed development takes into consideration appropriate measures to mitigate against identified adverse impacts to the environment. The study identified existing and potential environmental impacts and the issues of concern that interested and/or affected parties raised about the development. The associated prevention and mitigation measures for the proposed projects negative impacts are outlined in the environmental Management Plan (EMP) proposed.

The consultant on behalf of the proponent conducted the study by incorporating but not limited to the following terms of reference:

- Location of the proposed project

- A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.

- The objectives of the project.

- The materials to be used in the construction and implementation of the project.

- The products, by-products and waste to be generated by the project

- A description of the potentially affected environment.

- The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.

- Provide alternative technologies and processes available and reasons for preferring the chosen technology and processes.

- Analysis of alternatives including project site, design and technologies.

- An environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.

- Provide an action plan for the prevention and management of the foreseeable accidents and hazardous activities in the cause of carrying out development activities.

- Propose measures to prevent health hazards and to ensure security in the working environment for the employees, residents and for the management in case of emergencies.

- An identification of gaps in knowledge and uncertainties that were encountered in compiling the information.

- An economic and social analysis of the project.

- Such other matters as the Authority may require.

1.2: Data collection procedures

The data collection was carried out through questionnaires/standard interview schedules, a stakeholders meeting, use of checklists, observations and photography, site visits and desk top environmental studies scientific as per the Integrated Environmental Impact Assessment Regulations, 2018.

1.3: Responsibilities and Undertaking

The Consultant undertook to meet all logistical costs relating to the assignment, including those of production of the report and any other relevant material.

The output from the consultants includes the following:

- An Environmental Impact Assessment Study Report comprising of an executive summary, study approach, baseline conditions, anticipated impacts and proposed mitigation measures.

- An Environmental Management Plan Outline which also forms part of the report recommendations.

1.4: Methodology outline

The proposed site is located within an area with no rich natural resources hence the project's cumulative effects to the surrounding environment will not be such adverse even if the developer considers expansion of infrastructure such as the sewerage system, drainages, and water supply

and roads. Moreover, the proposed development and use of the Facility will be in line with what exists in the surrounding areas; hence an environmental study report will adequately address the project's impacts. The general steps followed during the assessment were as follows:

- Environment screening, in which the project was identified as among those requiring environmental impact assessment under schedule 2 of EMCA, cap 387;
- Environmental scoping that provided the key environmental issues;
- Desk Stop studies and interviews;
- Physical inspection of the site and surrounding areas;
- EIA Public participation by the use of questionnaires, meetings; and
- Reporting.

1.5: Environmental screening

The screening process was applied to determine whether a full study was required and what level of assessment was necessary. This was done in reference to the requirements of the principal environmental legislation; specifically, the second schedule. Issues considered included the physical location, sensitive issues and nature of the anticipated impacts of the proposed project.

1.6: Environmental scoping

The scoping process narrowed down the study to the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, natural/ecological and social, economic and cultural aspects.

1.7: Desk top study

The study included documentary review on the nature of the proposed activities, project documents, designs, relevant policy and legislative framework as well as the environmental setting of the project site area among others. It also included discussions with managers and design engineers as well as interviews with neighbors.

1.8: Site assessment and public participation

Field visits were meant for physical inspections of the site characteristics and the environmental status of the surrounding areas to determine the anticipated impacts.

To ensure adequate public participation in the EIA process, questionnaires were administered to the site neighbors within the area, Public Consultation Meetings (PCMs) were also held and the information gathered was subsequently analyzed and incorporated into the EIA study report also the discussion and interviews.

1.9 Reporting

In addition to constant briefing of the proponent, this prepared report is to be presented for submission to NEMA as required by law.

CHAPTER 2: POLICY, LEGAL AND INSTITUTION FRAMEWORK

2.1 Introduction

Environmental and Social Impact Assessment is a tool for environmental conservation and has been identified as a key component in new project implementation. According to Environmental Management and Coordination Act No. 8 of 2015, and the Integrated Environmental Impact Assessment Regulations, 2018, both new and old projects must undergo Environmental Impact assessment and Audits. The report of the same must be submitted to the National Environment Management Authority (NEMA) for approval and issuance of the relevant certificates.

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

2.2 Environmental policy

This ESIA has been prepared to fully comply with environmental and social safeguard policies and procedures as outlined in the various regulations by Kenya's National Environment Management Authority.

2.3 Relevant Kenya Policies

2.3.1 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. The major objective of the policy is to provide a framework for an integrated approach to planning and sustainable management of Kenya's environment and its natural resources. The policy further ensures that the environment is integrated in all government policies in order to facilitate and realize sustainable development at all levels.

This would help promote green economy, enhance social inclusion, improve human welfare and create opportunities for employment and maintenance of a healthy ecosystem.

2.3.2 Physical Planning Policy

The current policy governs the development and approval of all building plans as provided for in the Physical Planning Act (Cap 286). The proposed project has been subjected to the provisions of this policy and legislation.

2.3.3 Public Health Policy

The prevailing public health policy calls upon the project proponent to ensure that ancillary buildings are adequately provided with utilities that make them fit for human habitation. The proposed development has been designed by professional engineers and architects and as such will have all amenities/utilities that are essential for safeguarding public health for all the residents and visitors who access the facilities.

2.3.4 The Sessional Paper No.4 on Energy

The major objective of the Policy is to ensure adequate, quality, cost effective and affordable supply of energy through indigenous resources while protecting the environment. It encourages wider adoption and use of renewable energy technologies to enhance their role in the country's energy supply matrix. The Energy Policy is aligned to long term development strategy -Vision 2030 and other policies.

2.3.5 The Kenya Vision 2030

The Kenya Vision 2030 is the national long-term development policy that aims to transform Kenya into a newly residential, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment.

2.3.6 The Kenya National Climate Change Response Strategy

The purpose of this strategy is to put in place robust measures needed to address most of the challenges posed by climate variability and change through thorough impact assessments and monitoring of various projects. According to Climate Change Projections, the country is likely to experience hotter drier sunny seasons, warmer wetter rainy seasons, rise in sea levels and an increase in extreme weather events.

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

2.3.7 The National Occupational Safety and Health Policy

This Policy significantly sustains continual development and implementation of the National Occupational Safety and Health systems and programs to reduce incidences of work related accidents and diseases. In addition, it seeks to offer equitable compensation to those who suffer physical injuries and contract occupational diseases.

The Policy addresses the current challenges, gaps and future development of safety and health systems and programs in the country.It promotes basic principles of assessing occupational risks or hazards; combating occupational risks or hazards at source; and developing a national preventative safety and health culture that includes information, consultation, research and training.

The policy also promotes continuous improvement of occupational safety and health by integrating Kenyan national laws and regulations with Regional Protocols, ILO Conventions, ISO standards and the best practices in the world. It sets up mechanisms for resource mobilization for occupational safety and health programs and activities and provides guidance to all stakeholders in the development and implementation of national occupational safety and health systems and programs.

In all phases of the project, the issues of occupational safety and health will emerge and the National Occupational Safety and Health Policy will be handy in addressing these issues.

2.4 Institutional Framework

Environmental Impact Assessment (EIA) is a critical examination of the effects of a project on the environment. The goal of an EIA is to ensure that decisions on proposed projects and activities are environmentally sustainable. It guides policy makers, planners, stakeholders and government agencies to make environmentally and economically sustainable decisions. It is therefore a legal requirement to carry out an EIA before commencement of the proposed project.

At present there are over twenty (20) institutions and departments which deal with environmental issues in Kenya. Some of the key institutions relevant to the proposed residential development include the National Environmental Council (NEC), National Environmental Management Authority (NEMA), the Kenya Forest Service, Water Resources Authority (WRA), Directorate of Occupational Safety and Health Services (DOSHS) and others. There are also local and international NGOs involved in environmental issues in the country.

2.4.1 National Environment Management Authority (NEMA)

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

 Co-ordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plan, programmes and projects with a view to ensuring the

proper management and rational utilization of environmental resources on a sustainable basis for the improvement of the quality of human life in Kenya.

- Take stock of the natural resources in Kenya and their utilizations in consultation, with the relevant lead agencies, land use guidelines.

- Examine land use patterns to determine their impact on the quality and quantity of the natural resources.

- Carry out surveys, which will assist in the proper management and conservation of the environment.

- Advise the government on legislative and other measures for the management of the environment or the implementation of relevant international conservation treaties and agreements in the field of environment as the case may be.

- Advise the government on regional and international environmental convention treaties and agreements to which Kenya should be a party and follow up the implementation of such agreements where Kenya is a party.

- Undertake and co-ordinate research, investigation and surveys in the field of environment and collect and disseminate information about the findings of such research, investigation or survey.

- Mobilize and monitor the use of financial and human resources for environmental management.

- Identify projects and programmes or types of projects and programmes, plans and policies for which environmental audit or environmental monitoring must be conducted under EMCA.

- Initiate and evolve procedures and safeguards for the prevention of accidents, which may cause environmental degradation and evolve remedial measures where accidents occur.

 Monitor and assess activities, including activities being carried out by relevant lead agencies in order to ensure that the environment is not degraded by such activities, environmental management objectives are adhered to and adequate early warning on impeding environmental emergencies is given.

 Undertake, in co-operation with relevant lead agencies programmes intended to enhance environmental education and public awareness about the need for sound environmental management as well as for enlisting public support and encouraging the effort made by other entities in that regard.

 Publish and disseminate manuals, codes or guidelines relating to environmental management and prevention or abatement of environmental degradation.

 Render advice and technical support, where possible to entities engaged in natural resources management and environmental protection so as to enable them to carry out their responsibilities satisfactorily.

 Prepare and issue an annual report on the state of the environment in Kenya and in this regard may direct any lead agency to prepare and submit to it a report on the state of the sector of the environment under the administration of that lead agency and,

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

However, NEMA mandate is designated to the following committees

2.4.2 National Environmental Complaints Committee (NECC)

The NECC'S mission is to facilitate access to environmental justice to the public by providing a forum for environmental conflict resolution and contributing to environmental policy. The Committee performs the following functions:

- Investigate complaints or allegations regarding the condition of the environment in Kenya and suspected cases of environmental degradation.

- The NECC also undertakes public interest litigation on behalf of the citizens in environmental matters.

2.4.3 County Environment Committee

The County Environment Committee shall-

(a) Be responsible for the proper management of the environment within the county for which it is appointed;

(b) Develop a county strategic environmental action plan every five years for consideration and adoption by the County Assembly.

Every County Environment Committee, in preparing a county environment plan, shall undertake public participation and take into consideration every other county environment action plan already adopted with a view to achieving consistency among such plans. The respective County Executive Committee members of every county shall submit the county environment action plan to the Cabinet Secretary for incorporation into the national environment action plan.

(c) Perform such additional functions as are prescribed by the EMCA (Amendment) Act 2015 or as will from to time, be assigned by the county Governor by notice in the Gazette.

2.4.4 National Environmental Tribunal

The tribunal's principal function is to receive, hear and determine appeals arising from decisions of the National Environment Management Authority (NEMA) on issuance, denial or revocation of environmental impact assessment (EIA) licenses, among other decisions.

If disputes with respect to the proposed project arise, the NET will function very much like a court of law.

2.4.5 National Environmental Council (NEC)

Part III section 4 of the principal Act outlines the establishment of the National Environment Council (NEC). NEC is responsible for policy formulation and directions for purposes of EMCA; sets national goals and objectives, determines policies and priorities for the protection of the environment, promotes co-operation among public departments, county governments, private sector, non-governmental organizations and such other organizations engaged in environmental protection programmes. It also performs such other functions as assigned under EMCA.

2.4.6 Directorate of Occupational Safety and Health Services (DOSHS)

This is one of departments within the current Ministry of East African Community, Labour and Social Protection, whose primary objective is to ensure safety, health and welfare of all workers in all workplaces.

Unsafe and unhealthy work environment causes accidents, diseases, disasters and environmental pollution that occasion huge economic and social burdens to individuals and enterprises thereby stifling economic and social growth.

The Directorate enforces Occupational Safety and Health Act, 2007 (OSHA, 2007) with its subsidiary legislation which aims at prevention of accidents and diseases at work. It also administers the Work Injury Benefits Act, 2007 (WIBA, 2007) which provides for compensation of workers who have been injured or have suffered a disease out of and in the course of employment.

Functions

In fulfilment of its responsibility of identifying hazards at workplaces and assessment of risks with a view of preventing accidents, diseases and damage to property, the Directorate undertakes the following functions;

- Systematic inspection and auditing of workplaces to promote best practices and ensure compliance with safety and health standards as set out in OSHA, 2007 and its subsidiary legislations.

- Examination and testing of passenger lifts, hoists, cranes, chains and other lifting equipment to ensure their safe use.

- Identification, evaluation and control of biological, chemical, physical, psychosocial, ergonomic and other factors in the work environment which may affect the safety and health of employed persons and the general environment.

- Medical surveillance, including medical examination to monitor and check on the health status of the workers and advise on intervention measures.

- Training and awareness creation on occupational safety and health in order to promote safety and health culture in the country.

- Ensuring compensation to employees for work related injuries and diseases contracted in the course of their employment in accordance with the provisions of WIBA, 2007.

- Investigation of occupational accidents, dangerous occurrences and cases of Occupational diseases with a view to preventing recurrence.

2.5 Legal Framework

2.5.1 Environmental Management and Coordination Act, Cap 387

Section 58.(1) Of the Act states ―Notwithstanding any approval, permit or license granted under this Act or any other law in force in Kenya, any person, being a proponent of a project, shall, before financing, commencing, proceeding with, carrying out, executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the Second Schedule to this Act, submit a project report to the Authority,

in the prescribed form, giving the prescribed information and which shall be accompanied by the prescribed fee.

Relevance to the proposed project

Environmental Management and Coordination Act, Cap 387 provides a legal and institutional framework for the management of the environmental related matters. This report has been written pursuant to section 58 (1) of this Act.

2.5.2 Integrated Environmental Impact Assessment Regulations, 2018

These regulations stipulate how an EIA project report should be prepared and specifies all the requirements that must be complied with. It highlights the stages to be followed, information to be made available, role of every stakeholder and rules to be observed during the whole EIA project Report making process. It also requires that during the EIA process a proponent shall in consultation with the Authority seek views of persons who may be affected by the project or activity.

Relevance to the proposed project

The proponent and consultants shall seek the views of the project neighbours through PCMs and the use of questionnaires so as to ensure that their concerns are addressed in this report.

2.5.3 Water Quality Regulations (2006)

The Water Quality Regulations (2006) are contained in the Kenya Gazette Supplement No.

68, Legal Notice No. 120.

Water Quality Regulations apply to water used for domestic, residential, agricultural, and recreational purposes; water used for fisheries and wildlife purposes, and water used for any other purposes. Different standards apply to different modes of usage. These regulations provide for the protection of lakes, rivers, streams, springs, wells and other water sources. It is an offence to contravene the provisions of these regulations with a fine not exceeding five hundred thousand shillings. In addition, of immediate relevance to the proposed project for the purpose of this Project Report is Part II Sections 4-5 as well as Part V Section24.

Part II Section IV states that ―Every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution. Part IV Section 24 states that ―No person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive wastes, or other pollutants or permit any person to dump any such matter into water meant for fisheries, wildlife, recreational purposes or any other uses. According to these regulations, ―Every person shall refrain from any action which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act.

Relevance

All waste water shall be channeled to the main sewer line (NCWSC) so as not to pollute the ground and surface water and if a pollution incidence occurs the contractor/proponent shall notify the authority immediately.

2.5.4 EMCA (Waste management) Regulation, 2006

The Waste Management Regulations (2006) are contained in the Kenya Gazette No. 69, Legal Notice No. 121. The Waste Management Regulations are meant to streamline the handling, transportation and disposal of various types of waste. The aim of the Waste Management

Regulations are to protect human health and the environment. The regulations place emphasis on waste minimization, cleaner production and segregation of waste at source. The regulation requires licensing of transporters of wastes and operators of disposal site (sections 7 and 10 respectively).

Of immediate relevance to proposed development for the purposes of this project report is Part II Sections 4(1-2), 5 and 6. Section 4 (1) states that ―No person shall dispose of any waste on a public highway, street, road, recreational area or any other public place except in a designated waste receptacle. Section 4(2) and 6 explain that the waste generator must collect, segregate (hazardous waste from non-hazardous) and dispose waste in such a facility that shall be provided by the relevant local authority.

Section 5 provides method of cleaner production (so as to minimize waste generation) which includes the improvement of production processes through conserving raw materials and energy. Section 11 provides that any operator of a disposal site or plant shall apply the relevant provisions on waste treatment under the local government act and regulations to ensure that such waste does not present any imminent and substantial danger to the public health, the environment and natural resources.

Section 12 provides that every licensed owner or operator shall carry out an annual environmental audit pursuant to the provision of the act In section 14 (1) every trade or residential undertaking is obliged to install anti- pollution equipment for the treatment of waste emanating from such trade or residential undertaking.

Relevance

The Developer is expected to take all responsibility to ensure that solid waste is properly disposed by a solid waste collection company that has a valid license from the National Environment Management Authority (NEMA).

2.5.5 EMCA (Noise and Excessive Vibration Pollution Control) Regulations, 2009

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

Time of the day;

- Proximity to residential area;
- Whether the noise is recurrent, intermittent or constant;
- The level and intensity of the noise;
- Whether the noise has been enhanced in level or range by any type of

- Whether the noise is subject to be controlled without unreasonable effort or expense to the person making the noise.

These regulations also relate noise to its vibration effects and seek to ensure no harmful vibrations are caused by controlling the level of noise. Part II Section 4 state that: except as otherwise provided in these Regulations, no person shall

a) Make or cause to be made excessive vibrations annoys, disturbs, injures or endangers the comfort, response, health or safety of others and the environment; or

b) Cause to be made excessive vibrations which exceed 0.5 centimeters per second beyond any source property boundary or 30 meters from any moving source.

Part III Section 2 (1) states that any person wishing to a) operate or repair any machinery, motor vehicle, construction equipment, pump, fun, air conditioning apparatus or similar mechanical device; or b) engage in any commercial or residential activity, which is likely to emit noise or excessive vibrations shall carry out the activity or activities within the relevant levels provided in the First Schedule to these Regulations. Any person who contravenes this Regulation commits an offence.

Section 13 (1) states that except for the purposes in sub-Regulation (2) hereunder, no person shall operate construction equipment (including but not limited to any pile driver, steam shovel, pneumatic hammer, derrick or steam or electric hoist) or perform any outside construction or repair work so as to emit noise in excess of the permissible levels as set out in the Second Schedule to

these Regulations. These purposes include emergencies, those of domestic nature and/or public utility construction.

Section 14 relates to noise, excessive vibrations from construction, demolition, mining or quarrying site, and state that: where defined work of construction, demolition, mining or quarrying is to be carried out in an area, the Authority may impose on how the work is to be carried out including but not limited to requirements regarding a) machinery that may be used, and b) the permitted levels of noise as stipulated in the Second and Third Schedules to these Regulations.

Relevance

The contractor shall be required to implement these measures, ensure that all machineries are in good working condition to reduce noise. Also construction activities shall be restricted between 0800Hrs-1700Hrs to ensure that the neighbours are not disturbed.

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

The objective of these Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. The general prohibitions state that no person shall cause the emission of air pollutants listed under First Schedule (Priority air pollutants) to exceed the ambient air quality levels as required stipulated under the provisions of the Seventh Schedule (Emission limits for controlled and non-controlled facilities) and Second Schedule (Ambient air quality tolerance limits).

Relevance

The contractor shall implement the mitigation measures provided in the EMMP to prevent air pollution especially during construction phase.

2.5.7 The Energy (Solar Water Heating) Regulations, 2012 Installation and use of solar water heating systems

All premises within the jurisdiction of a local authority with hot water requirements of a capacity exceeding one hundred liters per day shall install and use solar heating systems

A person who contravenes the provisions of this regulation commits an offence and shall, on conviction, be liable to a fine not exceeding one million shillings, or to imprisonment for a term not exceeding one year, or to both.

Responsibility for compliance

6. (1) A developer of a housing estate, a promoter of the construction, an owner of the premises or an Architect or an Engineer engaged in the design or construction of premises shall comply with these Regulations.

(2) An owner of premises, Architect and an Engineer engaged in the design, construction, extension or alteration of premises shall incorporate solar water heating systems in all new premises designs and extensions or alterations to existing premises.

(3) An owner or occupier of premises that has a solar water heating system shall use and carry out the necessary operational maintenance and repairs required to keep the installation in good and efficient working condition.

(4) An electric power distributor or supplier shall not provide electricity supply to premises where a solar water heating system has not been installed in accordance with these Regulations.

Relevance

In compliance to these regulations solar energy shall be adopted for water heating, water pumping within the development.

2.5.8 Environmental Management and Coordination Controlled Substances Regulations, 2007 (Legal Notice No.73 of 2007)

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

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

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

2.5.9 Environmental Management and Coordination (Conservation of Biodiversity regulations), 2006

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

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

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

2.5.10 County Governments Act, 2012

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

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

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

Section 114 and 115 indicate and give guidelines in planning of projects of national significance and instill the aspect of public participation in every aspect of the planning process through that: clear strategic environmental assessments; clear environmental impact assessment reports; expected development outcomes; and development options and their cost implications. Each county assembly is tasked with the role to develop laws and regulations giving effect to the

requirement for effective citizen participation in development planning and performance management within the county.

Relevance to the project

The project proponent has initiated the process of County Government engagement in the initial project planning through application of essential development approvals from Nairobi County Government.

2.5.11 Land Planning Act cap 303

Section 9 of the subsidiary legislation (the development and use of land Regulations 1961) under which it require that before the local Authority to submit any plans to then minister for approval, steps should be taken as may be necessary to acquire the owners of any land affected by such plans. Particulars of comments and objections made by the landowners should be submitted, which intends to reduce conflict of interest with other socio economic activities.

Relevance to the proposed project

The proponent has submitted architectural plans to Nairobi County for approval.

2.5.12 The Land Act, 2012

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

a) Public land may be converted to private land by alienation

b) Subject to public needs or in the interest of defense, public safety, public order, public morality, public health, or land use planning, public land may be converted to community land

c) private land may be converted to public land by

i. Compulsory acquisition;

ii. Reversion of leasehold interest to Government after the expiry of a lease; and

iii. Transfers; or

iv. Surrender.

d) Community land may be converted to either private or public land in accordance with the law relating to community land enacted pursuant to Article 63(5) of the Constitution.

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

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

(a) allocation;

(b) land adjudication process;

(c) compulsory acquisition;

(d) prescription;

(e) settlement programs;

(f) transmissions;

(g) transfers;

(h) long term leases exceeding twenty-one years created out of private land; or any other manner prescribed in an Act of Parliament.

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

2.5.13 The Land Registration Act, 2012

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

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

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

rights and privileges belonging or appurtenant thereto and subject to all implied or expressed agreements, liabilities or incidents of the lease.

2.5.14 The Environment and Land Court Act, 2011

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

2.5.15 The National Land Commission Act, 2012 (No. 5 of 2012)

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

- to manage public land on behalf of the national and county governments;
- to recommend a national land policy to the national government;
- to advise the national government on a comprehensive programme for the registration of title in land throughout Kenya;
- to conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities;
- to initiate investigations, on its own initiative .or on a complaint, into present or historical land injustices, and recommend appropriate redress;
- to encourage the application of traditional dispute resolution mechanisms in land conflicts;

 to assess tax on land and premiums on immovable property in any area designated by law; and
To monitor and have oversight responsibilities over land use planning throughout the country

2.5.16 National Construction Authority Regulations, 2014

The NCA published the National Construction Authority Regulations 2014, the Code of Conduct and Ethics for the Construction Industry, and the NCA Strategic Plan (2015-2020) to effectively regulate the construction industry in Kenya. Contractors operating or willing to undertake construction operations in Kenya are required by law to register through the National Construction Authority (NCA), which is constituted under Act No. 41 of 2011 Laws of Kenya. The NCA is mandated to clear builders and contractors as a way of eliminating rogue contractors in Kenya and malpractices in the building and construction industry. The Authority has provided the regulatory framework for registration and renewal of contractors.

It is tasked with the responsibility of inspecting construction and building projects around the country to ensure high quality of work and close projects posing health risks and collapse hazards.

2.5.17 Occupational Safety and Health Laws and Regulations

The following pieces of legislation form the basis for occupational safety and health matters in Kenya:

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

His Excellency the President assented into law this Act on 22nd October 2007 and the date of commencement declared as 26th October 2007. This is the main operational law for health and safety in Kenya today.

Duties of the proponent pertaining to safety and health It
is the duty a proponent to:-

i) Ensure absence/elimination of risks at the workplace.

ii) Provide information to employees to ensure safety and health at the project site.

iii) Carry out the workplace risk assessment and send a copy of the risk assessment to the Directorate of Occupational Safety and Health Services (DOSHS).

iv) Stop any hazardous activities.

v) Obtain a certificate of registration of a workplace with the Directorate of Occupational Safety and Health Services.

vi) Prepare safety & health policy and submit a copy to the Directorate of Occupational Safety and Health Services.

vii) Bring the content of the safety and health policy statement to the attention of employees.

viii) Prevent environmental pollution

ix) Send notice of accident occurrence, cases of occupational diseases and dangerous occurrence to DOSHS

x) To have the architectural plans of the project site approved by the Directorate of Occupational Safety and Health Services before construction activities commence. In approving the plans Directorate of Occupational Safety and Health Services will among other requirements ensure that:

- Space defining machine layout for intended use by operators will be within statutory limits

- Emergency exits are provided for and are designed to open in accordance to statutory requirements

- Sanitary conveniences are provided for with adequacy as to number of intended employees and are designed to have separate approaches

- First aid facilities like first aid room(s) are provided for,
- There is provision for adequate ventilation

- There is provision for storage of firefighting water storage tank with a capacity of at least 10,000 liters

xi) Ensure that no employee is discriminated against by virtue of:-

- Lodging a complaint about an unsafe condition at the workplace
- Being an active member of a health safety committee.

xii) Establish a health and safety committee whose composition should be in accordance to the (Health and Safety Committees) Rules L.N. 31of 2004, if he will employ 20 or more employees.

xiii) Carry out workplace health and safety audit on an annual basis.

Work Injury Benefits Act, No. 17 of 2007

This law was assented to by His Excellency the President on 22nd October 2007. Various sections in this law were nullified by the high court as they were found to be unconstitutional. This is an act of parliament designed to provide for compensation to employees for work-related injuries and diseases contracted in the course employment and for connected purposes. This is the law whose enactment led to the demise of the Workmen Compensation Act Cap 236.

Relevance to the proposed project

The contractor as the employer has a duty provide for compensation to employees for work related injuries and diseases contracted in the course of their employment at the construction site.

Rules and Regulations

The following rules have been promulgated by the Minister for Labour as provided for in the statues in the furtherance of the safety & health agenda in various applicable workplaces, processes, occupations and branches of the economy; construction sites inclusive:

i. Safety & Health Committee Rules, 2004 Legal Notice No. 31

These rules apply in all workplaces where The Occupational Safety and Health Act, No. 15 of 2007 applies.

These rules are described in Legal Notice No. 31 of the Kenya Gazette Supplement No. 25 of 14th May 2004. The rules apply to all places work that regularly employs twenty or more employees. Among other items, the rules state that:

- The occupier of every workplace shall establish a health and safety committee;

- The committee shall consist of safety representatives from the management and the workers;

- Every member of the Health and Safety Committee shall undertake a prescribed basic training course in occupational health and safety within a period of six months from the date of appointment or election, and thereafter further training from time

  to time;

The Legal Notice also describes the functions and duties of the health and safety committee, the purpose of meetings and recording minutes, and the roles of the office bearers. It further describes the duties of the occupier and those of the Health and Safety Adviser.

Relevance to the proposed project

This Subsidiary legislation require the contractor to form a safety and health committee to oversee safety and health on site while construction activities on site are ongoing

ii. First Aid Rules, 1977 Legal Notice No. 160

These rules outline first-aid box content with respect to size of a workplace and under whose charge the first-aid box should be placed.

Relevance to the proposed project

During all phases of the project provision of first aid is a requirement and the rules will be useful in this regard in catering for injuries sustained on site and workplace.

iii. Eye Protection Rules legal Notice No. 44 of 1978

The rules were developed for purposes of eye safety in workplaces. Processes where eye protection is required include blasting, cleaning, chipping, metal cutting, arc welding, abrasive wheel use (grinding).

Relevance to the proposed project

During the construction phase, work activities requiring eye protection will be a common feature. The rules will provide a good platform for ensuring eye safety of the workers involved in the stated activities

iv. Electric Power(Special) Rules, 1979 Legal Notice No. 340

The rules were developed to provide for electrical safety with regards to electrical power installations, use and handling. These rules apply to generation, transformation, conversion, switching, controlling, regulating, distribution and use of electricity.

v. Building Operations and Works of Engineering Construction Rules, 1984 Legal Notice No. 40

These rules provide for the safety, health and welfare of workers in construction sites.

Relevance to the proposed project

The contractor will be expected to ensure safety, health and welfare of workers and all persons lawfully present at the construction site

vi. Medical Examination Rules, 2007 Legal Notice No. 24

The rules apply to workplaces of classified hazards. Every employer has to ensure medical examination of workers in the workplaces of classified hazards.

Relevance to the proposed project

During the construction phase there will be noise emission, exposure to dusts and fumes (cement, soil, welding fumes etc.) and exposure to musculoskeletal hazards. Exposure to the said hazards will require statutory medical examination on the victims.

vii. Noise Prevention and Control Rules, 2005. Legal Notice No. 25

Kenya's Noise Prevention and Control Rules were passed under Legal Notice No. 25 dated 2005, as a subsidiary legislation of the now repealed Places of Work Act, Cap. 514. The rules state that '*No worker shall be exposed to noise level excess of the continuous equivalent of 90 dB(A) for more than 8 hours within any 24 hours duration'*.

Relevance to the proposed project

During the construction phase there is likely to be noise emission in excess of 90 dB(A) requiring the invoking of these rules to provide for the safety with regards to noise. The rules will guide the contractor in protecting the workers from effects of high noise levels.

2.5.18 The Standards Act Cap. 496

The Act is meant to promote the standardization of the specification of commodities, and to provide for the standardization of commodities and codes of practice; to establish a Kenya Bureau of Standards, to define its functions and provide for its management and control. Code of practice is interpreted in the Act as a set of rules relating to the methods to be applied or the procedure to be adopted in connection with the construction, installation, testing, sampling, operation or use of any article, apparatus, instrument, device or process.

2.5.19 Public Roads and Roads of Access Act (Cap. 399)

Sections 8 and 9 of the Act provides for the dedication, conversion or alignment of public travel lines including construction of access roads adjacent lands from the nearest part of a public road. Section 10 and 11 allows for notices to be served on the adjacent land owners seeking permission to construct the respective roads.

2.5.20 Water Act, 2002

This Act of Parliament provides for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water; to provide for the regulation and management of water supply and sewerage services; to repeal the Water Act (Cap. 372) and certain provisions of the Local Government Act. Section 25 (1) states that a permit shall be required for any of the following purposes:— (a) Any use of water from a water resource, except as provided by section 26; (b) The drainage of any swamp or other land; (c) The discharge of a pollutant into any water resource;

(d) Any purpose, to be carried out in or in relation to a water resource, which is prescribed by rules made under this Act to be a purpose for which a permit is required.

2.5.21 Physical Planning Act, 1999

Part V—Control of development 30. (1) No person shall carry out development within the area of a local authority without a development permission granted by the local authority under section

33. (2) Any person who contravenes subsection (1) shall be guilty of an offence and shall be liable to a fine not exceeding one hundred thousand shillings or to an imprisonment not exceeding five years or to both. (3) Any dealing in connection with any development in respect of which an offence is committed under this section shall be null and void and such development shall be discontinued. (4) Notwithstanding the provisions of subsection (2) (a) The local authority concerned shall require the developer to restore the land on which such development has taken place to its original condition within a period of not more than ninety days;

(b) If on the expiry of the ninety days notice given to the developer such restoration has not been effected, the concerned local authority shall restore the site to its original condition and recover the cost incurred thereto from the developer.

31. Any person requiring development permission shall make an application in the form prescribed in the Fourth Schedule, to the clerk of the local authority responsible for the area in which the land concerned is situated.

The application shall be accompanied by such plans and particulars as are necessary to indicate the purposes of the development, and in particular shall show the proposed use and density, and the land which the applicant intends to surrender for— (a) Purposes of principal and secondary means of access to any subdivisions within the area included in the application and to adjoining land; (b) Public purposes consequent upon the proposed development. 36. If in connection with a development application a local authority is of the opinion that proposals for residential location, dumping sites, sewerage treatment, quarries or any other development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an environmental impact assessment report.

Relevance to the proposed project

This Act provides for order in terms of development execution. The proponent shall submit the project designs to the local authority for approval. This development shall also comply with all the provisions of this law including vertical zoning requirements.

2.5.22 The Local Government Act (Cap. 265)

Section 160 helps local authorities ensure effective utilization of the sewerage systems. It states in part that municipal authorities have powers to establish and maintain sanitary services for the removal and destruction of, or otherwise deal with all kinds of refuse and effluent and where such service is established, compel its use by persons to whom the service is available.

Relevance to the proposed project

The appointed contractor and the Proponent will mitigate against such impacts by ensuring strict adherence to the Environmental Management Plan provided in this project report throughout the project cycle.

2.5.23 The Penal Code (Cap. 63)

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

Relevance to the proposed project

The Proponent will be required to ensure strict adherence to the Environmental Management Plan throughout the project cycle in order to mitigate against any possible negative impacts

2.5.24 The Traffic Act, 2012

The Traffic Act, 2012 gives provisions and guidelines that govern the Kenya roads transport sector. These guidelines are essential to private, public and commercial service vehicles in ensuring safety and sanity on the roads hence ensuring the environment; the human being a component is safeguarded. In section 41 The Act demands for installation and certification of speed governors

for the commercial vehicles ferrying goods adjusted to the loading condition of such vehicles to a limit of 80 KPH, registration and competence of drivers.

Moreover, the owner of commercial vehicles or trailer shall ensure clear markings on their vehicles in English language on the right side of the vehicle showing ownership details, tare weight of vehicle and maximum authorized weight.

Section 26 and 27 of the same discourages engines that emit exhaust gases to the atmosphere without passing via a silencer or expansion chamber

In ensuring safety of all the persons in transit section 56 encourages that every public and commercial vehicle be fitted with inspected and first class first aid box and fire extinguisher. In ensuring compliance to this Act the contractor and developer shall ensure that all site drivers and all material suppliers to the site satisfy the provisions as stipulated in Act.

2.5.25 Persons with Disability Act (PWD), 2003

Kenya has a Person with Disabilities Act (PWD), 2003 which is a comprehensive law covering rights, rehabilitation and equal opportunities for people with disabilities.

– It creates the National Council of Persons with Disabilities as a statutory organ to oversee the welfare of persons with disabilities.

– The Act aims to ensure that Persons with Disabilities' issues and concerns are mainstreamed.

– Requires establishment of DMCs in all public institutions

Section 21 of this Act entitles Persons with disabilities ‘to a barrier-free and disability-friendly environment to enable them to have access to buildings, roads and other social amenities, and assistive devices and other equipment to promote their mobility’.

The Proponent shall ensure that the main contractor adopts implements and mainstream PWD Provisions throughout the project phases.

2.5.26 Public Health Act (Cap. 242)

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

2.5.27 Building Code 2000

Section 194 requires that where sewer exists, the occupants of the nearby premises shall apply to the local Authority for permit to connect to the sewer line and all the wastewater must be discharged in to sewers. The code also prohibits construction of structures or building on sewer lines.

CHAPTER 3: PROJECT DESCRIPTION

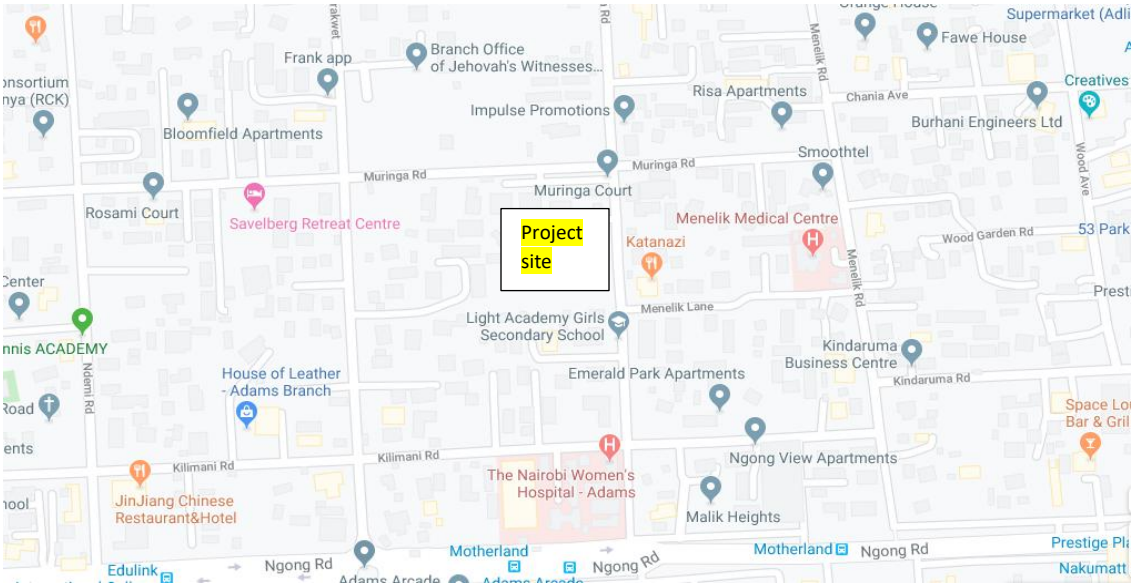
3.1 Introduction

The Kenya Power and Lighting Company Limited Retirement Benefits Scheme 2006 is a body established by a Trust Deed to receive, manage and provide benefits to employees of the Kenya Power and Lighting Company Limited upon their retirement or to their dependents in the event of death in service.

To achieve its elaborate role, the pension fund wishes to undertake development on its parcel of land situated in Kirichwa road, Kilimani area, Nairobi. The property contains approximately by measurement 1.666 acres on which the Trustees intend to develop a high-rise residential property comprising approximately 288 two- and three-bedroom apartments. The apartments are estimated to have a plinth area of between 100 to 170 square meters with a total built up area of 52,142 square meter. The houses are designed to target a middle class with medium specs.

3.2 Location of the proposed Project

The parcel of land for the proposed development is situated in Kirichwa road, Kilimani area, Nairobi. The proposed site is a long and directly opposite Katanazi restaurant in between Light Academy Girls Secondary School and Muringa Court off Kirichwa road. (See the Map Below).



3.3 Project Description

The project proponent is developing a high-rise residential property of 16 floors comprising 288 units of two- and three-bedroom apartments on plot L.R No. 2/31/3**,** Kirichwa Rd. Kilimani, Nairobi. The plot measures approximately 1.666 acres.

The development will include;

- Three-bedroom apartments with DSQ – 96 No.
- Two-bedroom apartments with DSQ – 124 No.
- Two-bedroom apartments without DSQ- 68 No.
- Car parking for 450 cars each on four levels that is- Ground floor, lower ground floor, upper ground floor and basement floor
- A restaurant with a swimming pool
- A gymnasium
- On ground recreation and children's play area
- Care takers two bedroom flat
- Roof deck for drying clothes and for solar water heating panels
- Solid waste management rooms
- Borehole

3.4 Objectives of the project

The overall objective of this Project is to develop the currently undeveloped land and provide housing to the people of Kilimani and its environs. The project will also create various employment and business opportunities in addition to the other positive impacts as discussed in this report.

3.5 Project's surrounding

The neighboring area is a mixed use area occupied mainly by residential homes such as Manza court, muringa court, Katanazi restaurant, Light Academy Girls School located within the project area.

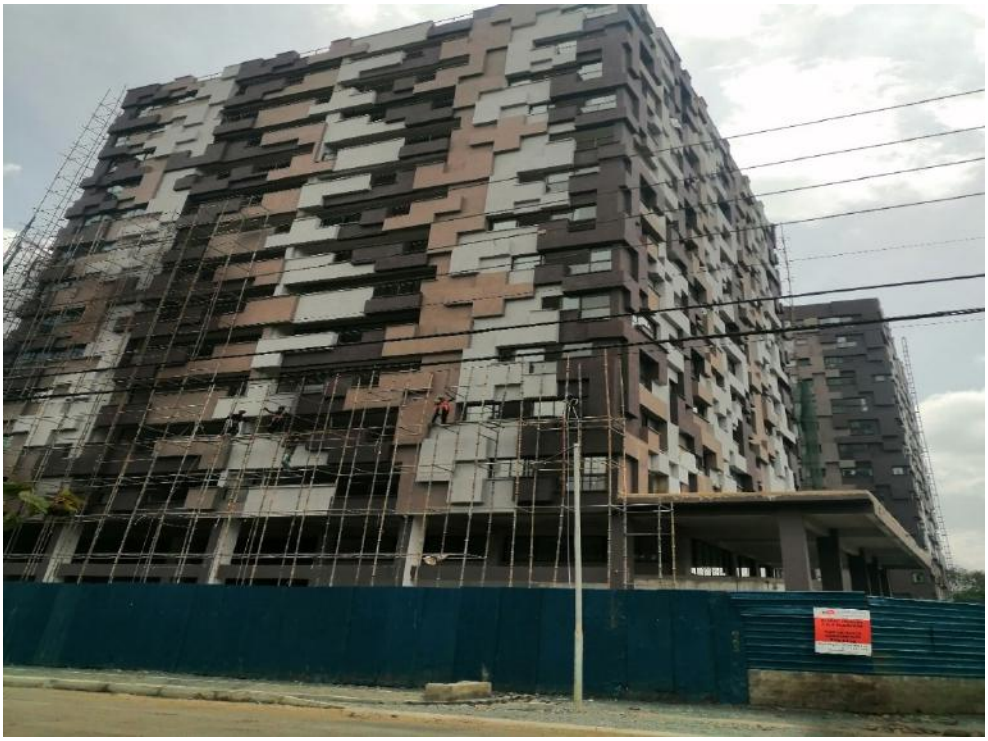


Figure 1 Neighbouring properties similar to the proposed development

Figure 2 Neighbouring residential properties similar to the proposed project

3.6 Land Ownership and Tenure

The land on which the development is proposed is on leasehold and registered under Registration of Land Act, Cap 300 as **L.R No. 2/31/3,** Kirichwa Rd. Kilimani, Nairobi under the name Kenya Power and Lighting Company Limited. Kenya Power Pension Fund.

Figure 3 Proposed Project site

3.7 Project Design

The design of the project has been executed with due consideration of the existing topography of the proposed project site. In general, the design of the project will optimize the use of the best available technology (BAT) to prevent or minimize potentially significant environmental impacts associated with the project and to incorporate efficient operational controls together with trained staff, to ensure high level business and environmental performances.

3.8 Description of the project's construction activities

3.8.1 Site preparation works

The proposed project site will be prepared for construction. This will involve excavation works and transportation of construction materials and construction of the proposed development.

This will be undertaken in a phased approach to mitigate soil erosion and the impacts of excessive dust generation. Due to the nature of the proposed project, construction will involve the use of earthmoving machinery such as excavators and bulldozers.

The engineers will also utilize human labour where necessary so as to create employment to the local residents especially the youth. Currently the site has an incomplete building which will be demolished.

3.8.2 Storage of materials

Building materials will be stored on site. Bulky materials such as stones, ballast, sand and steel will be carefully piled at designated areas on site. To avoid piling large quantities of materials on site, the proponent will order bulky materials such as sand, gravel and stones in quotas.

3.8.3 Masonry, concrete work and related activities

The construction of the buildings walls, foundations, floors, pavements, and residential houses among other components of the project involves a lot of masonry work, laying of plumbing and related activities. General masonry and related activities include, concrete mixing, plastering, slab construction, construction of foundations, and erection of building walls and curing of fresh concrete surfaces. These activities are known to be labour intensive and will be supplemented by machinery.

3.8.4 Structural steel works

The buildings will be reinforced with structural steel for stability. Structural steel woks involve steel cutting, welding and erection.

3.8.5 Electrical work

Electrical work during construction of the premises will include installation of electrical gadgets and appliances including electrical cables, lighting apparatus, sockets etc. In addition, there will be other activities involving the use of electricity such as welding and metal cutting.

3.8.6 Plumbing

Installation of pipe-work will be done to connect sewage from the building blocks to the main sewer system. Plumbing will also be done for drainage of storm water from the rooftop into the peripheral storm water harvesting tanks. Plumbing activities will include metal and plastic pipe cuttings, the use of adhesives, metal grinding and wall drilling among others.

3.9 Description of the project's operational activities

3.9.1 Occupation activities

Once construction is complete, the apartments will be sold.

3.9.2 Solid waste

The proponent will provide facilities for handling solid waste generated within the facility. These will include dust bins/skips for temporarily holding waste within the premises before final disposal at the designated sites.

The waste handling company must be registered with NEMA and disposing waste to a licensed designated dumping site using well branded waste plastic bags bearing the company's name.

3.9.3 Liquid waste

The proponent will provide adequate and safe means of handling liquid waste generated within the facility. These will include conducting regular inspections for pipe blockages or damages and fixing them appropriately.

Also, the proponent will conduct regular monitoring of the sewage discharged to the county sewerage system from the project to ensure that the stipulated sewage/effluent discharge rules are not violated. The current sewerage plant in the area is able to accommodate the existing capacity.

3.9.4 Storm Water Drainage

The proposed development will generate enormous surface water. It is therefore recommended that adequate and well drainage channels be provided to accommodate the increased discharge. This will be determined at the site works.

3.9.5 Electricity Supply

The proposed development will be connected to the Kenya Power and Lighting Company power supply line. The KPLC electricity supply lines are already available within the neighborhood of the proposed project site. There will also be solar panels for heating water in the apartments.

3.9.6 General repairs and maintenance

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

3.9.7 Water reticulation system

Water from the county council will be used during construction and operational phases. Additionally, a borehole will be sunk to supplement water supply and water storage tanks will be installed to increase water supply to various components of the development if need be.

3.10 DESCRIPTION OF THE PROJECT'S DECOMMISSIONING ACTIVITIES

3.10.1 Dismantling of equipment and fixtures

All equipment including electrical installations, furniture partitions, pipe-work and sinks among others will be dismantled and removed from the site on decommissioning of the project. Priority will be given to reuse of this equipment in other projects.

3.10.2 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 topsoil and re-vegetation using indigenous plant species.

CHAPTER 4:BASELINE INFORMATION OF THE STUDY AREA

4.1 Introduction

The proposed project site is situated on a plot **L.R No. 2/31/3,** Kirichwa Rd. Kilimani, Nairobi.. The site is situated in an already mixed development zone of residential and commercial. The proposed area can be accessed through Kirichwa road.

4.2 Climate

The proposed site is situated within Nairobi Metropolis. The climate of Nairobi and thus the project site is generally humid in character, with seasonal dry and wet periods.
Rainfall has a bi-modal distribution with long rains occurring between March and May and the short rains between October and December with a mean annual rainfall amounting to 900 mm. Temperatures are highest in the months of January to mid-march and lowest in July and August. Since Nairobi lies close to the Equator and being 1680 m above sea level, its temperatures are altitude modified tropical, but not torrid. The mean annual is 17°C and mean daily maximum and daily minimum are 23°C and 12°C respectively. On the other hand, the mean annual rainfall is 1080 mm falling in two distinct seasons: long rains from March to May and short rains from mid-October to December.

4.3 Soils

The project site is covered with black cotton soils. The soil is moderately fertile and can support diversified vegetation.

4.4 Topography and Drainage

The area is characterised by a flat terrain and fairly drained. There is a drainage system that has been established in the site of the area.

4.5 Biological environment

4.5.1 Flora

The proposed project site is covered by planted vegetation some of which include; grevillea and eucalyptus trees, shrubs and grass.

4.5.2 Fauna

There are no wildlife/wildlife corridors in the vicinity of the project site.

4.6 Socio-economic environment

4.6.1Land use

The project area serves as a commercial as well as a residential area. The area is generally developed with mixed use developments and is also occupied by people of different economic classes and ethnicities.

4.6.2 Infrastructure and services/Accessibility

The project site is served by a tarmacked road- Kirichwa Road.

Figure 4 Access road to the site (Kirichwa Road)

4.6.3 Water supply

The project will receive tapped water from Nairobi City Water and Sewerage Company supply and supplemented by borehole water which will be sunk during project construction phase.

CHAPTER 5: PUBLIC PARTICIPATION

5.1 Introduction

Public consultation and participation process is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by EMCA, Cap387 section 58, on Environmental Impact Assessment for the purpose of achieving the fundamental principles of sustainable development. Therefore, the chapter describes the process undertaken in the public consultation and public participation followed to identify the key issues and impacts of the proposed development. The objective of the consultation and public participation was to:

- Disseminate and inform the stakeholders about the project with Special reference to its key components and location.

- Gather comments, suggestions and concerns of the interested and affected parties about the project.

- Incorporate the information collected in the EIA study

In addition, the process enabled,

- The establishment of a communication channel between the general public and the team of consultants, the project proponents and the Government.

- The concerns of the stakeholders are known to the decision-making bodies at an early phase of project development.

5.2 Methodology used in Public consultation

The exercise was conducted by a team of experienced registered environmental experts.

The following process in carrying out the entire process involved:

- Key informant interviews and discussions

- Dissemination of questionnaires

- Field surveys, photography and observations

- Public Consultation Meetings (PCMs).

Due to the COVID -19 pandemic the consultant put in place safety and precautionary measures to ensure the safety of both experts and the project stakeholders. This was guided by the NEMA guidelines on conduct of public consultation for EIA, EA and SEA during the pandemic.

As much as possible the views of all Key Stakeholders and Project Area Community were collected through the following forums:

- ICT was a major tool in the public consultation through Zoom meetings and teleconferencing. The consultant undertook comprehensive stakeholder mapping to make these innovations acceptable and effective. The consultant provided their number for comments.

- Use of letters distributed and accessible to the Project Affected Persons by the area chief. In this case the consultant provided their number for the residents to be able to share their comments on the project.

- Public Consultation Meetings: Public Consultation Meetings (PCM) were convened within the project area. Due to Covid-19 there was minimal turnout, instead the consultants conducted door to door interviews and administering of questionnaires.

Figure 5 PCM witnin the project site in progress

5.3 Consulted Stakeholders

A total of two (2) physical Public Consultation Meetings were conducted at the project site on 29th and 30th September 2020 and also door to door interviews and issuance of questionnaires were conducted within a span of two weeks.

The Consultants also held discussions and interviews with various stakeholders including the following:

- Local Community;
- Administration at various levels;
- Business owners in the area.

5.4 Views expressed

From the field work surveys it was apparent that the proposed development was received with mixed reactions by the interviewed people as they anticipated numerous impacts both negative and positive . The neighbors/major stakeholders independently gave their views, opinions, and suggestions.

5.4.1 Positive Views Expressed

5.4.1.1 Affordable Housing

The respondents approved of the project since its aim is to provide affordable low cost housing to the general public. Though they proposed that the proponent to try and make the houses even cheaper or adopt the rent to own method so as to enable more middle-income Kenyans to afford the houses.

5.4.1.2 Employment Opportunities

The respondents interviewed were optimistic that the project will create numerous employment opportunities for both skilled and unskilled labour alike during the construction phase and the decommissioning phase. Despite the fact that most of the project will need skilled labour force, some of those interviewed expressed hope that they will be able to access employment once the project commences mostly as casual workers.

This will be a source of income for several individuals and households and hence is expected to boost the GDP and improve the living standards of the local people.

5.4.1.3 Economic growth

The use of locally available materials during the construction phase of the proposed residential development such as cement, building blocks concrete and ceramic tiles, timber, sand, ballast electrical cables etc., will enhance the growth of the economy as well as the living conditions of

the business enterprises trade on these construction materials. The consumption of these materials, fuel oil and others will attract taxes including VAT which will be payable to the government hence increased government revenue.

5.4.1.4 Infrastructure improvement

The proposed development will attract a large population into the area, there is need to provide services and utilities that will serve the people conveniently without depleting the existing ones.

5.4.1.5 Increased Business Opportunities

Those with businesses along and around the area were optimistic that the increased number of visitors and customers in the area will result in an increased customer base to their business enterprises.

According to them, the number of customers will increase from the construction workers, the security and maintenance personnel including visitors who will be visiting the residential development during its operation phase.

5.4.1.6 Improved Security

Security will be ensured around the proposed development through distribution of suitable security lights and presence of 24 hour security guards. This will lead to improvement in the general security in the surrounding area.

5.4.2 Negative concerns expressed

5.4.2.1 Overloading of the existing infrastructure

Due to the large increase that the project tends to introduce into the area there will be continuous strain on the current infrastructure such as the sewer line and water which is a scarce commodity already in the area.

5.4.2.2 Dust emissions

The people expressed concern over possibility of generation of large amount of dust and exhaust fumes within the project site and surrounding areas as a result of construction works and transportation of construction materials. The proponent shall ensure that dust levels at the site are minimized through implementation of dust abatement techniques on unpaved, un-vegetated surfaces to minimize windblown erosion.

Sprinkling water in areas being constructed and along the tracks used by the transport trucks and diversions within the site will be done. Additional mitigation measures presented within the EMP will be fully implemented to minimize the impacts of dust generation.

5.4.2.3 Noise and Vibration Pollution

The residents expressed their fears over noise pollution that would come from the construction works and the vehicles during the operation phase. They requested the proponent to use minimum noise producing machines and to reduce the duration of idling of vehicles making deliveries. Residents were informed that maximum permissible noise levels as per the EMCA (Noise and Excessive Vibration Pollution Control) Regulations 2008 would be observed during the construction phase.

It is also recommended that quieter construction machines such as jack-in piling machines, which generate about 20 dB (A) less noise than bore piling machines be utilized. It is also recommended that the proponent consider using noise control equipment such perimeter noise barriers, which can reduce noise by 5 dB (A) to 10 dB (A). These measures will be effective in reducing construction noise, when used as part of a good noise management system.

5.4.2.4 Traffic snarl-ups

There will be increased vehicular movement in and out of the site. This will exert pressure on the existing roads around the site only getting worse towards the occupation period. Construction period will be characterized by heavy motor vehicles leading and turning from and in to the site.

5.4.2.5 Solid Waste Generation

Some of the excavation spoil material will be rendered unusable and thus will have to be disposed of. This also applies to some of the soil/rocks, which may not be reusable after excavation processes are complete. All these materials need to be collected, transported and disposed of appropriately in approved designated areas. It is encouraged that other alternative uses of these materials should be found e.g. filling excavated areas at the site. During construction and the operational phase, designated areas for waste collection will be provided and the solid wastes will be disposed of by a NEMA registered Waste operator.

5.4.2.6 Public and Occupational Health and Safety Risks

Potential impacts during construction include: exposure to physical hazards from the construction activities, use of equipment; trips and fall hazards during construction of the upper floors and exposure to dust and noise. Construction workers are likely to have injuries and hazards as the construction works such as trenching and excavations as well as work at height unavoidably expose workers to occupational health and safety risks. The workers are also likely to be exposed to risk of construction noise and air pollution

5.4.2.7 The Zoning of the Area

Some of the residents are against the project stating that the area is for low rising residential developments and not high rising structures as the proposed project.

5.4.2.8 Analysis of Stakeholder Questionnaires

Feedback from the stakeholders was also obtained from the distributed questionnaires and the analysis indicated that most stakeholders approved the project so long as their concerns were addressed. The table below provides a summary of the comments and issues raised on the stakeholders. Filled questionnaires are attached in the annexes.

Table 1: Analysis of Stakeholder Responses

SNO.	Stakeholder Name	Organization	Tel.Number	Stakeholder Interest, Goals, And Concerns
1	Jorius Nandi	Pastor- Community of Christ	0774178308	**Positive Impacts** • Improved infrastructure **Negative Impacts** • Increased demand for water • Security concerns **Suggestions** • Coordinate with NCWSC to improve sewerage and drainage systems and water supply
2	David Omedo	Administrator- Kilimani Ward	0722900384	**Positive Impacts** • Job creation to the locals **Negative Impacts** • None **Suggestions** • Coordinate with NCWSC to improve sewerage and drainage systems and water supply • Provide street lighting in the project site and its environs • Car parking to be sufficient
3	Catherine Tendet	Assitant Chief Kilimani	0728922437	**Positive Impacts** • Job creation • Accommodation of the middle class citizens **Negative Impacts** • None

				Suggestions • Put in place measures to reduce noise and dust pollution
4	Edith Marah	Resident	0708888458	**Positive Impacts** • Local employment prospects • Health competition within surroundings • Pest control because land will be developed **Negative Impacts** • Noise pollution • Decreased ground water quality • Sustainability of surface water quality • Waste disposal **Suggestions** • Monitoring of ground and surface water during construction • Ensure proper solid waste management
5	Francesca Mutuku	Resident and Director J & T Kempro Ltd	0713782586	**Positive Impacts** • Social amenities to the public **Negative Impacts** • Noise pollution and dust pollution • Sunshine to adjacent property will be affected **Suggestions** • Hoarding of the construction site to minimize dust during construction

CHAPTER 6: POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

6.1 Introduction

This chapter focuses on the impacts likely to occur as a result of the proposed construction works. For ease of reference, the impacts due to or affecting certain elements during construction and operation are presented in matrix form in the Environmental and Social Management and Monitoring Plan.

6.2 Positive impacts of the construction activities

a) Creation of employment opportunities

Several employment opportunities will be created for construction workers during the construction phase of the project. This will be a significant impact in addressing unemployment menace in the country.

b) Provision of market for supply of building materials

The project will require supply of large quantities of building materials most, of which will be sourced locally. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

c) Increased business opportunities

The large number of project staff required will provide ready market for various goods and services, leading to several business opportunities for small-scale traders such as food vendors around the construction site.

d) Optimal land use

The public interviewed were optimistic that the implementation of the proposed project will lead to opening up the area by adding more residential space that ensures optimal land use as compared to the current use or any perceived future use of the said plot.

6.3 Negative Environmental Impacts of the Construction Activities

a) Extraction and use of building materials

Building materials such as hard core, ballast, cement, rough stone and sand required for construction will be obtained from various places such as; quarries, hardware shops and sand harvesters who extract such materials from natural resource banks such as rivers and land. Since substantial quantities of these materials will be required for construction of the building, the availability and sustainability of such resources at the extraction sites will be negatively affected, as they are not renewable in the short term. In addition, the sites from which the materials will be extracted may be significantly affected in several ways including landscape changes, displacement of animals and vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health impacts.

b) Dust emissions

During construction, the project will generate substantial quantities of dust at the construction site and its environs. The sources of dust emissions will include site preparation and levelling works, and to a small extent, transport vehicles delivering building materials. Emission of large quantities of dust may lead to significant impacts on construction workers and the local residents, which will be accentuated during dry weather conditions.

c) Traffic flow during construction

There is a likelihood of increase in traffic at the construction site and its environs. The trucks used to transport various building materials from their sources to the project site will contribute to increases in emissions of CO_2, NO_2 and fine particulate along the way as a result of diesel combustion. Such emissions can lead to several environmental impacts including global warming and health complications. Because large quantities of building materials are required, some of which are sourced outside Syokimau, such emissions can be enormous and may affect a wider geographical area. The impacts of such emissions can be greater in areas where the materials are sourced and at the construction site as a result of frequent running of vehicle engines, frequent vehicle turning and slow vehicle movement in the loading and offloading areas such trucks may slow down traffic flow.

d) Noise

The construction works, delivery of building materials by heavy trucks and the use of machinery/equipment including bulldozers, generators, metal grinders and concrete mixers will contribute to high levels of noise and vibration within the construction site and its environs. Elevated noise levels within the site can affect project workers and other persons in and within the vicinity of the project site.

e) Risk of accidents and injuries to workers

Because of the intensive engineering and construction activities including erection and fastening of roofing materials, metal grinding and cutting, concrete work, steel erection and welding among others, construction workers will be exposed to risks of accidents and injuries. Such injuries can result from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others. The proponent will install signage to direct and inform users and pedestrians.

f) Solid waste generation

Large quantities of solid waste (soil) will be generated as a result of excavation of the site. Additional solid waste will be generated at the site during construction of the building and related infrastructure. Such waste will consist of metal cuttings, rejected materials, surplus materials, surplus oil, excavated materials, paper bags, empty cartons, empty paints and solvent containers, broken glass among others. Such solid waste materials can be injurious to the environment through blockage of drainage systems, choking of water bodies and negative impacts on human and animal health. This may be accentuated by the fact that some of the waste materials contain hazardous substances such as paints, cement, adhesives and cleaning solvents, while some of the waste materials including metal cuttings and plastic containers are not biodegradable and can have long-term and cumulative effects on the environment

g) Energy consumption

The project will consume fossil fuels (mainly diesel) to run transport vehicles and construction machinery. Fossil energy is non-renewable and its excessive use may have environmental implications on its availability, price and sustainability. The project will also use electricity

supplied by supplied by KPLC. Electricity in Kenya is generated mainly through natural resources, namely, water and geothermal resources. In this regard, there will be need to use electricity sparingly since high consumption of electricity negatively impacts on these natural resources and their sustainability. The proponent will utilize renewable energy such as solar to maintain the facility and reduce running costs and reduce in contributions to green house emission.

h) Water use

The construction activities will require large quantities of water that will be provided by the county council. Water will mainly be used for concrete mixing, curing, sanitary and washing purposes. Excessive water use may negatively impact on the water source and its sustainability. The proponent will invest in recycling of water

6.4 Positive Environmental Impacts of Operational Activities

a) Employment opportunities

Employment opportunities are one of the long-term major impacts of the proposed residential development that will be realized after the construction phase and during the operation and maintenance of the facility.

b) Revenue to national and county governments

Through payment of relevant taxes, rates and fees to the government and the local authority, the project will contribute towards the national and local revenue earnings.

c) Improved security

Security will be ensured around the project area and its environs through distribution of suitable security lights, electric fence and presence of 24-hour security guards. This will lead to improvement in the general security in the surrounding area.

d) Optimal use of land

e)

By building the homes the design has incorporated an optimal use of the available land. Land is a scarce resource in Kenya and through construction of the proposed homes shall ensure optimal use of land.

6.5 Negative Environmental Impacts of Operational Activities

a) Solid waste generation

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

b) Energy consumption

During operation, the development will use a lot of electrical energy mainly for domestic purposes including lighting, cooking, running of air conditioning equipment, running of refrigeration systems, pumping water into reservoirs. Since electricity generation involves utilization of natural resources, excessive electricity consumption will strain the resources and negatively impact on their sustainability.

c) Increased water utilization

The domestic activities during the operation phase of the project will involve the use of large quantities of water in the daily operations of the commercial development to include offices, workshop, showroom and access road.

6.6 Positive Environmental Impacts of Decommissioning Activities

a) Rehabilitating

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

b) Employment opportunities

Several employment opportunities will be created for demolition staff.

6.7 Negative Environmental Impacts of Decommissioning Activities

a) Solid waste generation

Demolition of the projects small buildings and related infrastructure will result in large quantities of solid waste. The waste will contain the materials used in construction including concrete, metal, drywall, wood, glass, paints, adhesives, sealants and fasteners. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, sulphate and ammonia, which may be released as a result of leaching of demolition waste, are known to lead to degradation of groundwater quality.

b) Noise and vibration

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

c) Dust

Large volumes of dust will be produced during demolition works which in turn will affect the demolition staff and the adjourning residents**.**

CHAPTER 7: IMPACT MITIGATION AND MONITORING

7.1 Introduction

This chapter highlights the necessary mitigation measures that will be adopted to prevent or minimize significant negative environmental, health and safety impacts associated with the activities the project during its construction, operation and decommissioning phases. Allocation of responsibilities, time frame and estimated costs for implementation of these measures are presented in the Environmental Management Program (EMP).

7.2 Minimization of Soil Run-off

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

7.3 Minimization of Construction Waste

It is highly recommended that demolition and construction waste be recycled or reused to ensure that materials that would otherwise be disposed of as waste are diverted for productive uses. In addition, 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. Such measures will involve the sale or donation of such recyclable/reusable materials to construction companies, local community groups, institutions and individual residents or homeowners.

The proponent shall put in place measures to ensure that construction materials requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal. It is further recommended that the proponent should consider the use of recycled or refurbished construction materials. Purchasing and using once-used or recovered

construction materials will lead to financial savings and reduction of the amount of construction debris disposed of as waste.

7.4 Reduction of Dust Generation and Emission

Dust emission during construction will be minimized through strict enforcement of onsite speed controls as well as limiting unnecessary traffic within the project site. In addition, it is recommended that excavation works be carried out in wet weather; and traffic routes on site be sprinkled with water regularly to reduce amount of dust generated by the construction trucks.

7.5 Minimization of impacts on traffic flow

The proponent will put in place measures to address such concerns by ensuring that construction vehicles preferably deliver materials during off-peak hours when traffic is low. There will also be provision for caution signs on the access road to alert users on construction activities in progress in order to prevent occurrence of accidents.

This will be achieved through proper planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road. In addition, truck drivers will be sensitized to avoid unnecessary racing of vehicle engines at loading/offloading areas, and to switch off or keep vehicle engines at these points.

7.6 Minimization of Noise

Noise and vibration will be minimized in the project site and its environs through sensitization of construction truck drivers to switch off vehicle engines while offloading materials. In addition, they will be instructed to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, schools and hospitals. In addition, construction machinery shall be kept in good condition to reduce noise generation. It is recommended that all generators and heavy-duty equipment be insulated or placed in enclosures to minimize ambient noise levels.

7.7 Health and safety of Workers on site

The proponent is committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Health and Safety Act (Cap 514). In this regard, the proponent is committed to provision of appropriate personal protective equipment such as gloves; helmets, overall as well as ensuring a safe and healthy environment for construction workers by providing sanitary facilities (toilets) while portable water and food will be will be bought by workers from the nearby kiosks and hotels.

To ensure safety and health workers employed and to eliminate or minimize incidents during the operational phase of the project, a number of requirements to be adhered to by the proponent are outlined in table hereunder.

Table **1**: Requirements to be adhered to during the operational phase of the project

Requirement	**Relevant clause in the Law**
1. Ensure acquisition and annual renewal of registration certificate of the workplace by lodging an application and remitting prescribed fees to the Directorate of Occupational Safety and Health Services	Legal Notice No.14 of 2011 as read together with Section 44 of OSHA, 2007
2. Provide Personal Protective and Equipment (PPE) to construction site workers i.e. a) Helmets/hard hats for head protection b) Goggles/shields for eye protection where necessary c) Ear protection (ear muffs or ear plugs) for those workers exposed to high noise levels d) Dust masks/respirators for protection from inhalation of air contaminants where necessary and as applicable d) Body protection (overalls, reflector jackets, aprons dust coats as appropriate)	Section 101 of OSHA, 2007

e) Gloves for hand protection where necessary f) Foot protection (safety boots or safety shoes) g) Safety harnesses, when necessary, for prevention of falls from height	

Requirement	**Relevant clause in the Law**
3. Acquire and display at a prominent place within workplace an abstract of OSHA, 2007	Section 121 of OSHA, 2007
4. Acquire and maintain a General Register	Section 122 of OSHA, 2007
5. Develop an occupational safety and health policy and ensure all workers are informed of its content.	Legal Notice No.31 of 2004 as read together with Section 7 of OSHA, 2007
6. Undertake the risk assessment exercise, compile a report and submit a copy to the Directorate of Occupational Safety and Health Services.	Section 6 of OSHA, 2007
7. Form a workplace Safety and Health Committee and	Legal Notice No.31 of 2004 as read

have it trained on matters relating to Occupational Safety and Health.	together with Section 9 of OSHA, 2007
8. Provide first aid i.e. a) Appoint and train using a government recognized trainer, first aiders b) Provide and maintain, to the prescribed standard, first aid box(es)/cupboards	Legal Notice No. 160 of 1977 as read together with Section 95 of OSHA, 2007
9. Ensure safe Housekeeping by:- a) Ensuring good machine layout and arrangement b) Designating and marking walkways, gangways and driveways for workplace safe movement. c) Proper arrangement of stocks and products	Section 77 of OSHA, 2007
10. Ensure safety of workers engaged in high risk activities by development of a permit to work document to be used in such activities	Section 77 of OSHA, 2007
11. Ensure good health of workers employed by:- a) Causing prescribed periodical medical examinations to be done on workers exposed to classified hazards e.g. excessive noise levels, hazardous dusts, chemicals, radiation etc. b) Causing pre-employment medical examinations to be done on workers to be employed in areas with classified hazards c) Causing post-employment medical examinations to be done on workers formerly employed in areas with	Legal Notice No.24 of 2005 as read together with section103 of OSHA, 2007

classified hazards d) Causing prescribed medical surveillance to be done	

7.8 Reduction of Energy Consumption

The proponent shall ensure that electricity be used only when necessary at the construction site as well as sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used.

In addition, proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts.

7.9 Minimization of Water Use

The proponent shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water usage. In addition, the proponent will ensure avoidance of leaking taps and use automatic taps where necessary.

7.10 Mitigation of Operation Phase Impacts

- **Ensure Efficient Water Use**

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

- **Ensure Efficient Energy Consumption**

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

- **Ensuring Efficient Solid Waste Management**

The proponent will be responsible for efficient management of solid waste generated by the project during its operation. In this regard, the proponent will provide waste handling facilities such as waste bins for temporarily holding domestic waste generated at the site. In addition, the proponent will ensure that such is disposed of regularly and appropriately.

7.11 Mitigation of Decommissioning Phase Impacts

- **Reduction of Dust Particulate and Emission**

Dust emission during construction will be minimized through strict enforcement of onsite speed controls as well as limiting unnecessary traffic within the project site. In addition, it is recommended that excavation works be carried out in wet weather; and traffic routes on site be sprinkled with water regularly to reduce amount of dust generated by the construction trucks.

- **Minimization of Noise**

Noise and vibration will be minimized in the project site and its environs through sensitization of construction truck drivers to switch off vehicle engines while offloading materials. In addition, they will be instructed to avoid gunning of vehicle engines or hooting especially when passing through the park which can scare the animals. In addition, construction machinery shall be kept in good condition to reduce noise generation. It is recommended that all generators and heavy-duty equipment be insulated or placed in enclosures to minimize ambient noise levels.

- **Ensuring Efficient Solid Waste Management**

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

8. ENVIRONMENTAL MANAGEMENT PLAN

8.1 Introduction

The Environment Management Plan is an important process of ensuring project sustainability and environmental and social protection. Whereas efforts are usually made to develop mitigation measures for a proposed project, it is during the operation lifespan of the project that actual impacts are noted or experienced.

It is therefore important to integrate in the environmental and social impact assessment process, an environment monitoring and management plan that includes the monitoring of the progress of mitigation measures being implemented while also monitoring the project for any new negative impacts that were not earlier considered or anticipated.

The proponent shall ensure that the Contractor understands and implements all specified mitigation measures during the construction period. The proponent's Supervising Engineer is responsible for assessing the Contractor's Environmental and Social Management Plan and internally implements the Management Plan to ensure that the Environmental and Social Impacts are monitored and managed in an environmentally and socially acceptable manner.

Monitoring systems should be set up by the Proponent during the operational phase, so that potential environmental problem areas can be detected well in advance and the appropriate remedial action carried out. The Proponent shall have a checklist of items that need to be monitored as a matter of routine or periodically over agreed intervals, depending on the nature of the aspect to be monitored. The types of parameters that can be monitored may include proposed mitigation measures or design features, or actual impacts. Depending on the nature of impact or aspect to be monitored, monitoring can be done as part of routine or periodic maintenance. However, socio-economic and ecological parameters can be effectively assessed over a longer time span.

8.2 Environmental and Social Management Plan

Environmental monitoring is an integral part of the environmental management process.

It rationally completes the process that begins with establishing the environmental baseline condition followed by carrying out the Environmental and Social Impact Assessment then Implementation of Mitigation Measures and Monitoring the success of those measures.

The Environmental and Social Management Plan (ESMP) is provided in the table below.

Table 2: Environmental and Social Management Plan (ESMP)

#	Activity	Negative Impact	Mitigation Measure	Responsibility	Performance Indictors	Cost (KShs)
Design Phase						
1.	Proposed Residential apartments	Landscape visual impact	- Design of infrastructure that conforms with the project site features (topography and aesthetics)	□ The Proponent □ Design Consultant	□ Site infrastructure design blending with host environment	Approx. 500,000/=
2.	Proposed Residential apartments Sanitation Facilities	Soil and water contamination	- Design appropriate containments for oils/other construction chemicals and sanitary waste from the contractor's camp.	□ The Proponent □ Design Consultant	□ Availability of sanitary facility and paved containments in the design	Approx. 300,000/=

Construction Phase						
1	Soil Excavation at Proposed Residential apartments site	Soil Erosion	- Excavated soil is to be used for backfilling excavated areas while excess soil is disposed of off-site; - Soils are not to be left exposed to wind/water; - Soil erosion is to be reduced and river valley protection enhanced. *This is in line with:* □ *Environmental Management and Coordination Act No. 8 of 2015*	□ The Proponent □ Contractor	□ Ground cover in constructed areas □ Quality of surface water at the site	Part of Construction Obligation

			□ *Water Act, 2002* □ *OP 4.01 Environmental Assessment*			
2.	Construction of the Proposed Residential apartments site	Air Pollution (dust, fuel and smoke emissions)	- Control speed of vehicles and Prohibit idling; - Spray water during construction; - Maintenance vehicles & equipment regularly; - Provision of dust masks for use in dusty conditions;	□ The Proponent □ Contractor	□ Records of machine and vehicle maintenance	Approx. 300,000/= for air pollution
#	**Activity**	**Negative Impact**	**Mitigation Measure**	**Responsibility**	**Performance Indictors**	**Cost (KShs)**
			- Use serviceable vehicles/machinery to reduce smoke; *This is in line with:*		□ Availability and use of Noise Masks	prevention

			□ *Environmental Management and Coordination Act No. 8 of 2015* □ *Occupational Safety and Health Act (OSHA) 2007* □ *OP 4.01 Environmental Assessment;* □ *Public Health Act, Cap 242*		□ Low dust generation during constructio n	
3.	Construction of the Proposed Residential apartments site	Excess noise and vibration	- Use noise hearing protection devices when working with noisy equipmen t or noisy environmen t; - Use serviceable equipment with low noise emission;	□ The Proponent □ Contractor	□ Records of machine and vehicle maintenanc e	Approx. 250,000/= for provision of noise pollution

			- Instruct truck/machinery operators to avoid raving engines; *This is in line with:* □ *Environmental Management and Coordination Act No. 8 of 2015* □ *Noise and Excessive Vibration Pollution) (Control) Regulations, 2009* □ *Occupational Safety and Health Act (OSHA) 2007* □ *OP 4.01 Environmental Assessment*		□ Availability and use of Ear Muffs	
4.	Construction of	Generation of	- Provide communal solid waste collection	□ The Proponent	□ Clean, Organized,	Approx.

	the Proposed Residential apartments site	Solid Waste	containers (skip) for the collection and storage prior to appropriate disposal; - Local Authority/NEMA to provide waste dumping site; Engage a NEMA Registered Waste - Collection	□ Contractor □ NEMA Registered Waste Collection and Disposal Firm	Neat Site □ Presence of waste collection receptacles	250,000/= for waste containers

#	Activity	Negative Impact	Mitigation Measure	Responsibility	Performance Indictors	Cost (KShs)
			Firm; Excavation activities to be done during the - dry season to avoid soil erosion and siltation of streams;		□ Contract with NEMA Registered Disposal	50,000/= per month for waste collection and

			Site soil to be used to backfill excavated - sites; *This is in line with:* □ *Environmental Management and Coordination* *Act No. 8 of 2015,* □ *Waste Management Regulations, 2006* □ *Water Act 2002* □ *Public Health Act, Cap 242* □ *OP 4.01 Environmental Assessment*		Wast e Firm	disposal
5.	Construction of the Proposed Residential apartments site	Generatio n of Liquid Waste – used oil and other Chemical s	Construct a paved containment for storage - of oils and other liquid chemicals being used in the construction site; - Provide containers for storage of used oils from vehicles /machines/equipment being	□ The Proponent □ Contractor □ NEMA Registered Used Oil Collection and Disposal Firm	□ Presence of a paved area for storage of oils and other chemicals □ Presence of used oil	Approx. 80,000/= for paved containment & used oil

		(Hazardous Waste)	used at the construction site; - Engage a NEMA Registered Firm for the collection, transportation and appropriate disposal of used oil; *This is in line with:* □ *Environmental Management and Coordination Act No. 8 of 2015,* □ *Waste Management Regulations, 2006* □ *Water Act 2002* □ *Public Health Act, Cap 242* □ *OP 4.01 Environmental Assessment*		container s.	container s. 20,000/= per month for collection and disposal of used oil.

#	Activity	Negative	Mitigation Measure	Responsibility	Performance	Cost (KShs)

		Impact			**Indictors**	
6.	Construction of the Proposed Residential apartments site	Risk of fire	- Provide firefighting equipment at the construction site area; Contractor staff to be sensitized on - firefighting equipment use; No burning of materials is to be permitted - at the site. *This is in line with:* *Occupational Safety and Health Act (OSHA) 2007* *Public Health Act, Cap 242* *OP 4.01 Environmental Assessment*	The Proponent Contractor	Performance records Presence of Fire Extinguishers at construction site	Approx. 100,000/= for fire extinguishers

7.	Construction of the Proposed Residential apartments site	Potential Pollution of Surface and Groundwater	No disposal of domestic waste at the □ project site; Provision of used oil containers at a - central point; Use of waste bins/proper waste □ management; □ Pave parking area for trucks and direct drainage to containment; *This is in line with:* □ *Environmental Management and Coordination Act No. 8 of 2015,* □ *Water Act, 2016* □ *Public Health Act Cap 242* □ *OP 4.01 Environmental Assessment*	□ The Proponent □ Contractor	□ Water Quality Reports □ Presence of Waste Bins	Approx. 10,000/= for commun al waste containers 40,000/= per year

#	Activity	Negative Impact	Mitigation Measure	Responsibility	Performance Indictors	Cost (KShs)
			dropping objects [□ Provide first aid facilities at the site; *This is in line with:* □ *Occupational Safety and Health Act (OSHA) 2007* □ *OP 4.01 Environmental Assessment* □ *Public Health Act Cap 242*		Construction Site	
10.	Construction of the Proposed Residential apartments site	Health issues of construction worker s and Community	- Sensitize workers and community on sexually transmitted diseases especially STIs and HIV/AIDS which is spread through socialization and unprotected sex; - Sensitize workers on use of protection	□ The Proponent □ Contractor □ Ministry of Public Health	□ Pamphlets on Health Matters □ Records of disease	50,000/= for sensitization

			facilities like mosquito nets *This is in line with:* □ *Public Health Act Cap 242* □ *Occupational Safety and Health Act (OSHA)* *2007* □ *OP 4.01 Environmental Assessment*		incidence s /prevalence	
11.	Construction of the Proposed Residential apartments site	Surface run off and sedimentation from construction activities	- Construction of effective drainages and culverts; - Plant soil binding grasses and other native plants *This is in line with:* □ *Environmental Management and Coordination* *Act No. 8 of 2015* □ *Water Act, 2002* □ *OP 4.01 Environmental Assessment*	□ The Proponent □ Contractor	□ Surface runoff water impact protection facilities in the project area	Construction Obligation

#	Activity	Negative Impact	Mitigation Measure	Responsibility	Performance Indictors	Cost (KShs)
12.	Construction of the Proposed Residential apartments site	Sanitary facilities for construction workers	Installation of appropriate sanitary facilities; *This is in line with:* *Environment Management & Coordination Act (EMCA), 1999,* *Waste Management Regulations, 2006* *Public Health Act Cap 242* *OP 4.01 Environmental Assessment*	The Proponent Contractor	Presence of Toilet Facilities for Workers and Visitors to the Construction Site.	Construction Obligation
13.	Construction of the Proposed	Dangers of having Child	Contractor to be strictly advised not to engage any underage persons (under 18 years of age)	The Proponent Contractor	List of workers that does not contain	Construction Obligation

	Residential apartments site	Labour issues arising	to perform any form of work at the site during construction Contractor will be required to comply with □ the Employment Act, 2007 *This is in line with* □ *Employment Act, 2007*		underage persons	
Operational Phase						
1.	Operation of Proposed Residential apartments Facility	Maintenance of facilities Working at heights	□ Use of barrier tapes to isolate the maintenance areas; □ Provide harnesses/scaffolds for working at heights; □ Inspect and maintain fall protection equipment;	□ The Proponent □ The Proponent Site Manager	□ Use of Proper PPE and Equipment □ Handouts on safety	Approx. 350,000/=

			Use of protective devices □ to mitigate against injury; □ Provide first aid facilities at the site; *This is in line with Occupational Safety and Health Act (OSHA) 2007*			
#	**Activity**	**Negative Impact**	**Mitigation Measure**	**Responsibility**	**Performance Indictors**	**Cost (KShs)**
			□ *OP 4.01 Environmental Assessment*			
2.	Operation of Proposed Residential apartments Facility	Risk of Fire	Sensitization of Workers on Fire Safety - Risks; *This is in line with:* □ *Occupational Safety and Health Act (OSHA)* *2007*	□ The Proponent Site Manager □ Local Authority	□ Handouts on Fire Hazards and Safety	Routine Site Operation Activity

			□ *Environmental Management and Coordination Act No. 8 of 2015* □ *OP 4.01 Environmental Assessment*			
3.	Operation of Proposed Residential apartments Facility	Pollution of surface water and Waste management	- Ensure solid waste is collected and appropriately disposed of; - Ensure that used oil from trucks are not released to the ground; - Used oil is to be put into containers and appropriately disposed of by a NEMA approved agent; - Provision of used oil containers for use by truck drivers; *This is in line with:* □ *Environmental Management and Coordination*	□ The Proponent Site Manager	□ Presence of solid waste containers □ Containers for storage of used oil recovered from trucks	Approx. 250,000/= for provision of used oil containers

			Act No. 8 of 2015, □ *Water Act, 2002* □ *Public Health Act Cap 242* □ *OP 4.01 Environmental Assessment*			
4.	Operation of Proposed Residential apartments Facility	The Proponent Site Solid Waste Management during Operation	□ Provision of communal solid waste containers (skip); □ Provision of secured solid waste collection containment where waste container (skip) is to be placed; □ Regular disposal waste depending rate fill up.	□ The Proponent Site Manager	Collectio □ Waste n and Disposal Reports □ Presence of Waste Bins	Approx. 250,000/= fo r Waste Containers 30,000/= per month for
#	**Activity**	**Negative Impact**	**Mitigation Measure**	**Responsibility**	**Performance Indictors**	**Cost (KShs)**
			This is In line with:			waste disposal by

			□ *Environmental Management and Coordination* *Act No. 8 of 2015,* □ *Waste Management Regulations, 2006* □ *Water Act, 2002* □ *Public Health Act Cap 242.*			NEMA Approved Firm
5.	Operation of Proposed Residential apartments Facility	Health issues of Facility Workers and Community	- Sensitize workers and community on sexually transmitted diseases especially STIs and HIV/AIDS which is spread through socialization and unprotected sex; - Provide workers and community with condoms. - Encourage the Community to go for HIV Testing and Counselling in order to live a productive life; *This is in line with:*	□ The Proponent □ Ministry of Public Health □ Local Administration	□ Presence of a HIV Programme at the Facility □ Records of disease incidences /prevalence.	450,000/= for sensitization and provision Of condoms.

			□ *Public Health Act Cap 242* □ *Occupational Safety and Health Act (OSHA) 2007*			
6.	Operation of Proposed Residential apartments Facility	Monitoring and Evaluation of the effectiveness of project Mitigations	Implementation of monitoring of facility operations and success of proposed mitigations - Health Trends - Livelihood and socio-economic status of project area community; - Any new emerging issues, threats and benefits of the residential apartment facility	□ The Proponent Site Manager □ Local Administration	□ Quarterly Reports on Facility performance	Routine Operation of the Facility

			-			
#	**Activity**	**Negative Impact**	**Mitigation Measure**	**Responsibility**	**Performance Indictors**	**Cost (KShs)**
Decommissioning Phase						
1.	Decommissioning of Proposed Residential Houses Facility	Air Pollution (dust, smoke, fuel emissions)	- Control of demolition vehicle speeds; - Prohibition of idling of vehicles; - Water is to be sprayed on building undergoing demolition during decommissioning o reduce dust emission; - Regular maintenance of vehicles and equipment; - Provision of dust masks for use in dusty conditions. - Use of serviceable vehicles and machinery to	□ The Proponent □ Decommissioning Contractor	□ Decommissioning Records	Approx. 150,000/= for nose protection equipment (dust masks)

			avoid excessive smoke emission *These is in line with:* □ *Environmental Management and Coordination* *Act No. 8 of 2015* □ *Occupational Safety and Health Act (OSHA)* *2007*			
2.	Decommissioning of Proposed Residential Houses Facility	Noise pollution	Noise reduction/ hearing protection - devices when working with noisy equipment; - Use of serviceable equipment with low noise level; - Instruction to truck/machinery operators to avoid raving engines; - Use of noise protection (ear muff) during demolition; *This is in line with:*	□ The Proponent □ Decommissioning Contractor	□ Decommissioning Records	Approx. 330,000/= for noise pollution mitigation

			□ *Environmental Management and Coordination Act No. 8 of 2015.* □ *Occupational Safety and Health Act (OSHA) 2007.*			

#	Activity	Negative Impact	Mitigation Measure	Responsibility	Performance Indictors	Cost (KShs)
3.	Decommissioning of Proposed Residential apartments Facility	Potential Injury to Workers	□ Use of ppropriate head, hand and feet protection (PPE) during demolition of structures Adopting ergonomic work flow designs □ that fit physical tasks to employees and not vice versa	□ The Proponent □ Decommissioning Contractor	□ Availability of appropriate gear/Records □ Use of Proper PPE	Approx. 200,000/= for PPE and other safety equipment

			while maintaining a balance with productivity; *This is in line with:* □ *Occupational Safety and Health Act (OSHA) 2007*			
4.	Decommissioning of Proposed Residential apartments Facility	Working at heights	□ Use construction site barrier tape to isolate the site to guard site visitors from accidents and injuries; □ Implement a fall protection program that includes training in climbing techniques and use of fall protection measures, Provide Harnesses; Use of helmets and other protective □ devices to mitigate against injury,	□ The Proponent □ Decommissioning Contractor	□ Availability of appropriate Safety Gear/Records □ Proper use of PPE	Approx. 500,000/= for PPE and other safety equipment

			□ Provide first aid facilities at the site *This is in line with:* □ *Occupational Safety and Health Act (OSHA)* *2007*			
5	Decommissioning of Proposed Residential apartments Facility	Site area rehabilitation and restoration	□ Remove all demolished waste material; □ Repair and restore project area site □ Evaluate site contamination □ Plant trees and other appropriate vegetation *These is in line with:* □ *Environmental Management and Coordination* *Act No. 8 of 2015* □ *Occupational Safety and Health Act (OSHA)* *2007*	□ The Proponent □ Site Restoration Contractor	□ Site Pollution Report □ Well restored site	100,000/= for site Pollution assessment

CHAPTER 9 ANALYSIS OF PROJECT ALTERNATIVES

9.1 Introduction

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

9.2 Relocation Option

Relocation option to a different site might be an option available for the proposed project. However, presently the developer does not have an alternative land for the proposed project.
Locating an alternative piece of land together with the registration process is a process that can take a long time due to bureaucratic processes involved. Subsequent development of designs and approvals is a process that will delay the project further. Project design and planning before the stage of implementation will be very costly to the developer. Assuming the project will be given a positive response by the relevant authorities such as NEMA and County Government this project would have been delayed further hence a state of no project as all. Based on this scenario, relocation cannot be a good option for the project site.

9.2 Zero or No Project Alternative

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

- The economic status of the Kenyans and the local people would remain unchanged
- Stagnated industrialization process
- No employment opportunities will be created for thousands of Kenyans who will work in the hotel industry.
- Sustained and increased urban poverty and crime in Kenya

- Discouragement for investors to produce this level of modern tented commercial development to include offices, workshop, showroom and access roadand access roadss and camps
- Development of associated infrastructural facilities such as roads will not be undertaken.

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

9.3 Analysis of Alternative Construction Materials and Technology

The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Equipment that saves energy and water will be given first priority without compromising on cost or availability factors. The concrete pillars and walls will be made using locally sourced material like stones, cement, sand, steel metal bars and fittings that meet the Kenya Bureau of Standards requirements. The alternative technologies available include the conventional brick and mortar style, prefabricated concrete panels, or even temporarily structures. The scale and extent of the project is by design, the plot size and funds available. The various technologies available include, concrete frame construction, timber construction, prefabricated space frame construction, steel frame and aluminum frame. The technology to be adopted will be the most economical and one sensitive to the environment.

Timber use will be however minimized to prevent further destruction of vegetation. The exotic species would be preferred to indigenous species in the construction where need will arise.

9.4 Domestic wastewater management alternatives

Five locally available technologies are discussed below: -

9.4.1 Alternative one: Waste water treatment plant

This involves the construction of a plant that will enable the recycling of the wastewater from the project activities to reusable standards and utilized within the site in activities such as irrigating the flower gardens and flashing of the toilets. Although a water treatment is expensive to construct and maintain, it remains the most reliable, efficient and cost-effective option in the long term. Additionally, land is limited for the construction of a waste treatment plant.

9.4.2 Alternative two: Use of stabilization ponds/lagoons

This refers to the use of a series of ponds/lagoons that allow several biological processes to take place, before the water is reused. The lagoons can be used for aquaculture purposes and as well as for irrigation. Although they are less costly, they occupy a lot of space. Due to decomposition taking place in the lagoons, they remain a nuisance to the public because of foul smell from the lagoons/ponds. The scarcity of space at the site cannot allow for this option.

9.4.3 Alternative three: Use of Constructed/Artificial wetland

This is one of the powerful tools/methods used in raising the quality of life and health standards of local communities in developing countries. Constructed wetland plants act as filters for toxins. The advantages of the system are the simple technology, low capital and maintenance costs required. However, they require space and a longer time to function. Long-term studies on plant species on the site will also be required to avoid weed biological behavioural problems. Therefore, this alternative too is not the best alternative for this kind of project

9.4.4 Alternative four: Use of septic tanks

This involves the construction of underground concrete-made tanks to store the sludge with soak pits. It is less expensive to construct and regularly empty into large discharge points like the large-scale project of which the project shall be falling in.

9.4.5 Alternative Five: Connection to the existing sewer system

Connection to the available large main sewer line will solve the wastewater management issue at a very minimal cost and in an environmental efficient manner. Conclusively, the recommended course of action for this site would be connection to the existing county sewer to help in the management of all the waste water generated on site as this will adequately protect the environment from possible pollution.

9.5 Solid waste management alternatives

Huge amounts of solid wastes are expected from the operational phase of the facility due to the big size of the project. This explains why an integrated solid waste management system is recommendable. The proponent will first give priority to waste reduction at Source of the materials. This option will demand a solid waste management awareness programme by the management and the workers as well. Recycling, Reuse and Composting of the waste will be the second option. This will call for a source separation programme to be put in place.

CHAPTER 10: CONCLUSION AND RECOMMENDATIONS

The proposed residential housing development poses numerous positive impacts such as creation of employment, quality housing, improved infrastructure, and increase in revenue among others as outlined in the report. The negative environmental impacts that will result from establishment of the project include: increased pressure on infrastructure; air pollution; water pollution and generation of waste among others which however can be mitigated.

The proponent of the proposed project is committed to implementing the outlined measures in this report to mitigate against the negative environmental, safety, health and social impacts associated with the Development cycle of the proposed housing project. It is recommended that in addition to this commitment, the proponent shall focus on implementing the measures outlined in the EMP as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects. It is also recommended that the positive impacts that emanate from such activities shall be maximized as much as possible. The outlined measures will effectively ensure the best possible environmental compliance and performance standards.

It is our recommendation that the proponent be allowed to implement the project provided the mitigation measures outlined in the report are adhered to, and the developer adheres to the conditions of approval of the project.

CHAPTER 11: PROJECT COST

The total project cost is approximately 2.3 Billion.

REFERENCES

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Noise Prevention and Control Rules 2005, Legal Notice no. 24, Government Printers, Nairobi Pollution prevention and abatement handbook – Part III, (September, 2001)

The Occupational Safety and Health Act, 2007, Government Printers, Nairobi

APPENDICES

1) TOR approval letter
2) Ownership documents
3) Approved architectural drawings
4) Certificate of incorporation
5) Questionnaires
6) Copy of PIN and VAT certificate