# ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED COMPREHENSIVE RESIDENTIAL DEVELOPMENT ON PLOT L.R NO. KAJIADO/KITENGELA/6242 OFF NAMANGA ROAD IN KITENGELA, KAJIADO COUNTY.

**GPS Coordinates: -1.552412 (Latitude) and 36.930627 (Longitude).**

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***July, 2023***

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## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **AIDS** | Acquired Immune Deficiency Syndrome |
| **CBD** | Central Business District |
| **EIA** | Environmental Impact Assessment |
| **EA** | Environmental Audit |
| **EMCA** | Environmental Management and Coordination Act |
| **EMP** | Environmental Management Plan |
| **HIV** | Human Immunodeficiency Virus |
| **NEMA** | National Environment Management Authority |
| **NOx** | Nitrogen Oxides |
| **RC** | Reinforced Concrete |
| **SERC** | Standards and Enforcement Review Committee |
| **SOx** | Sulphur Oxides |
| **ToR** | Terms of Reference |
| **EHS** | Environmental Health and Safety |
| **ECDE** | Early Childhood Development Education |

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## EXECUTIVE SUMMARY

This EIA study was carried out in accordance with the Environmental Management and Coordination (Amendment) Act, 2015 and in line with the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019, which requires that all proposed development projects listed under legal notice No. 150 of 2016 should undergo an EIA study to determine the potential adverse effects of a development project and subsequently provide appropriate mitigation measures. This EIA report details the potential environmental impacts, both positive and negative, of the proposed project as well as mitigation measures to manage the identified impacts. An Environmental Management and Monitoring Plan for the proposed project has also been provided.

The proposed development will comprise of 24No. blocks of Apartments and 153No. Maisonettes. The total number of units shall be 393 units. The proposed development shall also incorporate play grounds, club house, swimming pool, private parking, public parking, Early Childhood Development Education (ECDE) school, waste water treatment plant, soakage area, storm water wayleaves, water tanks, gate house and land for future development. A detailed description of the design is provided in chapter 2 of the report.

The plot measures approximately 14.2 Ha (approximately 35.5 acres) or thereabouts. However the proposed development shall cover approximately 15 acres.

Relevant baseline data on the environmental characteristics of the project's area of influence was reviewed; this includes the physical and biological aspects of the environment, including but not limited to; climate, geology, soils, topography, drainage, fauna and flora, among others.

An in-depth analysis of public concerns from interested and affected parties was undertaken, and views were incorporated in the EMP. Views from the stakeholders who, in one way or another, would be affected or have an interest in the proposed project were sought through interviews, meetings and structured questionnaires as stipulated in the Environment Management and Coordination (Amendment) Act, 2015. Some of the significant issues raised by the stakeholders include; proper management of traffic, minimize dust and ensuring proper management of waste among others.

The potential positive and negative environmental impacts were identified based on the different phases of the project development. Appropriate mitigation measures were provided as well as an Environmental Management and Monitoring Plan. The impacts were characterized in terms of positive or negative impacts, direct or indirect. The magnitude of each impact was also described in terms of being significant, minor or negligible, temporary or permanent, long-term or short-term, specific (localized) or widespread, reversible or irreversible. The table below summarizes the proposed project's potential environmental and social impacts and the corresponding mitigation measures for the identified impacts.

## Table 1: Summary of Anticipated Impacts and their Mitigation Measures

| POTENTIAL IMPACT | MITIGATION MEASURES |
|---|---|
| **Air Pollution** | • Exposed stockpiles of, e.g., sand, will be enclosed, covered, and watered daily to minimize dust.<br>• Use of dust screens to minimize air pollution to adjacent users.<br>• All personnel working on the project will be trained prior to starting construction on methods of minimizing air pollution.<br>• Workers shall be provided with proper PPE, such as dust masks<br>• All machinery and equipment shall be maintained in good working condition in order to minimize emissions to acceptable standards.<br>• Construction trucks delivering materials to the site shall be covered in order to minimize emissions to the surrounding areas.<br>• No burning of materials shall be permitted at the project site.<br>• Frequent watering of the access road to minimize dust. |
| **Noise Pollution** | • Restrict noisy construction activities to the NCA/NEMA recommended working hours.<br>• Use quiet equipment (i.e., equipment designed with noise control elements).<br>• Sensitize construction drivers to avoid hooting, especially when passing through sensitive areas such as churches, offices, hospitals, residential houses, and schools.<br>• Conduct periodic noise measuring and monitoring to determine levels and to persons operating within or visiting identified high noise areas. |
| **Health and Safety** | • Employ skilled and trained workers, and provide protective clothing<br>• Have adequate worker insurance cover<br>• Provide sanitation facilities and clean drinking water on site<br>• Enforce occupational health and safety standards.<br>• Mandatory construction of adequate hoarding around the project area prior to commencement of any construction activity.<br>• There shall be adequate warning and directional signs.<br>• Provide first Aid kits within the construction site.<br>• Fence off the storm water soakage facility and install warning signs during operation phase.<br>• Limit access into the soakage area by authorized personnel only. |
| **Generation of Solid Waste** | • There will be adequate collection and storage of waste on-site, safe transportation to, and disposal methods at designated areas by a licensed contractor.<br>• The contractor shall prpare a site waste management plan prior to the commencement of construction activities.<br>• All persons involved in refuse collection shall be in appropriate protective gear.<br>• Use of an integrated solid waste management system, i.e., through a hierarchy of options .i.e 1) Reduction 2) Recycling 3) Re-use 4) Land filling.<br>• Ensure no littering of the open spaces.<br>• Waste to be collected regularly to control air pollution and vermin/insects etc.<br>• Encourage waste separation at the generation points<br>• Provide a garbage chute protected from rain and animals |

| | |
|---|---|
| **Generation of Liquid Waste** | • Ensure Regular checks of the waste water treatment reticulation system to ensure it's in proper working condition.<br>• Provide a site toilet during construction.<br>• Conduct regular inspection of the waste water pipes and repair blockages or damages appropriately<br>• Ensure regular monitoring of the waste water reticulation system to ensure that the stipulated effluent discharge rules and standards are not violated.<br>• All waste pipes should be accessible from outside and free at every part of the system for inspection, cleaning and repair. |
| **Traffic Congestion** | • Provide adequate on-site parking dedicated for construction site personnel and heavy vehicles.<br>• All deliveries and collections to and from the site shall be staggered and restricted to off-peak traffic hours to prevent obstruction of other road users.<br>• Traffic speeds for construction and other vehicles coming to and fro the project site shall be restricted to 20 mph to ensure pedestrian safety.<br>• Signage to identify the construction site shall be erected at the site's entry point.<br>• Repair any roads damaged during the construction phase.<br>• Provision of designated entry and exit points.<br>• Carry out a Traffic Impact Assessment |
| **Flora and Fauna disturbance** | • Ensure the use of excavated soil for landscaping to ensure that invasive species of flora or fauna are not introduced at the site.<br>• Spare the vegetation that must not necessarily be removed.<br>• Minimize the amount of destruction caused by machinery by promoting non-mechanized construction methods.<br>• Implement a comprehensive landscaping program after construction |
| **Pressure on Existing Infrastructure Facilities and Services (Roads, power supply and water supply)** | • Management and monitoring of water usage<br>• Explore renewable sources of energy such as solar energy<br>• Repair all leaking taps and valves<br>• Maximize on natural lighting to reduce the use of artificial lighting.<br>• Install energy-saving bulbs at all lighting points.<br>• Provide an automatic generator to cushion against power outages<br>• Explore alternative sources of water such as harvesting storm water and recycling.<br>• The proposed borehole shall be constructed according to the approved specifications and standards.<br>• Regular maintenance of the access road |
| **Increased Surface run off** | • Use of permeable construction materials, e.g., cabro paving where possible, to allow for infiltration and minimize surface runoff.<br>• Planting of trees and grass on site after completion of construction activities to reduce the speed of runoff and increase water retention capacity of the soil.<br>• Regular maintenance of the storm water drains to ensure they are in good working condition. |
| **Fire risk** | • Adhere to the provisions of the building code regarding fire safety<br>• Ensure all fire-fighting equipment is in proper working condition and conduct regular audits. |

| | |
|---|---|
| | • Ensure all fire exits have clear and visible signage<br>• Display Emergency Response Procedures at visible areas within the development.<br>• Conduct regular fire drills |
| **Oil Leaks and Spills** | • Ensure no spillage occurs by servicing machinery and construction vehicles regularly.<br>• Prepare and display spill response procedures at the site.<br>• Training of workers on spill response procedures and management.<br>• In case of spillage the Contractor shall isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent material and/or other materials approved by the Project Manager.<br>• Fats and oil interceptors must be installed along the drainage channels leading from the kitchen and car parks. |

Measures to prevent or minimize the negative environmental impacts and to maximize the positive ones have been provided through an Environmental Management and Monitoring Plan. The measures mainly focus on the following;

- Use of alternative materials, products, or technologies that are more environmentally sustainable
- Ensuring compliance with relevant safety, health, and environmental regulations
- Reduction of exhaust emissions through proper planning of vehicle movements and use of lead-free fuel
- Provision of adequate parking space for vehicles both during construction and operation phases
- Energy and water conservation
- Reduction of impacts of waste through minimization of waste generation, recycling, reuse, and responsible disposal.

The EIA concludes that the project is environmentally sound with minimal potential negative impacts, which can be minimized through appropriate mitigation measures. These have been integrated into the project decision-making level to ensure that the project design considers all the highlighted aspects of this study.

In view of the foregoing, it is recommended that the EIA License be granted to the proponent for implementation. The project proponent shall adhere to the recommendations provided in the Environmental Management and Monitoring Plan. The Contractor shall obtain all the necessary permits and licenses from the relevant authorities and hire qualified and adequate personnel as proposed.

# CHAPTER 1: INTRODUCTION

## 1.1 Project Background

The rate of urbanization and population growth worldwide is currently increasing fast, and with it comes the need for improvement in service provision, especially in urban areas. Increased population due to rural-urban migration in search of job opportunities and or higher education in major towns of Kenya has increased demand for housing and supporting facilities and services.

The National Development Plan and the Kenya Vision 2030 strategy have targeted the provision of 200,000 housing units annually for all income levels. However, the production of housing units is currently at less than 50,000 units annually, well below the target number, culminating in a housing deficit of over 2 million units, with nearly 61% of urban households living in slums. This deficit continues to rise due to fundamental constraints on both the demand and supply sides. It is exacerbated by an urbanization rate of 4.4%, equivalent to 0.5 million new city dwellers every year.

The proposed residential development on Plot L.R No. Kajiado/Kitengela/6242 is propagated by the Kenyatta National Hospital Staff retirement benefits scheme (2011).

Environmental concerns need to be an integral part of the planning and development process and not just an afterthought. To avoid land use conflict with the surrounding area and unmitigated adverse effects to the surrounding users, the environmental experts undertook this EIA study and incorporated environmental concerns that are likely to be generated by the proposed project. The objective of the EIA study is to identify potential and significant environmental impacts that are likely to occur if the project is implemented. Specifically, the scope of the study is to identify impacts likely to affect the surrounding environment, public health, and socio-economic well-being. The benefits of conducting an EIA include:

- Screening out environmentally-unsound projects
- Proposes modified designs to reduce negative environmental impacts
- Identifies project alternatives such as alternative technology and project location etc
- Predicts significant adverse impacts
- Identifies mitigation measures to reduce, offset, or eliminate major impacts
- Engages and informs potentially affected communities and individuals
- Influences decision-making and the development of terms and conditions

The proponent proposes to develop a comprehensive residential development on the aforementioned property. The proposed development shall comprise of 24No. blocks of residential apartments, 153No. maisonettes, play grounds, club house, swimming pool, private parking, public parking, day care, waste water treatment plant, soakage area, storm water wayleaves, water tanks, gate house and land for future development.

## 1.2 Objectives of the EIA

The primary objective of this study is to prepare an EIA and EMP for the proposed project. The EMP will provide detailed guidance on the implementation of mitigation measures which will be recommended for the identified environmental impacts.

The specific objectives of the EIA Study are;

(i) To identify and evaluate the environmental impacts which the proposed development may cause.
(ii) To examine the environmental impacts of site-specific or alternative development proposals.
(iii) To identify and describe procedures and measures that will mitigate the predicted adverse impacts of the development proposals and measures that would enhance the beneficial impacts of the proposed activities.
(iv) To liaise with key interested and affected parties and relevant government departments (stakeholders consultation) on issues relating to the proposed development to ensure compliance to existing policies, guidelines, regulations (by-laws) and accommodate public views.
(v) Verify compliance with the national environmental regulations and industry standards as well as safeguard policies and environmental assessment procedures.
(vi) To generate baseline data to monitor and evaluate how well the proposed mitigation measures are being implemented during the project cycle.
(vii) To provide for consultation of all stakeholders, including communities to be affected by the project and other stakeholders to obtain their input during the Environmental Impact Assessment (EIA) process.
(viii) Screening of potential issues, concerns, and impacts relative to siting, construction, and operation of various design components to distinguish those likely to be significant for particular subcomponent warrants further study.
(ix) To prepare an EIA project report and accompanying Environmental Management Plan EMP in accordance with the Environmental Management and Coordination Act (Cap 387) and the Environmental (Impact Assessment & Audit) regulations, 2003 detailing findings and recommendations.

## 1.3 Scope

The Consultant shall be guided by the project's ToR and the relevant legal and policy framework of the Government of Kenya as outlined in the NEMA guidelines (2012) and EIA/EA Regulations. The Kenya Government policy on all new projects, programs, or activities specified in the second schedule of the EMCA (Amendment) Act (Cap 387), requires that an Environmental Impact Assessment is carried out at the planning stages of the proposed undertaking to ensure that significant environmental impacts are taken into consideration during the design, construction, operation and decommissioning phases of the project.

The scope of this Environmental Impact Assessment study was informed by the Environmental Impact Assessment and Audit regulations, 2003 and in particular part IV 18[1] a-q. The EIA framework study will therefore cover the following:

-The proposed location of the project
-A concise description of the national environmental legislative and regulatory framework.
- Baseline information
-Any other relevant information related to the project.
-The objectives of the 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 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.
-Alternative technologies and processes available and reasons for preferring the chosen technology and processes.
-Analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies.
-An environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, time frame and responsibility to implement the measures.
-Provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities or major industrial and other development projects.
-The measures to prevent health hazards and to ensure security in the working environment for the employees and for the management 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.
-An indication of whether the environment of any other state is likely to be affected and the available alternatives and mitigating measures.
-Such other matters as the authority may require.

All these aspects will be considered accordingly. This study report also seeks to ensure that all the potential environmental impacts are identified and that workable mitigation measures are suggested for adoption by the Contractors/Project Managers.

### 1.4 Terms of Reference (TOR)

The scope of the assessment covered the project site, the area in close proximity to the proposed site, and the utilities under the project. The output of the study is a comprehensive Environmental Impact and Social Assessment Study Report for the purposes of applying for an EIA license.

The main objective of the assignment was to ensure that the proposed development takes into consideration appropriate measures to mitigate any adverse impacts to the environment. The study identified potential environmental impacts and possible concerns that interested and/or affected parties have with the development, as well as the associated prevention and mitigation measures for the negative impacts as stipulated in the Environmental Management Plan (EMP).

The Terms of Reference for the preparation of this EIA Report include but are not limited to;

- The study of the location of the proposed development and availability of support infrastructure
- A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the 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 project's environmental effects include the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term, and long-term effects anticipated.
- The 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.
- An action plan for the prevention and management of the foreseeable accidents and hazardous activities in the course of carrying out development activities.
- Measures to prevent health hazards and to ensure security in the working environment for the employees and the management in case of emergencies.
- An identification of gaps in knowledge and uncertainties which were encountered in compiling the information.

## 1.5 Methodology

The scope of this assessment was guided by the requirements of the Environmental Management and Coordination Act (Cap 387) and, in particular, the Environmental Impact Assessment and Audit Regulations of 2003. A wide range of methods was used in the various stages of the assessment. They included methods used by the various specialists for Stakeholder analysis; Scoping of key issues; Consultation and public participation, carrying out the various baseline studies, the definition of the project's sphere of influence, and impact analysis. An intensive survey provided an overview of the general implications of the proposed project. This involved the following steps:

### 1.5.1 Screening and Scoping

Screening was undertaken to determine whether an EIA study would be required for the proposed development. At this stage, the significance of the project's environmental impacts was determined as well as the depth of study required.

The scoping activity was undertaken to determine the range of issues to be addressed in the EIA study. Significant impacts related to the project were identified, grouped and analyzed to facilitate a more in-depth and focused study. Indirect and secondary effects were also identified and incorporated in the EIA study while the irrelevant impacts were identified and excluded from the study. The scoping activity helped the Consultant to understand the proposed project within its environmental and social contexts and to determine the geographical boundary that is likely to be affected by the proposed project activities.

### 1.5.2 Desktop Study

Available project documents were reviewed including Architectural drawings, site layout plans etc. which provided a detailed description of the proposed project.

Project activities were also described based on the different phases of the project life cycle i.e. Construction, Operation and Decommissioning. Relevant baseline data on the environmental characteristics of the project's area of influence was also reviewed, this include the physical and biological aspects of the environment including but not limited to; climate, geology, soils, topography, drainage among others. The biological aspects include the flora and fauna, endangered species, sensitive ecosystems etc. The study also incorporated the socio-economic and socio-cultural environment. This include; population, land use, cultural practices, employment, sources of livelihood, gender issues, security, physical developments, public health, cultural attitudes, water and sanitation and existing physical infrastructure. Baseline data was collected through review of existing secondary data, direct observation and discussions with relevant key informants.

### 1.5.3 Legislative and Institutional Framework

The relevant laws, regulations and standards governing environmental quality, pollutant discharges to surface waters and land and to public sewers, building codes of practice, siting, land use control, noise regulations, Health and safety, solid and liquid waste management, etc. were reviewed. Further, the Consultant described how the developer will comply with the stated laws and regulations as well as institutional policies.

### 1.5.4 Public and Stakeholder Consultation

The Consultation and Public Participation Process is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by EMCA (Amendment) Act (Cap 387) section 58 on EIA for the purpose of achieving the fundamental principles of sustainable development. The objectives of the Consultation and Public participation

exercise include; disseminating and informing the stakeholders about the project with special reference to its key components and location, Create awareness among the public on the need for the EIA for the proposed project and to incorporate the information and views collected in the EIA study.

The methodology that was applied during public participation include; identification of relevant stakeholders, key informant interviews and administration of structured questionnaires.

The Consultant identified and consulted all the relevant stakeholders that were likely to be affected by the project.

### 1.5.5 Analysis of the Alternatives to the Proposed Project

The Consultant analyzed alternatives to the proposed project. The EMCA (Amendment) Act (Cap 387) and Environmental Impact Assessment Guidelines (2012) and administrative procedures call for analysis of project alternatives in order to ensure prudent decision making and to enhance sustainability of the project and the environment. Project alternatives were evaluated with respect to site, technology, scale, potential impacts, capital and operating costs and suitability under local conditions. The alternatives also included a "no project" alternative, in order to demonstrate environmental conditions without implementation of the project.

### 1.5.6 Identification of the Potential Impacts of the Proposed Project

The potential positive and negative environmental and social impacts of the proposed project were identified based on the various phases of the project. These included the construction phase, operation phase and decommissioning phase.

The Consultant analyzed impacts on but not limited to the following baseline conditions; topography, geology, soil, groundwater resources, hydrology, fauna and flora, physical infrastructure and socio-economic environment etc. The magnitude of each impact was described in terms of being significant, minor or negligible, temporary or permanent, long-term or short-term, specific (localized) or widespread, reversible or irreversible.

### 1.5.7 Determination of Impact Mitigation Measures

Cost-effective measures for minimizing or eliminating adverse impacts of the proposed project were provided. Measures for enhancing positive or beneficial impacts were also recommended. The cost of implementing these measures was estimated and presented as well as the responsible persons for their implementation. The proposed mitigation measures were based on the different phases of the project cycle i.e. construction phase, operation phase and decommissioning phase.

### 1.5.8 Development of an Environmental Management Plan (EMP).

The EMP focused on implementation of mitigation measures and monitoring requirements. The Consultant prepared an Environmental Management Plan which incorporated proposed impacts and mitigation measures, cost estimates, time frame and responsible parties for implementing the proposed mitigation measures.

### 1.5.9 Reporting

The EIA report was prepared and compiled as per the guidelines provided in Section 18 of the Environmental (Impact Assessment and Audit) Regulations, 2003 as well as the NEMA guidelines, 2012.

## CHAPTER 2: PROJECT DESCRIPTION

### 2.1 Overview

The proposed development is a comprehensive residential development comprising of 24No. Apartment Blocks and 153No. Maisonettes. The design elements are described below;

### Apartments

The proposed apartments shall consist of 18No. 3Bedroomed apartment blocks of 10 units per block giving a total of 180 units and 6No. 2 Bedroomed apartment blocks of 10 units per block giving a total of 60 units. The space elements are described below;

- The three bedroomed apartment blocks shall occupy the ground floor and four upper floors. Each of the units shall consist of; a lounge, dining area, kitchen, pantry, laundry area, washrooms, stair lobby, balcony and 3No Bedrooms (2 ensuite).
- The two bedroomed apartment blocks shall occupy the ground floor and four upper floors. Each unit shall consist of; a lounge, dining area, kitchen, laundry, pantry, balcony and 2No. bedrooms (master ensuite).

### Maisonettes

The proposed maisonettes shall be of two design typologies. Type 1 shall consist of 72 units and Type-2 shall consist of 81 units. The space elements are as described below;

- Type-1 shall occupy the ground floor and first floor. The ground floor shall consist of; 2 No. parking spaces, lounge, entry lobby, dining area, garden, kitchen, larder, guest bedroom, washrooms, store and a DSQ.

  -The First Floor shall consist of 3No. Bedrooms (all ensuite), balcony, stair lobby and an accessible flat roof.

- Type-2 shall occupy the ground floor and first floor. The ground floor shall consist of; 2No. parking spaces,garden,lounge,dining area ,entry porch, corridor, kitchen, washrooms, guest bedroom, washrooms and DSQ

  -The First Floor shall consist of a balcony, accessible flat roof and 3No. bedrooms (all ensuite)

### Club House

The proposed development shall also incorporate a club house which shall occupy the ground floor and first floor as below;

- The ground floor shall consist of; a multi-purpose hall, outdoor longe, BBQ area, meeting room/lounge, snack shop, washrooms, store, pool attendant's office and an entrance lobby.
- The first floor shall consist of a gym, terrace, yoga room, store, stair lobby, washrooms, salon/barber shop.

The total number of units shall be 393 units. The proposed development shall also incorporate play grounds, swimming pool, private parking, public parking, kindergarten, waste water treatment plant, soakage area, storm water wayleaves, water tanks, gate house and land for future development. The master plan and detailed architectural drawings are attached. ***Appendix 5***

The project site occupies 6.0 Ha or thereabouts of land (Approximately 15 acres). However, the entire plot measures 35.5 acres as shown in the attached ownership document. ***Appendix 1***

Implementation of the proposed project shall be done in phases. Phase one shall include construction of 3No. apartment blocks, 59No. maisonettes, club house, waste water treatment plant, parking spaces, playgrounds and soakage area as highlighted in figure 2.1 below. The other phases shall be determined after implementation of the first phase.

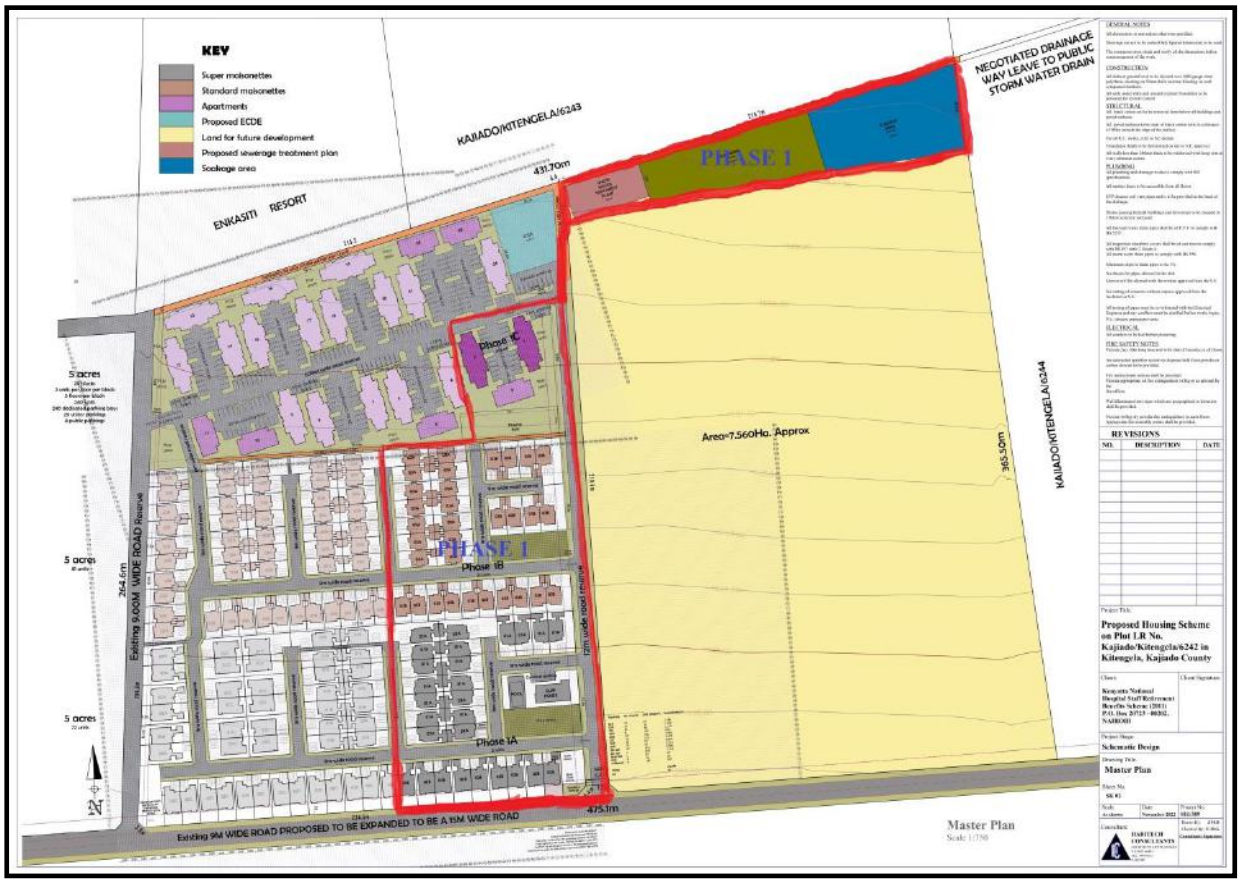


***Figure 2.1: Phase 1 of the Proposed Development***

## 2.2 Project Location

The property is located off Namanga Road in Kitengela area within Kajiado County. It is located 600m from Namanga Road and next to Enkasiti Plains Resort. The specific location is -1.552412 (Latitude) and 36.930627 (Longitude). A comprehensive location map is attached. ***Appendix 2***

## 2.3 Project Proponent/Developer

Kenyatta National Hospital Staff Retirement Benefits Scheme (2011) of P.O Box 20723-00200, NAIROBI is the owner and developer of the above project situated off Namanga Road in Kitengela area, within Kajiado County.

## 2.4 Land Tenure and Ownership

The aforementioned property is registered under The Land Registration Act (No.3 of 2012) and is held under freehold tenure. Attached is a copy of the ownership document– ***Appendix 1***. The total area of the land is approximately 14.2Ha Hectares or thereabouts of land (Approximately 35.5 Acres).

## 2.5 Site Conditions

The proposed site is currently vacant. There are temporary structures on site including a latrine, temporary house and a container as shown on plate 3.1. The site is covered with black cotton soil and the topography of the site is gently sloping towards Enkasiti Resort. Access to the site is from the existing 9m road abutting the property.

## 2.6 Infrastructure Strategy

### 2.6.1 Water supply

The project area is not served by trunk water supply. The proposed development will be supplied with water from the proposed borehole within the site. The necessary approvals for drilling the borehole have already been obtained from WRMA and NEMA. ***Appendix 4.*** Adequate water storage tanks shall also be provided to cushion against water shortage.

### 2.6.2 Waste Water Management

Foul water from the development shall be discharged into the proposed waste water treatment plant within the site. The treated waste shall then be discharged into the proposed soakage area within the site for re-use within the development. The proposed design of the waste water treatment plant is attached. ***Appendix 9***

### 2.6.3 Storm Water Drainage

Storm water from the development will be channeled into the proposed storm water drainage wayleaves.

The waste water shall then be discharged into the proposed soakage area within the site for re-use/recycling. The excess storm water shall then be pumped and channeled to the 9m access road through micro-tunneling. Culverts will then be done to channel it to public drains located along Namanga Road.

### 2.6.4 Power Supply

Upon completion, the development will be connected to the existing Kenya Power and Lighting Company (KPLC) main supply line. The necessary guidelines and precautionary measures relating to the use of electricity shall be adhered to. Additionally, the proposed development will have a generator for power back up and solar energy shall also be harnessed to supplement KPLC power supply.

### 2.6.5 Solid Waste Management

The development shall incorporate a garbage chute for temporary storage of waste before collection and disposal at approved waste disposal sites. An integrated solid waste management system will also be applied in all phases of the project. This will follow the Waste Management Hierarchy which reflects the relative sustainability of each. One of the key principles underlying waste management is to ensure that waste is dealt with as high up the Waste Management Hierarchy as possible. Since all waste disposal options have some impact on the environment, the only way to avoid impact is not to produce waste in the first place, and waste reduction is therefore at the top of the hierarchy.

The proponent will encourage reduction at source by implementing a waste management awareness program for the management and the residents. This will be followed by re-use, and recovery techniques such as recycling while disposal to landfilling or incineration will be the last option.

### 2.6.6 Roads and Access

The proposed site shall be accessed through the 9M access road fronting the property. The road has been earmarked for expansion to 15M and the proponent has already surrendered 3M for road widening.

### 2.6.7 ICT and Telecommunication

The project area is served by all the available telecommunication network service providers such as Safaricom, Airtel, Telkom among others.

Security alarms and quick response systems shall also be installed within the development during the operation phase in order to enhance the security of the site.

## 2.7 Project Budget

The total project cost is estimated at **KES. 1,357,976,150.00 (One Billion, Three Hundred and Fifty Seven Million, Nine Hundred and Seventy Six Thousand, One Hundred and Fifty Only).** The 0.1% fee payable to NEMA can therefore be estimated at **KES 1,357,976 (One Million, Three Hundred and Fifty Seven Thousand, Nine Hundred and Seventy Six Only).**

The main capital investment costs relate to Site preparation, Excavation, Construction of the foundation, Construction of the superstructure, External works and Finishes.

It is estimated that 30% of the total project cost shall be allocated for labor related expenses. Professional consultants such as Architects, Structural Engineers, Environmental Experts, Project Managers and Contractors shall also be engaged in the project. The total professional and labor cost is estimated at **KES. 407,392,845.00** ***(Four Hundred and Seven Million, Three Hundred and Ninety Two Thousand, Eight Hundred and Forty Five Only).***

The cost of construction materials is estimated to take 60% of the total development cost. This can therefore be estimated at **KES 814,785,690.00** ***(Eight Hundred and Fourteen Million, Seven Hundred and Eighty Five Thousand, Six Hundred and Ninety Only).*** Phase one of the project is estimated to take 24 months.

## 2.8 Description of Project Construction Activities

The proponent proposes to develop a comprehensive residential development on the aforementioned property. The proposed development shall comprise of 24No. blocks of residential apartments, 153No. maisonettes, play grounds, club house, swimming pool, private parking, public parking, ECDE School, waste water treatment plant, soakage area, storm water wayleaves, water tanks, gate house and land for future development.

A structural engineer will inspect the proposed structures to ensure they are structurally sound. Architectural drawings have also been prepared to show the actual designs and layout of the proposed project.

The main works will include: hoarding, clearing the site, excavation, building works, plumbing works, interior finishes, electrical and mechanical works among others. The Architectural drawings for the proposed development have been attached -***Appendix 5***

The project activities are described below;

### 2.8.1 Pre-Construction Activities

Implementation of the project started with preliminary surveys and feasibility study to establish the viability of the proposed project. Investigations also identified all the existing legal and regulatory requirements that may affect the project at any stage of implementation.

### 2.8.2 Hoarding

A temporary hoarding will be put up before commencement of construction activities. This will help to protect motorists, pedestrians and passers-by from falling debris and injury. Hoarding is also a security measure to prevent theft of construction materials at the site.

### 2.8.3 Clearing of the Site and Excavation

Site clearance entails removal of any obstruction on the way of the intended construction activities. The clearing process will not involve the use of heavy machinery or explosives.

### 2.8.4 Laying out the Site

The site will then be laid out to identify the location of the proposed building on site. The corner points and edges of the proposed building units will be established accordingly. The marking out will use sticks and strings as well as chalk lines.

### 2.8.5 Building Works

#### i) Building Materials

Materials to be used during construction will include; building quarry stones, aggregate, sand, cement, steel, timber, power cables, electric conduits, water pipes, drain pipes, culverts, electric fittings and accessories. The proposed construction works will be labor intensive utilizing different cadre of skills and casual labor in the construction industry. Most of the casual laborers will be sourced from the local community.

Construction materials will be transported to the project site from their extraction, manufacture, or storage sites using tippers. The materials to be used in construction of the project will be sourced from neighboring or surrounding areas. Greater emphasis will be laid on procurement of construction materials from within the local area. This will make both economic and environmental sense as it will reduce negative impacts that may arise from transportation of the materials to the project site.

Sourcing materials from local suppliers will also save on cost of building materials due to reduced distance of travel by the suppliers and also promote the local economy.

#### ii) Construction of the Foundation

The foundation is that part of the building structure that is beneath the ground floor. The foundation includes the footing and foundation wall of a building. The depth of the foundation is to be determined on site by the structural engineer. The foundation will be to structural engineer's detail. RC foundation walls are to be water proofed with approved water proofing agent to structural engineer's detail.

All RC foundations will be to the structural engineers' detail. The area enclosed by the foundation walls is to be backfilled with compacted hardcore. The foundation shall not encroach on any neighboring plots or road reserves. Approved Damp Proofing Membranes (DPM's) and anti-termite treatments shall be provided.

### iii) Construction of the Super Structure

The Ground floor slab level shall be determined on site by the Architect. The Contractor shall carry out the works in accordance with the approved program of works and in accordance with the Building Code and any other building regulations.

The walls are to be reinforced with hoop iron at every alternate course. The project Engineer shall ensure the structural integrity of the building through regular inspection of the construction works. All materials for doors and windows shall be determined by the Architect.

### iv) Driveway and Parking Spaces

A paved driveway and walkway shall be constructed to ensure adequate circulation within the development for both pedestrians and vehicles. Adequate parking will be provided within the development in accordance to Kajiado County Government parking requirements.

### v) Site Landscaping

To improve the aesthetic value or visual quality of the site once construction is completed, the contractor will carry out comprehensive landscaping of the site as per the attached master plan.

## 2.9 Cleaning the Site

The site will be given a general cleaning after completion of construction activities and any leftover material and debris will be carted away. Similarly, any tools and equipment still on site will be removed. All debris and any other solid waste shall be collected by a licensed waste transporter and disposed of at approved Kajiado County dumpsites.

## 2.10 Final Inspection

Final inspection will be undertaken to ensure that the project has been done properly and according to the terms of the contract. The inspection team will include the project proponent/client, the Architect, Engineer, Environmental Expert and the contractor or their representatives. The inspection will start at the beginning of the construction to the end and look at every detail of construction, functioning of mechanical and electrical installations etc.

## 2.11 Decommissioning

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

- Remove all underground facilities from the site
- The site should be well landscaped by flattening the mounds of soil
- All the equipment should be removed from the site
- Fence and signpost unsafe areas until natural stabilization occurs
- Backfill surface openings if practical

## 2.12 Materials, Products and By-Products

During Construction, Operation and Decommissioning phases of the project, different types of wastes are likely to be generated. This section will look into the materials to be used, products and by-products including waste to be generated by the project and the methods of disposal. Waste will be managed and disposed of in accordance to Legal Notice 120 of 2006, Waste Regulations. In deciding the most appropriate disposal route, both environmental and economic costs and benefits need to be considered. This decision should be reached taking into account all the costs and impacts associated with waste disposal, including those associated with the movement of waste.

*Table 2-1 Materials, Wastes Generated and Disposal Methods*

| Activity | Materials to be Used | Waste/By-Products Generated | Disposal Method |
|---|---|---|---|
| **Construction Phase** | | | |
| Site Clearance and excavation | - Fuel<br>-Spare parts and lubricants/oil<br>-machinery such as excavators and trucks | -Air fumes from vehicle exhausts<br>- Used oil<br>- Dust<br>- Excavated soil | -Used oil to be reused for lubricating movable parts of equipment e.g. wheelbarrows.<br>-Excavated soil to be re-used on site for landscaping in order to restore part of the biodiversity. |
| Building Works | - Machine cut stones<br>- Steel<br>- Cement<br>- Paving slabs<br>- Timber<br>- Nails, Galvanized iron sheets<br>- Gravel, sand<br>- Tiles<br>- Glass etc. | - Plastic pipes<br>- Scrap metal<br>- Used timber<br>- Broken tiles<br>-Sand, cement and building stones<br>-Packaging materials<br>-Glass, paint. | - Excavated soil to be reused for landscaping and filling.<br>-A licensed waste transporter to be engaged for waste transportation and disposal at approved dumpsites.<br>-Recyclable waste to be sold to recycling companies/dealers. |
| Electrical, Mechanical & Plumbing Works | -Cables<br>-Plastic Pipes<br>-Sockets/switches<br>-Metal | -E-waste (cables, sockets, rubber)<br>-Plumbing waste (Plastic Pipes, steel)<br>-Metal waste | - Licensed waste transporters to dispose appropriately off-site at approved dumping sites<br>- Recyclable waste to be sold to recycling companies/dealers |
| **Operation Phase** | | | |
| Project operations | - Foodstuff<br>-Cans/bottles<br>- Paper<br>-Batteries<br>-Sockets<br>-Cables | - Organic waste<br>- Plastic containers<br>- Waste Water<br>-Paper waste<br>-e-waste (damaged sockets, cables etc) | -Non-recyclable waste to be segregated and disposed of by a private contractor at approved dump sites.<br>-Waste water to be discharged into the proposed waste water treatment plant within the site.<br>- E-waste to be sold to recycling companies |

| **Decommissioning Phase** | | | |
|---|---|---|---|
| Demolition works | - Building Stones<br>- Steel<br>- Timber<br>- Nails, Galvanized iron sheets<br>- Gravel<br>- Tiles<br>- Glass etc. | - Building debris<br>- Used timber<br>- Broken tiles | -Waste will be sorted and disposed of in accordance to Legal Notice 120 of 2006, Waste Regulations.<br>-All debris will be disposed of at approved Kajiado County dumpsites by licensed contractors. |

## CHAPTER 3: BASELINE INFORMATION

### 3-1 Project Location

The property is located off Namanga Road in Kitengela area within Kajiado County. It is located 600m from Namanga Road and next to Enkasiti Plains Resort. The specific location of the site is -1.552412 (Latitude) and 36.930627 (Longitude). A comprehensive location map is attached. ***Appendix 2***

### 3-2 Physical Environment

This is comprised of the physical aspects of the environment including but not limited to the following; climate, geology, drainage, temperature, wind patterns among others.

### 3.2.1 Climatic Conditions

The climate of the area is warm and temperate according to the Köppen-Geiger climate classification. The temperature here averages 16.7 °C. In a year, the average rainfall is 865 mm. Most rainfall (rainy season) is seen in April, May, November and December. Kitengela has dry periods and the coolest month is August while April is the wettest month.

The driest month is August, with 6 mm of rain. In April, the precipitation reaches its peak, with an average of 138 mm.

The monthly mean minimum and maximum daily temperatures indicate that March is the warmest month of the year. The temperature in March averages 20.9 °C. At 16.9 °C on average, July is the coldest month of the year.

### 3.2.2 Topography & Geology

The geological history of the area has been dominated by volcanic activities and mainly comprises of thick succession of lavas (volcanics) and sediments of Kainozoic age. These lie directly on the rough dissected and folded erosional surface of the basement system. The basement system rocks (Schists and gneisses) form the foundation of the folded Precambrian crystalline rocks of the Mozambiquan Belt. Apart from this, the rocks are considered to be younger than Miocene. The geology of the area is comprised of Tertiary Volcanics underlain by Basement Complex of Precambrian rocks. The oldest of these rocks is the Kapiti Phonolite, which covers a vast area to the east and northeast of Kajiado.

There are no central volcanoes from which the phonolite could have been extruded so it is assumed that this is the result of eruption from fissures or small vents. The Kapiti Phonolite rests on the sub- Miocene surface, and may date from the Miocene by analogy with other parts of East Africa, where similar flows overlie sediments containing Miocene fossils. Kapiti Phonolite collected at the bridge over the Stony Athi river on the Nairobi-Mombasa road was dated at 13 million years, placing it in the Upper Miocene age (Matheson, 1966).

The largest outcrop of the Kapiti Phonolite is found in the east and north-east, forming the western part of the Kapiti plains.

There are no major physical features in the project area. The area is generally flat with a slight slope towards the nearby Olooloitikoshi river. The altitude of the area is about 1597m above sea level.

### 3. 2.3 Soils

The soils in the proposed site are the black cotton soils that are heavy to work on. These soils require judicious construction of foundations for the stability of erected buildings since they expand when wet and contract when dry. This property often undermines constructed structures by causing serious cracks and fissures.

A soil profile analysis of the site was carried out and the results revealed black cotton soil as the top layer followed by soft rock with murram layers in some sections.

### 3.2.4 Hydrology

Water is scarce as there are no perennial rivers. Water can be obtained from the river bed of the Kajiado River, but much of the population in this area depends on boreholes. The most accessed horizons are the biotite gneisses, or the contact between the metamorphic rocks and the volcanics.

### 3.3 Biological Conditions (Biodiversity)

#### a) Flora

Vegetation type in the county is determined by altitude, soil type and rainfall. In many instances it has been modified by animal and human activity. Grazing, browsing, charcoal burning, extraction of fuel wood and cultivation are the major causes of vegetation reduction. In the lower parts of Mt. Kilimanjaro, indigenous trees have been cleared to create room for agriculture. Vegetation is scarce in low altitude areas and increases with altitude. Ground cover throughout the county varies seasonally with rainfall and grazing intensity. Canopy cover ranges from less than 1% on heavily settled areas to about 30% on steep hills.

#### b) Fauna

The county boasts of a wide range diverse fauna and flora. The animals include Wild Beasts, Gazelles, Zebras, Warthogs, Hyenas, Giraffes, Elephants, Lions, Leopards and Elands and diverse bird species. Areas designed for game reserves are; Amboseli National Park which covers a total of 392Km$^2$ and Chyulu conservation area which is 445Km$^2$. These areas fall within range lands.

The project area has a lot of roaming cows and goats and most of the animal husbandry is a pastoralist or semi-pastoralist activity. Dairying, which may involve paddock systems and zero grazing, is also practiced around the project area.

The project area is also a migratory route for wildlife including; antelopes, zebras and hyenas. These are mostly spotted around March and April during the migration season. However, human-wildlife conflict cases are rare in the area.

### 3.4 Drainage and Water Resources

The drainage of the area is controlled by the pre-volcanic high ground and the high ground along the edge of the Rift Valley. The headwaters of the Kajiado river lie north-west of Kajiado, while their western watershed is formed by the Kapiti Phonolite and the Ol Doinyo Narok plateau. The river then cuts through the ridge south-west of Kajiado to drain the eastern side of the Lemilebbu hills and the western side of the Ngoragaishi hills.

The eastern side of the latter is drained by the river Mataraguesh and its tributaries, whose basin is bounded to the north by the Kapiti Phonolite. The Stony Athi river, most of whose tributaries originate in hills along the edge of the Rift Valley, drains the Kapiti plains and flows north to join the Athi River. The drainage of the Rift Valley is effected by small streams originating in the scarp and terminating in enclosed basins. The Turoka river has cut back through the scarp to the north end of the Lemilebbu hills, and terminates in Lake Kabongo in the area to the south-west. Its tributary, the Seure, drains the southern side of the Ol Doinyo Narok plateau before descending into the Rift Valley. The other major river in the Rift Valley, the Ol Keju Nero, flows into the depression west of Olorgesailie.

### 3.5 Socio-Economic Environment

Kitengela town is one of the fastest growing urban areas of Kenya according to census data of 2019. The human population within Kitengela area has tripled in the last 10 years, from 58,167 in 2009 to154,436 in 2019.

Kitengela area is growing constantly with rapid developments of large estates, industries, intensive farming and institutions. Others include shopping malls, banks, supermarkets and hotels among others. Due to rapid urban growth, basic infrastructure services such as solid waste management, water, sewer and drainage have deteriorated. Greater environmental pollution, congestion and other problems have been the result of under-provision of such basic services.

Livestock related earnings account to over 50% of incomes across all income categories in Kitengela area. Poorer households actually have more income sources than the wealthier ones. Higher income earning households have a larger proportion of their income coming from wages and business, while those in the lower ones depend more on petty trading and other informal sector activities to help them diversify their income.

### 3.6 Land Use

Land is mainly used for livestock rearing and crop growing. There is a significant change in land use in Kitengela where industrial and commercial use is gaining momentum. There is growing level of land speculation in the urban areas of the county, leading to excessive subdivision of land to small and sometimes uneconomical plots.

### 3.7 Infrastructure and Utilities

#### 3.7.1 Water Supply

There is no trunk water supply in the area. The main sources of water in the area are boreholes and rain water. The proponent has already obtained approval to drill a borehole within the site. Adequate water storage facilities shall also be incorporated to cushion against water shortage.

#### 3.7.2 Foul Water Drainage

The proposed site is not served by a trunk sewer. Foul water from the development shall be discharged into the proposed waste water treatment plant. The excess treated water shall be discharged into the proposed soakage area within the site. The treated water shall then be re-used within the development for landscaping, cleaning etc. The design of the proposed waste water treatment plant is attached. ***Appendix 9***

#### 3.7.3 Storm Water Drainage

The proposed site is gently sloping and is well drained. However, there is no public storm water wayleave and this leads to flooding downstream. Storm water from the proposed development shall therefore be discharged into the proposed soakage facility within the site. The water shall be used for growing hay and greening the adjacent 20 acres of land demarcated for future development. The water will also be used for irrigating the green areas within the proposed development and cleaning. The excess storm water shall then be pumped and channeled to the 9m access road through micro-tunneling. Culverts will then be done to channel it to public drains located along Namanga Road.

#### 3.7.4 Solid Waste Disposal

Solid waste in the area is managed by private companies who collect the waste at least once a week for final disposal. The residents pay for their own garbage collection directly to the contractors or through management companies. The waste collecting companies are required to be registered by NEMA for transportation of waste to approved Nairobi County dump sites. The proponent shall contract a private company for waste collection and disposal.

### 3.7.5 Electricity Supply

Kitengela area is connected to the Kenya Power Company main supply line. Some of the residents and commercial establishments have also incorporated solar energy to supplement the main supply by Kenya Power.

### 3.7.6 Roads and Access

The proposed project area is well connected by a network of roads. The primary road in the area is Namanga road which is tarmacked and in good condition. The site shall be accessed through the existing 9M road off Namanga Road. There are plans by the government to expand the 9M road to 15M and the developer has already surrendered 3M towards road expansion.

### 3.8 Existing Developments in the Neighborhood

Developments in the immediate neighbourhood of the site are mainly residential developments. However, pockets of commercial and Institutional developments are also found in the area. Institutions in the area include PCEA Ebenezer Church and PCEA Kitengela Township Junior Secondary School. Commercial establishments include Enkasiti Plains Resort and Shell Petrol Station among others. The proposed development will therefore be compatible with the existing neighborhood character and development trend. ***Plate 3.2 to 3.5***

***Plate 3.1: The proposed project site***

*Plate 3.2: PCEA Ebenezer Church opposite the Proposed Site*

*Plate 3.3: Shell Petrol Station along Namanga Road near entrance to the Site*

*Plate 3.4: Enkasiti Plains Resort adjacent to the Proposed Site*

*Plate 3.5: The Fronting Access Road*

## CHAPTER 4: LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK

### 4.1 Introduction

According to the Kenya National Environment Action Plan (NEAP, 1994) the Government recognized the negative impacts on ecosystems emanating from economic and social development programs that disregarded environmental sustainability. Development activities have the potential to damage the natural resources upon which the economies are based. A major national challenge today is how to maintain sustainable development without damaging the environment. The NEAP process introduced environmental assessments in the country culminating into the enactment of the Policy on Environment and Development under the Sessional Paper No. 6 of 1999.

EIA is a legal requirement in Kenya for all development projects. The Environmental Management and Co-ordination Act (Cap 387), is the legislation that governs EIA. The proposed project falls under the Second Schedule that lists the type of projects that are required to undergo EIA studies in accordance with section 58 of the Act. Projects under the Second Schedule comprise those considered to pose potentially negative environmental impacts.

### 4.2 International Conventions and Treaties

#### 4.2.1 The World Commission on Environment and Development

The commission commonly referred to as "the Brundtland Commission" focused on the environmental aspects of development, in particular, the emphasis on sustainable development that produces no lasting damage to the biosphere or to particular ecosystems. In addition, it also defined the concept of environmental sustainability, components of which include economic and social sustainability. Economically sustainable development is development for which progress towards environmental sustainability occurs within available financial resources. On the other hand, socially sustainable development maintains the cohesion of a society and its ability to help its members work together to achieve common goals, while at the same time meeting individual needs for health and well-being, adequate nutrition, and shelter, cultural expression and political involvement.

The proposals of this commission set the tone for environmental planning and management activities today. The focus on environmental and socio-economic sustainability is more apparent than ever, especially in the national policy and institutional frameworks. As such, an emphasis on sustainable development forms the basis for this study.

#### 4.2.2 The Rio Declaration on Environment and Development

The Rio Declaration on Environment and Development, or Agenda 21 – a program of action for sustainable development worldwide, was adopted by more than 178 governments at

the United Nations Conference on Environment and Development, also known as the Earth Summit, held in Rio de Janeiro, Brazil from 3rd to 14th June 1992.

Principle No. 10 of the declaration underscores that environmental issues are best handled with the participation of all concerned citizens at all relevant levels. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities. All states shall encourage and facilitate public participation by making such information widely available. Effective access to judicial and administrative proceedings, including redress and remedy shall also be provided.

The foregoing discussion is relevant to the proposed development because EMCA demands that the public must be involved before any development project that is likely to have adverse impacts to the environment is initiated by a proponent. The Act has further established Public Complaints Committee (PCC) where the issues raised by the public in regard to any proposed development can be addressed.

### 4.3 Policy Framework

#### 4.3.1 The National Environmental Action Plan (NEAP)

The NEAP for Kenya was prepared in 1994. It was a deliberate policy to integrate environmental considerations into the country's social and economic development process. The integration was achieved through a multi-sectoral approach to develop a comprehensive framework that ensures that environmental management and conservation of natural resources is an integral part of our societal decision-making process.

As a result of its adoption and implementation, establishment of appropriate policies and legal guidelines as well as harmonization of the existing ones have been accomplished and/or are in the process of development. Under the NEAP process, Environmental Impact Assessments were introduced targeting the industries, business community and local authorities.

#### 4.3.2 Policy Paper on Environment and Development (Sessional Paper No. 6 of 1999)

The key objectives of the policy include;

i) To ensure that from the onset, all development policies, programmes and projects take environmental considerations into account.
ii) To ensure that an independent environmental impact assessment (EIA) report is prepared for any industrial venture or other development before implementation.
iii) To come up with effluent treatment standards that will conform to acceptable health guidelines.

According to this sessional paper, the government has the fundamental principles relating to environmental management and conservation.

Under this paper, broad categories of development issues have been covered that require a "sustainable development" approach. These issues relate to waste management and human settlement. The policy recommends the need for enhanced re- use/recycling of residues including wastewater, use of low or non-waste technologies, increased public awareness and appreciation of a clean environment.

### 4.3.3 National Shelter Strategy to the Year 2000

Kenya adopted this strategy following the International Year of Shelter for the Homeless in 1987. This advocates for the involvement of various actors to come in and assist the government in providing housing. This took cognizance of the government's inability to provide sufficient shelter for all its citizens. The government was to simply facilitate other actors such as developers to invest in shelter.

### 4.3.4 The National Poverty Eradication Plan (NPEP)

The objective of NPEP was to alleviate poverty in rural and urban areas by 50 percent by the year 2015, as well as the capabilities of the poor and vulnerable groups to earn income. It also aimed to narrow gender and geographical disparities and a healthy, better educated and more productive population. This plan has been prepared in line with the goals and commitments of the World Summit for the Sustainable Development (WSSD) of 1995. Since poor housing is among the indicators of poor societies, pursuits to address it build individual capacity to relieve poverty.

### 4.3.5 National Policy on Water Resources Management and Development (1999)

This policy enhances a systematic development of water facilities in all sectors for promotion of the country's socio-economic progress. It also recognizes the by-products of this process as wastewater. It therefore calls for development of appropriate sanitation systems to protect people's health and water resources from institutional pollution. The policy also requires industrial and business development activities to undergo comprehensive EIA's that will ensure environmental resources and people's health in the immediate neighborhood and further downstream are not negatively impacted by the emissions. As a follow up to this, EMCA 1999 requires annual environmental audits to be conducted in order to ensure that mitigation measures and other improvements identified during the EIA's are implemented.

In addition, the policy provides for charging levies on waste water on the basis of quantity and quality. The "polluter pays principle" applies in which case parties contaminating water are required to meet the appropriate cost of remediation. Consequently, to ensure water quality, the policy provides for establishment of standards to protect water bodies receiving wastewater.

The standards and measures to prevent pollution to water resources are provided for in the Environmental Management and Coordination (Water Quality) Regulations,2006 which is a supplementary legislation to EMCA, 1999.

## 4.4 Legal and Legislative Framework

### 4.4.1 The Constitution of Kenya

Article 42 of the Bill of Rights of the Kenyan Constitution provides that every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated under Article 69.

Part 2 of Chapter 5 is dedicated to the Environment and Natural Resources. Article 69(1) of the Constitution provides the obligations of the State in respect to the environment. It provides that the state shall;

i) Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits
ii) Work to achieve and maintain tree cover of at least ten per cent of the land area of Kenya
iii) Protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities.
iv) Encourage public participation in the management, protection and conservation of the environment
v) Protect genetic resources and biological diversity
vi) Establish systems of environmental impact assessment, environmental audit and monitoring of the environment
vii) Eliminate processes and activities that are likely to endanger the environment
viii) Utilize the environment and natural resources for the benefit of the people of Kenya

Article 69(2) provides that every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

*This EIA study will help to protect and conserve the environment and ensure sustainable development.*

### 4.4.2 The Environmental Management and Coordination Act (Cap 387)

The Environmental Management and Coordination Act (Cap 387), provides for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya. Section 58 (I) has underscored that any person being a proponent of a project shall before financing, commencing or proceeding with construction submit an EIA report to the National Environment Management Authority (NEMA) of

Kenya. Section 68 (I) gives NEMA or its designated agents the mandate to carry out environmental audits of all activities that are likely to have significant impacts on the environment. It authorizes environmental inspectors, as appointed by NEMA, to enter in any premise and determine how far the activities carried out conform to statements in the EIA study.

Pursuant to section 25 (4) of EMCA, National Environment Management Authority (NEMA) is required to restore degraded environmental sites using the National Environmental Restoration Fund. Currently, the restoration fund consists of 0.1% levied from industries and other project proponents through the EIA process. Section 58 of the Act makes it mandatory for an Environmental Impact Assessment Study to be carried out by proponents intending to implement projects specified in the second schedule of the Act which are likely to have a significant impact on the environment. Similarly, section 68 of the same Act requires operators of existing projects or undertakings to carry out environmental audits in order to determine the level of conformance with statements made during the EIA study. The proponent is required to submit the EIA and environmental audit reports to NEMA for review and necessary action.

Section 72 of the Act prohibits discharging or applying poisonous, toxic, noxious or obstructing matter, radioactive or any other pollutants into aquatic environment. According to section 73 of the act, operators of projects which discharge effluent or their pollutants into the aquatic environment are required to submit to NEMA accurate information on the quantity and quality of the effluent. Section 76 provides that all effluent generated from point sources are to be discharged only into the existing sewerage system upon issuance of prescribed permit from the local authorities.

Section 87 (1) makes it an offence for any person to discharge or dispose of any wastes, whether generated within or outside Kenya, in such a manner as to cause pollution to the environment or ill health to any person.

*This Project falls within Schedule 2 of EMCA and therefore requires an EIA. The Proponent has commissioned the Environmental Impact Assessment study in compliance with the Act. The Proponent shall be required to commit to implementing the Environmental Management Plan laid out in this report and any other conditions laid out by NEMA.*

Under EMCA, a set of regulations have been developed to address management and compliance in specific aspects of the environment. The relevant regulations are indicated below;

### i) Environmental Management and Co-ordination Act (Cap 387); The Environmental (Impact Assessment and Audit) Regulations, 2003

The Regulation provides the guidelines that have been established to govern the conduct of environmental assessments and environmental audits in Kenya. The guidelines require that the EIA study be conducted in accordance with the issues and general guidelines spelt out in the Second and Third schedules.

These include coverage of the issues on schedule 2 (ecological, social, landscape, land use and water considerations) and general guidelines on schedule 3 (impacts and their sources, project details, national legislation, mitigation measures, a management plan and environmental auditing schedules and procedures.

*This Report complies with the requirements of the Environmental Regulations in the coverage of environmental issues, project details, impacts, legislation, mitigation measures, management plans and procedures. The Proponent shall be required to commit to implementing the Environmental Management Plan laid out in this report and any other conditions laid out by NEMA.*

### ii) Environmental Management and Co-ordination Act (Cap 387): (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009

Section 3 of this regulation states that no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

In determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered; time of the day, proximity to residential area, whether the noise is recurrent, intermittent or constant, the level and intensity of the noise, whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and whether the noise can be controlled without much effort or expense to the person making the noise.

Any person who contravenes these provisions commits an offence. Section 5 further states that "No person shall make, continue or cause to be made or continued any noise in excess of the noise levels set in the First Schedule to these Regulations, unless such noise is reasonably necessary to the preservation of life, health, safety or property.

*The proponent shall adhere to these regulations in all phases of the project cycle in order to maintain a healthy and safe environment.*

### iii) Environmental Management and Co-ordination Act (Cap 387); Waste management Regulations, 2006

The Waste Management Regulations, 2006 stipulates the standards for the segregation, collection, storage and disposal of waste. Sections 1, 2 and 3 of the general provisions of the regulations outline the responsibilities of the waste generators. These provisions prohibit any person from disposing of any waste on public places. Section 2 requires all the waste generators to collect, segregate and dispose or cause to be disposed of the waste generated as per the provisions of the regulations. All the waste generators have an obligation under section 3 of the provisions to ensure that the waste generated is transferred to a licensed transporter and that the transferred waste is disposed of in a designated disposal facility.

*Appropriate waste management measures will be necessary throughout the project cycle from Construction, Operation to Decommissioning of the project. Licensed persons shall operate transportation vehicles approved by NEMA and will collect waste from the collection points to approved disposal sites.*

**iv) Environmental Management and Co-ordination Act (Cap 387); Environment Co Ordination (Air Quality) Regulations, 2008**

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

*The Proponent shall observe policy and regulatory requirements and implement the mitigation measures proposed in this report in an effort to comply with the provisions of these Regulations on abatement of air pollution.*

**v) The Environmental Management and Co-ordination Act (Cap 387); (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006**

The Act states that no person shall engage in any activity that may have an adverse impact on any ecosystem, lead to the introduction of any exotic species, or lead to unsustainable use of natural resources, without an Environmental Impact Assessment License issued by the Authority under the Act.

*The Proponent has commissioned this environmental assessment study and seeks to obtain an EIA License from the Authority (NEMA) in compliance with the Act; the Environmental Management Plan included in this report provides guidelines for the mitigation of potentially adverse impacts on natural resources.*

**vi) Environmental Management and Coordination Act (Cap 387); (Controlled Substances) Regulation, 2007, Legal Notice No. 73**

The Controlled Substances Regulations defines controlled substances and provides guidance on how to handle them. The regulations stipulate that controlled substances must be clearly labeled 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." Persons handling controlled substances are required to apply for a permit from NEMA.

*The Proponent will not use controlled substances in the operation of the project.*

### 4.4.3 The Physical and Land Use Planning Act, 2019

This Act is aimed at making provision for the planning, use, regulation and development of land and for connected purposes. The objectives of the act are to provide;

(a) The principles, procedures and standards for the preparation and implementation of physical and land use development plans at the national, county, urban, rural and cities level;
(b) The administration and management of physical and land use planning in Kenya;
(c) The procedures and standards for development control and the regulation of physical planning and land use;
(d) A framework for the co-ordination of physical and land use planning by county governments;
(e) A mechanism for dispute resolution with respect to physical and land use planning;
(f) A framework for equitable and sustainable use, planning and management of land;
(g) The functions of and the relationship between planning authorities;
(h) A robust, comprehensive and responsive system of physical and land use planning and regulation; and
(i) A framework to ensure that investments in property benefit local communities and their economies.

Section 58(1) of the act provides that, a person shall obtain development permission from the respective county executive committee member by applying for development permission from that county executive committee member in the prescribed form and after paying the prescribed fees.

(2)The applicant for development permission is required to provide documents, plans and particulars as may be required by the respective county executive committee member to indicate the purposes of the proposed development.

*The Proponent shall secure all mandatory approvals and permits as required under this law*

### 4.4.4 The Factories and Other Places of Work (Fire risk Reduction) Rules, 2007

Nationally, the Factories and Other Places of Work (Fire risk Reduction) Rules, 2007 provides statutory guidelines for the prevention, control and management of fires within workplaces. Section 5 requires that suitable construction materials be used in the construction of workrooms where flammable substances are used, manufactured, or manipulated. Section 6 outlines conditions under which highly flammable substances must be stored, provided that no such store shall be so situated as to endanger the means of escape from a workplace or any part thereof in the event of a fire occurring in the store. Section 7 requires that every store room, cupboard, bin, tank or container used for storing highly flammable substances is clearly and boldly marked “Highly Flammable” in English or Kiswahili or otherwise with an appropriate indication of flammability.

Section 8 requires that every occupier shall ensure that the quantity of any highly flammable substance present at any one time in a workplace, shall be as small as is reasonably practical, having regard to the processes or operations being carried on. Section 9 also requires all occupiers to ensure that no means likely to ignite vapor from any highly flammable substances, are present where a dangerous concentration of vapor from flammable substances may reasonably be expected to be present. Further, Section 10 requires the occupier to continuously monitor the workplace with a view to assessing any possible fire risks and mitigate against them.

*The proponent shall adhere to the provisions of this law by incorporating the fire safety regulations at the design stage of the proposed project as well as compliance to the monitoring provisions during the operation phase.*

### 4.4.5 The Public Health Act (Cap. 242)

This Act aims at achieving a clean environment free of any nuisance so as to promote public health and safety. For the interpretation of the Act, Section 15 (IX) indicates that any noxious matter or wastewater discharged from any premise – such as a building – constitutes nuisance.

It equally stresses that no person shall cause a nuisance to exist on any land or premise occupied by him. Because of the above, the Act acknowledges that it shall be the duty of all local authorities to take all lawful measures for maintaining its area of jurisdiction at all times in a clean and sanitary condition for remedy of any nuisance or condition liable to be injurious to health.

To safeguard against this, Part X of the Public Health Act states that, where in the opinion of the Medical Officer of Health that food stuffs within a warehouse or a building are insufficiently protected, the owner shall be compelled to observe the required regulations, else he shall be guilty of an offense.

*The Proponent shall observe policy and regulatory requirements and implement measures to safeguard public health and safety.*

### 4.4.6 The Occupational Safety and Health Act (No.15 of 2007)

The act provides for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. The Act applies to all workplaces where any person is at work, whether temporarily or permanently. The purpose of this Act is to secure the safety, health and welfare of persons at work and protect persons other than persons at work against risks to safety and health arising out of, or in connection with, the activities of persons at work.

Under section 6 of this act, every occupier is obliged to ensure safety, health and welfare of all persons working in his workplace. The occupier shall achieve this objective by

preparing and as often as may be appropriate, revising a written statement of his general policy with respect to the safety and health at work of his employees and the organization and arrangements for the time being in force for carrying out that policy (Section 7).

He is also required to establish a safety and health committee at the workplace in a situation where the number of employees exceeds twenty (section 9) and to cause a thorough safety and health audit of his workplace to be carried out at least once in every period of twelve months by a registered safety and health Advisor (Section 11). In addition, any accident, dangerous occurrence, or occupational poisoning which has occurred at the workplace needs to be reported to the occupational safety and health officer of the respective area by an employer or self-employed person (section 21).

According to section 44, potential occupiers are required to obtain a registration certificate from the Director for all premises intended for use as workplaces. Such places shall be maintained in a clean state during the operation phase (section 47).

To ensure machinery safety, every hoist or lift – section 63 and/or all chains, ropes and lifting tackles – section 64 (1d), shall be thoroughly examined at least once in every period of six months by a person approved by the Director of Occupational Health and Safety Services. Similarly, every steam boiler - section 67 (8) and/or steam receiver - section 68(4) and all their fittings and/or attachments shall be thoroughly examined by an approved person at least once in every period of twelve months whereas every air receiver shall be thoroughly cleaned and examined at least once in every period of twenty four months or after any extensive repairs - section 69 (5). According to section 71 (3), every refrigeration plant capable of being entered by an employee also needs to be examined, tested and certified at least once in every period of twelve months by an approved person.

In relation to fire safety, section 78 (3) requires spillage or leaks of any flammable liquid to be contained or immediately drained off to a suitable container or to a safe place, or otherwise treated to make it safe. Furthermore, a clear and bold notice indicating that smoking is prohibited should be conspicuously displayed in any place in which explosive, highly flammable or highly combustible substances, are manufactured, used, handled or stored-section 78 (5). In addition, necessary precautions for dealing with fire incidents should be implemented including provision of means for extinguishing fire and means for escape, in case of fire, for the persons employed in any workplace or workroom – section 81. As far as disaster preparedness and emergency response program is concerned, section 82 (1) makes it a mandatory requirement for every occupier of a workplace to design evacuation procedures to be used during any emergency situation and to have them tested at regular intervals.

To promote health and safety of employees who are at risk of being exposed to chemical substances, section 84 (3) and 85 (4) requires every employer to maintain at the workplace material safety data sheets and chemical safety data sheets respectively for all chemicals and other hazardous substances in use and ensure that they are easily available to the employees.

The employers' positive contribution towards the welfare of the employees include provision and maintenance of adequate supply of wholesome drinking water - section 91 and a first aid box or cupboard of the prescribed standard – section 95 at suitable point (s) conveniently accessible to all employees.

Other precautionary measures include: issuance of a permit to work to any employee, likely to be exposed to hazardous work processes or hazardous working environment, including such work processes as the maintenance and repair of boilers, dock work, confined spaces, and the maintenance of machinery and equipment, electrical energy installations, indicating the necessary precautions to be taken – section 96 (1); provision and maintenance for the use of employees, adequate, effective and suitable protective clothing including suitable gloves, footwear, goggle and head coverings in any workplace where employees are likely to be exposed to wet, injurious or offensive substance –Section 101 (1).

*The EIA report advices the Proponent on safety and health aspects, potential impacts, personnel responsible for implementation and monitoring, frequency of monitoring, and estimated cost, as a basic guideline for the management of Health and Safety issues in the proposed project. The proponent will be required to ensure that the main contractor includes in the contract document, adequate measures to promote safety and health of workers*

### 4.4.7 The Building Code

This gives general guidelines for the construction of buildings and attendant safety measures such as installation of firefighting appliances, fire escapes etc. It equally recognizes local authorities as lead planning agencies and thus requires every developer to submit building plans to the relevant local authority for approval. The local authorities are in turn empowered to disapprove any plan submitted if it is not correctly drawn or does not provide sufficient information that complies with the relevant by-laws. Any developer who intends to erect a building must also give the concerned local authority a notice of inspection before the erection of the proposed structure.

After erecting the building, a notice of completion shall be issued to the local authority to facilitate final inspection/approval. No person shall therefore occupy a building whose certificate of completion has not been issued by the local authority. As a precaution against fire breakout, the by-law states that the walls of any premise shall be non-combustible throughout. Similarly, in every building which comprises more than one storey, other than a small house, shall have fire resistance.
*All drawings for the proposed project shall be submitted to the County Government of Kajiado for approval prior to construction. The Contractor shall also comply with all the provisions of these regulations and apply for an occupation certificate before occupation of the building.*

### 4.4.8 The Penal Code (Cap. 63)

Enacted in 1930, the chapter on "Offences against Health and Conveniences" of the Penal Code strictly prohibits the release of foul air which affects the health of other persons into the environment.
Any person who voluntarily violates the atmosphere at any place, to make it noxious to the health of persons in general dwelling or carrying out business in the neighborhood or passing along public ways is guilty of misdemeanor, i.e. imprisonment not exceeding two years with no option of fine.

*The Environmental Management Plan included in this report provides guidelines for the mitigation of potentially adverse impacts on natural resources/general public as a result of air pollution.*

### 4.4.9 The Water Act (2016)

The Act gives provisions for water management, including irrigation water, pollution, drainage, flood control and abstraction. It is the main legislation governing the use of water especially through water permit system.

One of the outcomes of the water sector reforms has been improved regulatory framework for water resource management and use. In addition to the Water Act 2016, the main document outlining the regulations is the Water Resources Management Rules 2007. The rules set out the procedures for obtaining water use permits and the conditions placed on permit holders.

Section 16 of the Water Rules requires approval from the Water Resources Management Authority (WRMA) for a variety of activities that affect the water resources, including the storage of water in dams and pans. Approval by WRMA is conferred through a Water Permit. A permit is valid for five years and must be renewed.

*The proponent will adhere to the provisions of these regulations by applying for all the necessary permits before occupation.*

### 4.4.10 The Standards Act (Cap 496)

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

*The Act contains various specifications touching on various construction products. The Proponent shall ensure that commodities and codes of practice utilized in the project adhere to the provisions of this Act.*

### 4.4.11 National Gender and Development Policy

The National Gender and Development Policy provide a framework for advancement of women and an approach that would lead to greater efficiency in resource allocation and utilization to ensure empowerment of women.

The National Policy on Gender and Development is consistent with the Government's efforts of spurring economic growth and thereby reducing poverty and unemployment, by considering the needs and aspirations of all Kenyan men, women, boys and girls across economic, social and cultural lines. The policy is also consistent with the Government's commitment to implementing the National Plan of Action based on the Beijing Platform for Action (PFA). The overall objective of the Gender and Development Policy is to facilitate the mainstreaming of the needs and concerns of men and women in all areas in the development process in the country.

*This law will be of relevance to the contractor in ensuring that both genders are given an equal opportunity during the construction and operation phase of the project. The contractor shall also provide adequate sanitation facilities for both genders within the project site.*

### 4.4.12 The Energy Act, 2006

The Energy Act, amongst other issues, deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated with these purposes.

*The Proponent shall follow the necessary guidelines and precautions when connecting power to the proposed development.*

### 4.4.13 The County Governments Act, 2012

The promulgation of the 2010 Constitution brought about County Governments. This Act highlights the role of the County Governments as below.

Section 105 (1) A county planning unit shall be responsible for;

(a) Coordinating integrated development planning within the county;
(b) Ensuring integrated planning within the county;
(c) Ensuring linkages between county plans and the national planning framework; and
(d) Ensuring meaningful engagement of citizens in the planning process;
(e) Ensuring the collection, collation, storage and updating of data and information suitable for the planning process; and,
(f) Ensuring the establishment of a GIS based database system.

*The County Government of Kajiado is mandated to oversee all development activities within the County and therefore it will be a major stakeholder for the proposed project.*

### 4.4.14 Traffic Act Cap 403

The Act empowers police officers to stop and remove vehicles producing noxious emissions. The Act prohibits obstruction of traffic, either by persons or facilities which are constructed in such a way as to interfere with the flow of traffic on roads or road reserves.

*The Contractor shall ensure smooth traffic flow during construction so as to minimize obstruction of traffic along the road fronting the site. The design of the proposed development shall also provide for smooth ingress and egress during the operation phase.*

### 4.4.15 The Land Registration Act,2012

The Land Registration Act is placed 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.

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.

*The proponent will adhere to all the conditions as provided in the land ownership document.*

### 4.4.16 The Climate Change Act, 2016

The Act Provides for a regulatory framework for enhanced response to climate change; to provide for mechanisms and measures to achieve low carbon climate development, and for connected purposes. Section 20 provides that NEMA shall integrate climate risk and vulnerability assessment into all forms of assessment and liaise with relevant lead agencies for their technical advice.

*The EIA study shall integrate climate change risk and vulnerability assessment and provide adaptive measures.*

### 4.4.17 The Wildlife Conservation and Management Act, 2013

The Act provides for the protection , conservation, sustainable use and management of wildlife in Kenya and for connected purposes.

Section 18 provides for the establishment of a County Wildlife Conservation and Compensation Committee whose functions shall include among others;
-To Develop and implement in collaboration with community wildlife associations, mechanisms for mitigation of human wildlife conflict.

-To review and recommend claims resulting from loss or damage caused by wildlife for payment of compensation.

Section 24 provides for establishment of a Wildlife Compensation Scheme that shall be used for financing compensation claims for human death or injury or crop and property damage caused by wildlife.

Section 78(1) provides that it shall not be unlawful for any person to kill or wound any wild animal in the defense of himself or any other person if immediately and absolutely necessary.

*The proponent shall adhere to the provisions of this Act in case of human wildlife conflict including damage of property*

### 4.5 Institutional Framework

The Environmental Impact Assessment for the proposed development is bound to be influenced by the operational interests of several lead agencies, whether exclusively or concurrently. These include, but not limited to the following key institutions:

#### 4.5.1 National Environmental Management Authority (NEMA)

NEMA is the supreme regulatory and advisory body on environmental management in Kenya. NEMA is required to coordinate and supervise the various environmental management activities being undertaken by statutory organs with a view of promoting their integration into development policies, programs, plans and projects that provide sustainable development and a safe and healthy environment for all Kenyans. NEMA is equally mandated by the Environmental Management and Coordination Act to assess Environmental Impact Assessment reports and Environmental Audits and issue licenses of compliance/approval.

#### 4.5.2 Public Complaints Committee

The National Environmental Complaints Committee is established under (EMCA) Act and it provides the administrative mechanism for addressing environmental harm. The Committee has the mandate to investigate complaints relating to environmental damage and degradation.

#### 4.5.3 National Environment Tribunal

The tribunal guides the handling of cases related to environmental offences in the Republic of Kenya. The Tribunal hears appeals against the decisions of the authority and any person who feels aggrieved by the decision of the tribunal may challenge the tribunal at the High Court of Kenya.

### 4.5.4 Standards and Enforcement Review Committee.

This is a technical committee responsible for environmental standards formulation, methods of analysis, inspection, monitoring and technical advice on necessary mitigation measures.

### 4.5.5 National Environment Action Plan Committee.

The committee is responsible for the development of a 5-year Environment Action Plan among other things. The National Environment Action Plan shall contain; Analysis of the natural resources of Kenya with an indication as to any pattern of change in their distribution and quantity over time and analytical profile of the various uses and value of the natural resources incorporating considerations of intergenerational and intra-generational equity among other duties as EMCA specifies.

## 4.6 Conclusion

The proposed project will be undertaken in adherence to the aforementioned relevant Laws and Legislations. The institutions guided by relevant policies and legislations must regulate urban development and promote sustainable development. The above expression is envisioned as a basic principle component of coordinated and harmonious development in urban areas, and is one of the core pillars for attaining sustainable development. These provisions will therefore guide the proposed project and will be adhered to.

# CHAPTER 5: PUBLIC CONSULTATION AND PARTICIPATION

## 5.1 Overview

The Consultation and Public Participation Process is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by EMCA 1999 section 58 on EIA for the purpose of achieving the fundamental principles of sustainable development. This chapter describes the process of public consultation and public participation followed to identify the key issues and impacts of the proposed project. Views from the local residents, the business community and opinion leaders who in one way or another would be affected or have an interest in the proposed project were sought through public meetings, interviews and structured questionnaires as stipulated in the Environment Management and Coordination Act (Cap 387).

## 5.2 Objectives of the Consultation and Public Participation (CPP) Exercise

The objectives of the Consultation and Public participation exercise were to:

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

The public participation exercise enabled the establishment of a communication channel between the general public and the team of consultants, the project proponents and NEMA. The process also enabled the concerns of the stakeholders to be known to the decision making bodies at an early stage of project development.

## 5.3 Methodology used in the CPP

The public participation exercise was facilitated by a team of experienced and registered experts. The stakeholder and public consultation process followed the following steps:

- Documentation of the public participation programme for the project.
- Description of the public participation methods, timing, type of information to be provided to the public, and stakeholder target groups.
- Preparation of a summary of the issues identified during the public participation process
- Incorporating public input that has been received into the proposed project design and environmental management systems.

### 5.3.1 Identification of Stakeholders

Stakeholders who were likely to be affected by implementation of the project were identified at the scoping stage of the EIA study. The Consultant prepared a database of all the stakeholders who comprised the following;

i) Project affected persons (immediate neighbours, Land owners, business operators, institutions etc).- interviews, public consultation meetings and questionnaires
ii) General public: information disclosure mechanisms: publication of notices in the dailies, Kenya Gazette and radio advertisements.
iii) Government agencies (County Government of Kajiado, Area Chief, NEMA, WRMA, KWS).
iv) The local community – community liaison committee meetings.
v) Contractors, material suppliers, workers and construction professional consultants: continuous consultation meetings and workers grievance redress mechanisms.

### 5.3.2 Public Participation

Public participation was carried out through questionnaires, key informant interviews and public consultation meetings. Questionnaires were randomly distributed within the vicinity of the proposed site. The respondents included; business people, residents, institutions and land owners. The Key informants that were consulted include the proponent, project consultants (Architect, Land Surveyor, Mechanical Engineer and the Quantity Surveyor). A Public consultation meeting was also held with members of PCEA Ebenezer church bordering the proposed site and the minutes are attached. ***Appendix 3***.

Another public meeting was held with different categories of stakeholders such as government agencies, residents, business community, institutions in the area etc as shown on Plate 5.1 - 5.2. Minutes of the said meeting are also attached. ***Appendix 3***



***Plate 5.1: Public Meeting with Project Stakeholders***

***Plate 5.2: Public Meeting with Project Stakeholders***

Below is a summary of the issues raised/comments by stakeholders during public participation;

-Plant more trees in the area
-Ensure storm water from the proposed development is managed effectively
-The project will bring about urbanization in the area
- Control dust especially during construction
-Minimize noise during construction
-Prioritize the locals when sourcing for employment and supply of materials
-The project will create employment and business opportunities in the area
-The project will provide decent and safe housing
-The value properties in the area will increase
- Control traffic
-The increased population will promote businesses in the area
-The project will aid in reducing the housing shortage
-Tarmac the road leading to the site to minimize dust
-Ensure proper disposal/recycling of solid waste
-Ensure the drainage system is well managed
-Construction to be done during the relatively wet season to contain dust
-Comply with all the statutory provisions governing such projects
-Limit the number of people accessing the development
-The scale of the project is likely to disrupt the ecosystem of the area
-The effluent from the project is likely to pollute the existing water resources
-The proponent should consider scaling down the project to minimize project impacts.
-The increased population will result in congestion/overcrowding in the area
-The project will result in the area's development and attract more investors which is good for the County.

## 5.4 Conclusion

From the foregoing, it is clear that key project stakeholders were consulted and the project is generally accepted by the local community albeit with conditions to ensure minimal disturbance to the neighbourhood and the environment. The EIA report has taken into account all the issues raised by stakeholders. Adequate mitigation measures have equally been provided to ensure that the mentioned negative impacts are contained.

# CHAPTER 6: ANTICIPATED POTENTIAL ENVIRONMENTAL IMPACTS

## 6.1 Overview

This chapter presents the general positive and negative social and environmental impacts which may result from the proposed project. The emphasis is on the specific impacts that are likely to result from the nature of works including excavation and construction works. Impacts during the operational and decommissioning phases of the project have also been identified. Adequate mitigation measures have been provided for all the identified impacts during the different phases of project development i.e. Construction, Operation and Decommissioning.

## 6.2 Impacts and Mitigation Measures during Construction Phase

### 6.2.1 Positive Impacts

#### 6.2.1.1 Employment Creation

The proposed development will create business opportunities by providing a market to suppliers of construction materials during the construction phase. It will also provide employment opportunities both directly and indirectly during the construction phase. Casual laborers, semi-skilled and skilled labor professionals such as environmentalists, supervising engineer, contractor staff and architects among others will benefit from the employment opportunities created by the proposed project.

#### 6.2.1.2 Optimal Use of Land

Land prices in this area have been increasing over time. This has partly been influenced by the high demand for housing in the area due to its proximity to Nairobi CBD as well improvement in transport infrastructure. The project proponent proposes to develop 24No. Apartment blocks on the plot. This will ensure optimal use of the land therefore increasing the rate of return on investment.

#### 6.2.1.3 Promote Local and National Economy

Implementation of the proposed project will promote local businesses in the area such as food vendors, construction material suppliers etc. The various permits issued by the County Government including approval of building plans will attract certain charges which will form part of the County's revenue. The National Government will benefit through income tax paid by Consultants engaged in the project as well as Value Added Tax (VAT) charged on building materials which will be required during construction, installations and interior finishes.

### 6.2.2 Measures to Enhance the Positive Impacts

Construction should adhere to recommended best construction practices that make effective and economical use of locally available resources including materials, expertise and labor. Construction materials will be sourced from certified suppliers in order to enhance the integrity of the proposed buildings.

### 6.2.3 Negative Impacts

#### 6.2.3.1 Pollution

There is likely to be pollution in terms of air, noise and soil pollution during the project's construction phase. Air pollution is likely to be from vehicle exhausts during transportation of materials to the site. The movement of trucks to and from the site is also likely to generate dust and noise pollution. Noise pollution will mainly emanate from the common construction machinery used at the site. This is likely to cause disturbance to the neighboring residents adjacent to the site.

Soil pollution is likely to occur from oil spills and leakage from construction vehicles. This has the potential to contaminate the soil leading to destruction of fauna in the affected areas as well as contamination of ground water.

***Proposed Mitigation Measures***

**i) Air Pollution**

- Exposed stockpiles of e.g. sand will be enclosed, covered, and watered daily to minimize dust.
- Use of dust screens to minimize air pollution to adjacent users.
- All personnel working on the project will be trained prior to starting construction on methods of minimizing air and noise pollution.
- Workers shall be provided with proper PPE such as dust masks. Mechanisms shall be put in place to ensure PPE provided is for the right activities and is always worn within the project site.
- All machinery and equipment shall be maintained in good working condition in order to minimize emissions to acceptable standards.
- Construction trucks delivering materials to site shall be covered in order to minimize emissions to the surrounding areas.
- No burning of materials shall be permitted at the project site.
- Frequent watering of the access road to minimize dust.

**ii) Soil Pollution/Spillage**

- Ensure no spillage occurs by servicing the construction vehicles regularly.
- Prepare and display spill response procedures at the site.
- Training of workers on spill response procedures and management.

- In case of spillage the Contractor shall isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent material and/or other materials approved by the Project Manager.
- All vehicles that have oil leaks shall be contained in one place to avoid chances of spillage in different parts of the site.
- Observe the requirements of the emission control regulations.
- Protect project area from fire by posting warning signs in areas where hydrocarbon fuels are used.

**iii) Noise Pollution**

- Restrict noisy construction activities to the NCA/NEMA recommended working hours.
- Use quiet equipment (i.e. equipment designed with noise control elements).
- Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.
- Sensitize construction drivers to avoid hooting especially when passing through sensitive areas such as churches, offices, hospitals, residential houses and schools.
- Conduct periodic noise measuring and monitoring to determine levels and extent of harmful noise.
- Clearly label the high noise areas.
- Provide attenuation features. Machines that exceed acceptable noise limits should be equipped with silencers or lagging materials or specially designed acoustic enclosures.
- Provide PPE (Ear Muffs) to persons operating within or visiting identified high noise areas.
- In order to meet noise level requirements, the works equipment shall be adjusted to standard noise.
- Inform local residents when construction activities are likely to generate excessive noise in order to minimize disruption to local residents.

#### 6.2.3.2 Health Hazards

The noise and dust generated by construction activities is a health hazard to the public as continuous exposure to noise levels above 85db can cause damage to hearing leading to occupation deafness. There are also high chances of littering during loading and transportation of construction waste from the site. Construction waste consisting of broken glass, nails etc can cause serious injuries to the public. Uncontrolled human waste from workers on site is also a potential health hazard if not managed properly.

***Proposed Mitigation Measures***

- All workers on the site will be required to wear protective clothing (PPE) while on duty
- All hazardous materials to be stored in appropriately sealed containers and clearly labeled
- Workers operating equipment that generate noise should be equipped with noise protection gear including ear muffs and plugs.
- Workers operating equipment generating noise levels greater than 80 dBA continuously for 8 hours or more should use earmuffs whereas those experiencing prolonged noise levels of 70 – 80 dBA should wear earplugs.
- All solid waste on site likely to cause injury to workers or passers-by shall be removed and disposed offsite.
- Ensure all hazardous areas are marked.
- Provide safety regulations and first aid kits on site in visible accessible areas.
- Minimize or altogether eliminate mosquito breeding grounds
- Provide appropriate solid waste disposal facilities
- Provide a toilet on site for construction workers

#### 6.2.3.3 Health, Safety and Accident Risks

On any construction site, the risk of accidents and other related safety concerns is high. This danger is posed to the workers on site as well as the adjacent occupants and passers-by. Thus, there is need to put in place measures to protect them against falling debris and other safety risks. Other potential health and safety risks include;

- Exposure of workers to harmful building materials which may cause fatal diseases.
- Construction activities such as; materials delivery, trench excavation and concrete mixing and construction traffic will generate a lot of dust and this may affect the respiratory system of the workers.
- Construction sites may be a source of both liquid and solid wastes. If these wastes are not well disposed of, the site may become a breeding ground for disease causing vectors such as mosquitoes and rodents.
- At the concrete mixing points the exposure of human skin to cement may lead to damage of the skin.
- Improper handling of solid wastes produced during civil works such as soil from excavations, scrap metal, mortar, paper, masonry chips and left over food stuff present a public nuisance due to littering or bad odor.
- Open trenches during excavation pose a risk to the workers as they access different sections of the construction site.
- Improper handling of construction equipment and machinery such as cranes can cause serious injury.

***Proposed Mitigation Measures***

- Employ skilled and trained workers, and provide protective clothing
- Prepare a clear work schedule
- Have adequate worker insurance cover
- Provide sanitation facilities and clean drinking water on site
- Enforce occupational health and safety standards.
- Mandatory construction of adequate hoarding around the project area prior to commencement of any construction activity
- Ensure that all construction activities are carried out within the hoarded area
- Maintain a record of incidents and accidents on site.
- The workers should receive requisite training especially on the operation of the machinery and equipment.
- There should be adequate warning and directional signs.
- Ensuring that the prepared code of conduct for staff is followed to prevent accidents.
- Develop a site safety action plan detailing safety equipment to be used, emergency procedures, restrictions etc.
- Provide first Aid kits within the construction site.

#### 6.2.3.4 Mushrooming of Informal Businesses

Usually, such development projects during construction stage have the potential of attracting unplanned commercial activities that come to take advantage of the increased trade prospects. This often leads to mushrooming of kiosks/informal vendors, which are attracted by the prospects of doing business especially selling food. Some have potential to pollute the environment owing to lack of sanitation infrastructure.

***Proposed Mitigation Measures***

- Provide clean and safe drinking water at the site
- Provide a toilet at the site to ensure hygiene and proper sanitation is observed
- The workers will have designated areas for eating and resting.
- Food vendors will be allowed to sell food within the hoarded area to avoid littering of the surrounding areas.

#### 6.2.3.5 Visual Impact

In order to develop the proposed development, excavation and earth works will be involved. The main visual impacts would occur during earthworks for construction of the foundation of the building. However, this impact will be generally confined to the site.

***Proposed Mitigation Measures***

- Mandatory construction of adequate hoarding around the project area prior to commencement of any construction activity.
- Ensure that all construction activities are carried out within the hoarded area.

### 6.2.3.6 Fauna and Flora Disturbance

In order to develop the proposed development, excavation and earth works will be involved. This may lead to soil disturbance and/or compaction and displacement of fauna. Invasive species of fauna may also be introduced at the site during landscaping.

***Proposed Mitigation Measures***

- Trees and grass will be planted on the available open spaces after construction
- Ensure re-use of excavated soil for landscaping to ensure that invasive species of flora or fauna are not introduced at the site.
- Minimize the amount of destruction caused by machinery by promoting non-mechanized methods of construction.
- The Contractor's Environmental, Health and Safety staff shall monitor regeneration of natural vegetation as well as the appearance/spread of invasive or opportunistic species within the disturbed areas. Monitoring should include spotting and uprooting of unwanted germinating plants.

### 6.2.3.7 Generation of Solid Waste

Significant volumes of solid waste will be generated from the various construction activities at the site. These include but not limited to concrete, timber, steel, plastics, packaging materials such as polythene bags, broken glass, paper waste, e-waste etc. This waste will negatively impact the aesthetic value of the site and surrounding environment if not properly managed. Solid waste, if allowed to accumulate on the ground, could cause localized pooling and flooding. Pooling of water, in turn, would create conditions conducive for breeding of disease causing vectors such as mosquitoes.

***Proposed Mitigation Measures***

- Adequate collection and storage of waste will be provided on site, and safe transportation of waste to designated areas.
- A site waste management plan shall be prepared by the contractor prior to commencement of construction activities. This should include designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring.
- Ensure no littering of the open spaces.
- Waste to be collected regularly to control air pollution and vermin/insects etc.
- Provide proper solid waste disposal and collection facilities
- Waste will be collected by a licensed operator to avoid illegal final dumping at unauthorized sites.
- All persons involved in refuse collection shall be in appropriate protective gear.
- Use of an integrated solid waste management system i.e. through a hierarchy of options i.e. 1) Reduction 2) Recycling 3) Re-use 4) Land filling
- The contractor shall select waste disposal locations based on the properties of the particular waste generated.

### 6.2.3.8 Poor drainage and Soil Erosion

Excavation and other construction works are likely to leave the ground bare and susceptible to soil erosion. Potential agents of soil erosion at the site include wind and rain water.
The contractor shall ensure that excavation is undertaken during the dry season to minimize chances of erosion by rain water. Exposed soil piles shall also be adequately watered to minimize wind erosion. Poor drainage at the site is also likely to result in flooding.

Soil erosion also leads to release of sediments into the drainage systems and ultimately into water bodies. Uncontrolled soil erosion can have adverse effects on the local water bodies such as sedimentation, introduction of nutrients into the water bodies and de-coloration of water affecting the penetration of sunlight into the water.

***Proposed Mitigation Measures***

- Ensure exposed stock piles of soil are watered regularly to minimize wind erosion.
- Ensure all construction activities and storage of materials are carried out within the hoarded area.
- In cases where it is identified that during construction there is a danger of increased run-off at the project site, temporary drainage channels or holding ponds shall be employed.
- Control construction activities especially during rainy / wet conditions.

### 6.2.3.9 Traffic Congestion

During construction, roads leading to the project site will experience increased traffic flow especially from construction vehicles. This will impact the road users through damage of roads and traffic snarl ups especially at turning points and along the access road. Appropriate measures will be undertaken to ensure smooth traffic flow.

***Proposed Mitigation Measures***

- Provide adequate on-site parking dedicated for construction site personnel and heavy vehicles
- All deliveries and collections to and from the site shall be staggered and restricted to off-peak traffic hours to prevent obstruction of other road users.
- Traffic speeds for construction and other vehicles coming to and fro the project site shall be restricted to 20 Km/h to ensure pedestrian safety.
- Signage to identify the construction site shall be erected at the site entry point.
- Appropriate traffic warning signs, informing road users of a construction site entrance ahead and instructing them to reduce speed, shall be placed along the main road in the vicinity of the entrance to the site during the construction period.
- Train drivers on road safety

- Limit idling time for pick-up trucks and other smaller equipment, observe a common-sense approach to vehicle use, and encourage workers to put off vehicle engines whenever possible.
- Repair any damage on the access road after completion of construction

#### 6.2.3.10 Gender Equality

There is need to promote gender equality in all aspects of economic development and more so in construction. Women roles in construction are mainly confined to supply of unskilled labor and vending of foodstuffs to the construction workers. During construction, the contractor is likely to be biased against the female gender during hiring of casual laborers. The Contractor shall ensure that either gender constitutes at least 30% of the work force at the site. The contractor shall also develop policies to protect female workers at the site against harassment by their male counterparts.

***Proposed Mitigation Measures***

- Ensure equitable distribution of employment opportunities between men and women
- Provide toilets and bathrooms for both male and female workers on site
- Enforce workers code of conduct
- The works contractor shall be required, under its contract, to prepare and enforce a No Sexual Harassment and Non-Discrimination Policy, in accordance with national law where applicable.
- The contractor shall prepare and implement a gender action plan

#### 6.2.3.11 HIV/AIDS

The project will attract new people to the project area and increase the amount of disposable cash available to the construction workers. This may lead to several repercussions leading to the spread of HIV/AIDS and/or other sexually transmitted diseases (STDs). Influx of new people to the project area especially construction workers can affect the number of new cases of HIV, because they often interfere with an otherwise stable situation but the contrary can also happen where the newcomers find themselves at higher risk.

***Proposed Mitigation Measures***

- Sensitize workers and the surrounding communities on prevention and management of HIV/AIDS through staff training, awareness campaigns, multimedia and workshops or during community Barazas.
- Identify other players (local CBOs, NGOs, and government organizations) on HIV/AIDS for enhanced collaboration.
- Develop an intervention strategy compatible with the construction programme to address HIV/AIDS prevention and provide peer educators for sustainability in collaboration with other stakeholders.

- Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs

## 6.3 Impacts during Operation Phase

### 6.3.1 Positive Impacts

#### 6.3.1.1 Promotion of Business

The proposed project will result in increased population in the area which will promote both small and medium sized enterprises in the neighborhood of the site thus enhancing profits.

#### 6.3.1.2 Income Opportunities

On completion, the proposed development will provide employment opportunities to various skilled and unskilled workers. The available job opportunities will include but not limited to; security personnel, property managers, waste management contractors and cleaners among others.

#### 6.3.1.3 Increased Property Values

The proponent proposes to put up a comprehensive housing development on the proposed site. The proposed development is also likely to result in increased property values for the neighboring properties thus promoting the overall development of the area.

#### 6.3.1.4 Provision of Housing

The rate of urban sprawl has and continues to increase in Kenya today; this has been aggravated by increase in population as a result of natural growth or as a result of urban-rural migration. The proposed project will therefore provide decent housing to the increasing population especially the middle class (Working) which forms significant percentage of the Urban population and urban families.

### 6.3.2 Measures to Enhance the Positive Impacts

- Carrying out periodic assessment of different components of the buildings' transmission and distribution system to initiate immediate repairs whenever damages are identified to reduce system leakage and maintain the aesthetic value of the buildings.
- Ensure trees and grass is planted on all the available open spaces after completion of construction.
- Incorporate green energy sources such as solar energy during the operation phase

- Hire a reputable property management company to oversee the operations of the building.
- Implement a landscaping plan to improve the natural aesthetic value of the property.

### 6.3.3. Negative Impacts

#### 6.3.3.1 Pressure on Existing Infrastructure Facilities

The proposed development is likely to increase pressure on the existing infrastructural facilities and services such as power, roads and water supply. The proposed development shall also increase energy consumption. Since power generation in Kenya is mainly through non-renewable sources, increased use of electricity will have adverse impacts on the sustainability of the natural resources. The proposed development will create an increased demand for water during the operation phase. Water will mainly be used for drinking, cleaning, cooking and for sanitary facilities.

***Proposed Mitigation Measures***

- Management and monitoring of water usage
- Installation of pressurized faucets
- Explore renewable sources of energy such as solar energy
- Repair all leaking taps and valves
- Maximize on natural lighting to reduce the use of artificial lighting.
- Switch off electrical equipment, appliances and lights when not being used.
- Install occupation sensing lighting at various locations such as storage areas and stairways which are not in use all the time.
- Install energy saving bulbs
- Water storage tanks shall be provided
- Explore alternative sources of water such as harvesting of rain water and recycling
- The proposed borehole shall be constructed according to the approved specifications and standards.
- Regular maintenance of the access road

#### 6.3.3.2 Waste Management

The proposed development is likely to contribute to an increased generation of solid waste. This has a potential of attracting disease vectors such as rats, flies, and cockroaches. The waste generated during the operation phase will comprise of kitchen waste, e-waste, paper waste, plastic waste and waste water etc. waste water is likely to cause sanitation issues if the proposed Waste Water reticulation system is not well maintained.

***Proposed Mitigation Measures***

- Ensure Regular checks of the waste water treatment reticulation system to ensure it's in proper working condition.
- Make arrangements for the regular collection of garbage from the site and appoint a licensed solid waste transporter to collect and transport the waste for dumping at approved dumping sites.
- Encourage waste separation at the generation points in order to ensure minimization of the waste stream and recover recyclable waste.
- Waste to be collected regularly to control air pollution and vermin/insects etc.
- Provide proper solid waste disposal and collection facilities.
- Provide a garbage chute protected from rain and animals
- All persons involved in refuse collection shall be in appropriate protective gear.
- Use of an integrated solid waste management system i.e. through a hierarchy of options i.e. 1) Reduction 2) Recycling 3) Re-use 4) Land filling
- The contractor shall select waste disposal locations based on the properties of the particular waste generated.
- Conduct regular inspection of the waste water pipes and repair blockages or damages appropriately
- Ensure regular monitoring of the waste water reticulation system to ensure that the stipulated effluent discharge rules and standards are not violated.
- All waste pipes should be accessible from outside and free at every part of the system for inspection, cleaning and repair.

#### 6.3.3.3 Fire Risk

During the operation phase, electrical faults may cause a fire risk within the development. This may lead to destruction of property and loss of life.

***Proposed Mitigation Measures***

- Adhere to the provisions of the building code regarding fire safety
- Ensure all fire equipment are in proper working condition and conduct regular audits
- Ensure all fire exits hare clear and visible signage
- Conduct regular fire drills

#### 6.3.3.4 Traffic Congestion

The proposed development is likely to cause increased traffic along the fronting access road. This will be generated by residents and visitors coming into and out of the site. However, the road has been earmarked for expansion from 9M to 15M. This will help to ease congestion and allow for smooth traffic flow. Further, the development has provided adequate parking within the development as shown in the attached master plan. ***Appendix 5***

***Proposed Mitigation Measures***

- Provide adequate parking within the facility to avoid vehicles parking along the access Road.
- Carry out a Traffic Impact Assessment
- Provision of designated entry and exit points.

### 6.3.3.5 Human-wildlife conflict

The project area is a migration route for wild animals looking for greener pastures. The common animals sighted in the area include; Zebras, antelopes, hyenas and sometimes lions. This mostly happens around March and April. However, there has been no reported cases of attacks so far.

***Proposed Mitigation Measures***

- The proposed development shall be fenced off with a stone masonry perimeter wall to prevent the wild animals from accessing the development. This will help to prevent injury and damage of property.
- Create awareness and organize training programs for the residents and local community.

### 6.3.3.6 Increased Surface Run off

The proposed development will create more impervious areas compared to the current situation. This will lead to a higher runoff coefficient during the rainy season which may lead to flooding.

***Proposed Mitigation Measures***

- Incorporate rain water harvesting in order to reduce the volume of runoff
- Use of permeable construction materials e.g cabro paving where possible to allow for infiltration and reduce surface runoff.
- Carry out comprehensive landscaping of site after completion of construction activities to reduce the speed of runoff and increase water retention capacity of the soil.

### 6.3.3.7 Air Pollution

During the operation phase, the proposed development will lead to increased vehicular traffic along the fronting access road. This is likely to result in increased generation of dust since the road is not paved.

***Proposed Mitigation Measures***

- Plant trees around and within the proposed development to act as wind breakers which can help to minimize dust.
- Regular maintenance of the fronting access road to control dust
- Control traffic coming into and out of the proposed site e.g by having speed limits.

### 6.3.3.8 Climate Change Risk Assessment

Climate change refers to shifts that can be attributed directly or indirectly to human activity that alter the composition of the global atmosphere, and which are in addition to natural climate variability observed over comparable time periods. According to the International Centre for Tropical Agriculture (CIAT), climate hazards are common in Kajiado County with a history of devastating droughts since the 1900s. The frequency has increased over time to about every 2-3 years and this has resulted in the drying up of water sources, crop failures and increased human-wildlife conflicts. The potential climate change impacts that maybe experienced by the proposed development during the project's lifespan include;

i. Flooding: Increase in precipitation due to climate change variability is likely to be experienced in the area. This also poses as an opportunity for the developer to find ways to store water which can be used during the drought season.
ii. Drought: Long periods of drought are also likely to be experienced. This may lead to depletion of water resources including boreholes and rivers.
iii. Power interruptions are likely to be brought about by extreme weather conditions such as storms. It is therefore necessary for the development to have power back up as a cushion against power outage.
iv. Human-wildlife conflict is likely to increase during the dry seasons as animals travel long distances looking for water and pasture.
v. Increase in temperatures is also a likely scenario during the lifespan of the project due to increased carbon emissions.

***Proposed Mitigation/adaptation Measures***

- The developer has proposed a soakage area within the development which shall collect storm water. The water can then be cleaned, stored and reused within the development especially during the dry seasons.
- The developer has proposed to install solar batteries for storage of solar power as well as a stand by generator to cushion against power interruption.
- The development shall be secured with a perimeter fence and this will help to keep away the wild animals from causing injury to the residents and property.
- The development shall incorporate building materials with anti-glare and thermal insulation properties as a cushion against high temperatures.

#### 6.3.3.9 Health Hazard

The proposed development has incorporated a soakage area for collection of storm water as well as the excess treated water from the waste water treatment plant. The proposed soakage area is likely to be a health hazard if not well managed. It is therefore necessary to fence off the area in order to limit access by unauthorized people and animals. If not well managed, it could lead to loss of lives and accidents.

***Proposed Mitigation Measures***

- Fence off the soakage area and install warning signs
- Limit access into the soakage area by authorized personnel only.
- Conduct regular checks and maintenance of the soakage facility to ensure it is working properly.

#### 6.3.3.10 Oil Leaks and Spills

The proposed development is anticipated to accommodate more than 500 cars. This is likely to cause oil leaks and spills especially at the parking areas and therefore appropriate mitigation measures must be put in place.

***Proposed Mitigation Measures***

- Fats and oil interceptors must be installed along the drainage channels leading from the kitchen and car parks.
- Car park areas must be well managed and the drains from these areas controlled

### 6.4 Impacts During the Decommissioning Phase

### 6.4.1 Positive Impacts

#### 6.4.1.1 Income Opportunities

Decommissioning activities will create demand for a niche group of contractors, experienced in this type of works. Licensed waste collectors and transporters will also be required. It will also lead to creation of employment for casual laborers, semi-skilled and skilled labor professionals.

#### 6.4.1.2 Restoration of the Natural Ecosystem

Decommissioning activities will lead to the restoration of the site to its original state. Thus, the vegetation that had previously been cleared to prepare the site for construction activities will be restored.

#### 6.4.1.3 Storm Water Runoff

Restoration of the site back to its natural state will reduce the amount of storm water runoff generated by the site. This will reduce the amount of runoff discharged into the drainage system, thus reducing chances of flooding during the rainy seasons.

### 6.4.2 Negative Impacts

#### 6.4.2.1 Pollution

Decommissioning activities are likely to lead to air and dust pollution from demolition, as well as noise pollution from the operation of the required heavy machinery. Therefore, appropriate mitigation measures must be put in place.

***Proposed Mitigation Measures***

- Exposed stockpiles of e.g. sand will be enclosed, covered, and watered daily to minimize dust.
- All personnel working on the project will be trained prior to starting construction on methods of minimizing air quality impacts.
- Workers in dusty areas on the site shall be issued with dust masks during dry and windy conditions.
- Clear and visible warning signs shall be put up at visible areas within the site
- Decommissioning activities to be limited to off-peak hours
- Install portable barriers to shield compressors and other equipment where necessary.
- Prescribe noise reduction measures if appropriate e.g. restricted working hours, transport hours and noise buffering.

#### 6.4.2.2 Soil Erosion

Activities during decommissioning involve demolition, including removal of all underground facilities. During this time, heavy earth moving machinery will be present throughout the site; this may result in soil compaction. Further, without the paving and surface water drainage facilities on site, the amount of erosion of the natural soil on site may increase.

***Proposed Mitigation Measures***

- Ensure exposed stock piles of soil are watered regularly to minimize wind erosion
- Ensure all decommissioning activities are carried out within the hoarded area.
- Implement an appropriate re-vegetation program to restore the site to its original status.
- Appropriate surface water run off controls will be taken to prevent surface erosion.
- Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences.

#### 6.4.2.3 Health Hazards

This impact will most likely arise from excess dust arising from the decommissioning activities. This may also arise from the improper disposal of solid waste from the site.

The wastes produced during the decommissioning phase, if not well disposed of, can pose a threat to the environment and can be hazardous to people's health and reduce the aesthetic value of the area. These wastes include but not limited to: steel, wood, broken glass, broken tiles, broken pipes and electronic waste among others.

***Proposed Mitigation Measures***

- All workers on the site will be required to wear protective clothing (PPE) while on duty
- All hazardous materials to be stored in appropriately sealed containers and clearly labeled
- Restrict noisy construction activities to off-peak hours.
- All debris should be removed and disposed offsite at approved dumpsites
- Ensure proper signage and warning signs are put up
- Provide safety regulations and first aid kits in visible accessible areas.

#### 6.4.2.4 Flora and Fauna Disturbance

There is likely to be disturbance to the existing Flora and Fauna on site during the decommissioning phase. This will be due to activities related to removal of underground facilities from the site.

***Proposed Mitigation Measures***

- Implement an appropriate re-vegetation program to restore the site back to its original status.
- During the re-vegetation period, appropriate surface water runoff controls will be taken to prevent surface erosion.
- Fencing and signs restricting access will be posted to minimize disturbance to newly-vegetated areas.

#### 6.4.2.5 Waste Management

Decommissioning activities are likely to generate huge amounts of solid waste at the site. These include but not limited to; scrap metal, building stones, e-waste, plastics etc.

***Proposed Mitigation Measures***

- Use of an integrated solid waste management system i.e. through a hierarchy of options i.e. 1) Reduction 2) Recycling 3) Re-use 4) Land filling

- The contractor shall select disposal locations based on the properties of the particular waste generated.
- All solid waste/debris to be disposed offsite by a licensed contractor.

## 6.5 Characterization of Impacts

Environmental impacts can be positive or negative, direct or indirect. The magnitude of each impact is described in terms of being significant, minor or negligible, temporary or permanent, long-term or short-term, specific (localized) or widespread, reversible or irreversible.

***Table 6-1 Characterization of Anticipated Environmental impacts***

| **Key** | **Type of Impact** | **Key** | **Type of Impact** |
|---|---|---|---|
| ++ | Major positive impact | + | Minor positive impact |
| - - | Major negative impact | - | Minor negative impact |
| 0 | Negligible/zero impact | NC | No change |
| SP | Specific/localized | W | Widespread |
| R | Reversible | IR | Irreversible |
| SH | Short Term | L | Long term |
| T | Temporary | P | Permanent |

On the basis of the information gathered during the field study, potential environmental and social impacts of the project are summarized below.

## Table 6-2 Summary of Anticipated Environmental Impacts

| Impact | Type of Impact | Remarks |
|---|---|---|
| **Construction Phase** | | |
| Employment Creation | ++ T | -During construction, there will be employment opportunities available to contractors, casual workers and consultants etc. |
| Optimal Use of land | ++ P | -The project proponents propose to develop several multi-storey apartments on the plot. This will ensure optimal use of the land therefore increasing the rate of return on investment. |
| Promote National and Local Economy | ++ L | -The implementation of this project will promote local businesses in the area such as food vendors, construction material suppliers etc.<br><br>-The County and National governments will also benefit through charges for statutory permits and taxes levied |
| Pollution<br>Air/noise/soil | - - T R | During construction air and noise pollution will increase as a result of construction activities. After construction, noise and air pollution from the site will be negligible and is not likely to significantly affect the neighborhood. |
| Health Hazards | - - T | The noise and dust generated by construction activities can be a health hazard to the public if not controlled. Other potential sources of health hazards include uncontrolled disposal of human waste on site and solid waste. |
| Health, Safety and Accident risks | - - T | -On any construction site, the risk of accidents and other related safety concerns is high. This danger is posed to the workers on site as well as the adjacent occupants and passers-by.<br>-Provide first Aid kit within the construction site.<br>-Enforce occupational health and safety standards. |
| HIV/AIDS | P IR | -Sensitize workers and the surrounding communities on prevention and management of HIV/AIDS through staff training, awareness campaigns, multimedia and workshops or during community Barazas. |
| Visual Impact | - SP | -During construction, the main visual impacts would occur during earthworks for construction of the foundation of the building. However, this impact would be generally confined to the site. |
| Mushrooming of Informal Businesses | T - | -Construction sites usually attract kiosks/informal vendors, which are attracted by the prospects of doing business especially selling food. Some have a potential to pollute the environment owing to lack of sanitation infrastructure. However, this will be a minor and temporary impact. |

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|---|---|---|
| Flora and fauna disturbance | R | -Construction activities may lead to loss of vegetation as well as soil disturbance and/or compaction.<br>After construction, landscaping shall be undertaken using the excavated soil to restore part of the biodiversity. |
| Solid waste | SH | -Construction waste shall be disposed of at approved Kajiado County dump sites. |
| Gender Equality | T | -Ensure equitable distribution of employment opportunities between men and women<br>-Provide toilets and bathrooms for both male and female workers on site<br>-Enforce workers code of conduct |
| Poor drainage and soil erosion | -- SH | -Construction of the proposed project will necessitate excavation and site clearance that will expose the soil to agents of erosion including wind and water. |
| Traffic Congestion | -- SH | -During construction, roads leading to the project site are likely to experience traffic congestion especially from construction vehicles. |
| **Operation Phase** | | |
| Promotion of Business | ++ L | -The proposed project will create and promote income generating activities for both small and medium sized enterprises in the area. |
| Income Opportunities | ++ L | -Upon completion, the proposed development will provide employment opportunities especially for the locals. |
| Provision of Housing | + | -Implementation of the proposed development will aid in reducing the current national housing shortage and will provide additional accommodation in Kitengela area |
| Increased property values | ++ L | -The proposed development will promote urbanization of the area thus increasing property values |
| Pressure on Existing Infrastructure Facilities | L - | -The proposed development is likely to increase pressure on existing infrastructure such as roads, power and water supply. |
| Proliferation of Uncollected Solid Waste | - - | -The proposed development is likely to contribute to increased generation of solid waste. This has a potential of attracting disease vectors such as rats, flies, and cockroaches. |
| Increased Surface Runoff | R | The proposed development will create more impervious areas compared to the current vacant site. This may lead to a higher runoff coefficient especially during the rainy season which may result in flooding |

| | | |
|---|---|---|
| Fire Risk | - - IR | -During operational phase, electrical faults can cause a fire risk within the development. This may lead to destruction of property and loss of life. |
| Human-wildlife conflict | 0 | -The proposed development shall be fenced off with a stone masonry perimeter wall to prevent the wild animals from accessing the development. This will help to prevent injury and damage of property.<br>-Create awareness and organize training programs for the residents and local community. |
| Climate change impacts | L | -The developer has proposed a soakage area within the development which shall collect storm water. The water can then be cleaned, stored and reused within the development especially during the dry seasons.<br>- install solar batteries for storage of solar power as well as a stand by generator to cushion against power interruption.<br>-Secure the development with a perimeter fence<br>The development shall incorporate building materials with anti-glare and thermal insulation properties as a cushion against high temperatures |
| **Decommissioning Phase** | | |
| Income Opportunities | SH ++ | The decommissioning activities will create a demand for a niche group of contractors, experienced in this type of works. Licensed waste collectors and transporters will also be required. |
| Restoration of the Natural Ecosystem | ++ P | Decommissioning activities will lead to the restoration of the site to its original state. Thus, the vegetation that had previously been cleared to prepare the site for construction activities will be restored. |
| Storm water runoff | ++ | -Restoration of the site back to its original state will reduce the amount of runoff generated from the site. |
| Pollution | T - - | Decommissioning activities are likely to result in air and soil pollution, as well as noise pollution from the operation of the required heavy machinery. |
| Health Hazard | T - | This impact will most likely arise from excess dust arising from the decommissioning activities. This may also arise from improper disposal of solid waste from the site. |
| Soil Erosion | SH - - | Without the paving and surface water drainage facilities on site, the amount of erosion of the natural soil on site may increase. |

## CHAPTER 7: ANALYSIS OF PROJECT ALTERNATIVES

### 7.1 Overview

This chapter highlights all the alternatives considered during the design of the project. These included looking at alternative project location, alternative land uses, technology employed in the design as well as a 'no development option'. A thorough assessment of the proposed project shows that the negative impacts likely to be caused by the project can be mitigated successfully. The following alternatives were considered.

### 7.2 No Development Option

The nil intervention describes a situation in which the proponent does not undertake the proposed development. This option would imply economic loss to the proponent, as well as to the local and national economies. The proponent will continue paying land rent and rates for a piece of land that is not earning income. The locals would lose in terms of employment generation as this would be foregone if the site is not developed. The cost of labor for the proposed project is estimated at **KES 407,392,845.00** ***(Four Hundred and Seven Million, Three Hundred and Ninety Two Thousand, Eight Hundred and Forty Five Only).*** The labor force will mainly be sourced from the local community. The national government would also lose the tax income that would be generated by the project if implemented.

This option means forfeiting the proposed development and avoiding all the anticipated environmental challenges of the project since it maintains the status quo of the environmental conditions of the project area. However, it does not add value to the status of the piece of land under consideration. The only benefit of this option would be that the anticipated negative impacts shall be avoided.

This option however, goes against many sectors and planning provisions such as the following:

- Vision 2030 economic and social blueprint
- The general growth and development of the economy
- The need to secure as many job opportunities for the growing unemployed population and emerging skilled work force
- The need to drive other key sectors of the economy such as the manufacturing sector, building and construction sub sector, agricultural and horticultural sector, the hospitality industry etc.

Implementation of the proposed project would therefore have more overall benefits than costs.

## 7.3 Relocation Option

The other option available is for the proponent to relocate the project to an alternative site. This implies looking for another piece of land elsewhere. Looking for land of a similar size and market location and completing official transactions might take over one year, with no guarantee that the land would be available, and if such land is available, its cost may not be affordable for the proponent. The proponent will have to restart the planning, design, and approval of the project afresh. The proponent will also need to re-engage professionals like EIA lead/audit experts and physical planners to assess the viability of the new site. In a year's time, the cost of labor and construction materials will have increased tremendously given the current high inflation rate in the country. This could lead to eventual abandonment of the project since it may no longer be economically viable.

The current site is considered suitable if the proposed mitigation measures are implemented. In addition, alternative land would have cost implications on the part of the proponent and financial loss in relation to the current development. Therefore, the option of seeking alternative land, whereas the anticipated impacts are manageable presents a high risk and an increase in project cost. It is against this backdrop that an alternative location to implement the project may not be considered.

## 7.4 Exploration of Alternative Land Uses

The developer could explore alternative uses for the site such as Recreational, Commercial or Institutional (Educational) development. Development of a recreational facility is not likely to maximize returns on investment given the cost of land and construction cost. Development of a school/commercial use on the plot is likely to face competition from the existing establishments in the immediate neighborhood. The proposed development of a comprehensive housing scheme was informed by market research and a feasibility study which confirmed the viability of the project. The proposed development would therefore be the most viable option for this site considering the high demand for accommodation in the area especially for the middle-class population.

## 7.5 Implementation of the Proposed Project

The proposed development of a housing scheme is the proponent's preferred alternative after a thorough consideration of available options on the said piece of land. The EIA report shall be submitted to NEMA for evaluation and a license issued after evaluation of impacts of the proposed project on the socio-economic, physical and biological environment. The developer has to ensure that all the conditions of licensing are adhered to and all environmental regulations complied with. This EIA study report has been prepared in accordance with Environmental Management and Co-ordination Act (Cap 387) which aims at reducing environmental impacts to the minimum extent possible.

## 7.6 Alternative Project Design

In view of the finite nature of land as a resource, the existing project design is geared towards taking into account space, costs, aesthetics, practicability and sustainability. Under project design, a number of alternatives were assessed to determine the best possible options that would be feasible and avoid adverse impacts on the environment. These are described below;

### i) Access

The project site is designed to be accessed through the fronting 9M Road. This is the best alternative since there are plans to expand the road to 15M.

### ii) Water

The proponent proposes to drill a borehole on site for water supply. The other available alternative is installation of rain water harvesting facilities and recycling of treated waste water from the waste water treatment plant. Storm water from the development shall also be collected and reused within the site for landscaping and gardening etc. The development has also incorporated water storage tanks to cushion against water shortage.

### iii) Waste Water Management

The proponent intends to treat the waste water on site since there is no trunk sewer in the area. The treated waste water shall then be recycled and the excess water discharged into the proposed soakage area. This is the best alternative considering there is no trunk sewer in the area.

### iv) Energy Sources

The proponent proposes to connect the development to the Kenya Power main supply for power supply. Other measures that will be put in place to conserve energy include; use of LED light bulbs, maximize the use of natural lighting, switching off lights when not in use and use of automatic lighting. The design of the proposed units will also ensure that all internal rooms are well lit from natural lighting. The development shall also incorporate a standby generator to cushion against power outage.

The proponent shall implement the above recommendations in order to conserve energy and promote sustainable use of natural resources.

## 7.7 Conclusion

All the alternative options analyzed have implications, which make the current design option proposed by the proponent to be more viable. The preferred alternatives are likely to maximize the returns on investment for the proponent while ensuring environmental sustainability.

# CHAPTER 8: HEALTH, SAFETY AND ACCIDENT PREVENTION PLAN

## 8.1 Overview

Environmental Health and Safety (EHS) is the broader and holistic aspect of protecting the workers, the workplace, the tools / equipment, and the biotic environment. It is an essential tool in determining the EIA study. The objective of the EHS on the proposed project is to develop rules that will regulate environmentally instigated diseases and occupational safety measures during construction and the operational phases of the proposed project.

The following principles/measures form the foundation for the approach to a safe and healthy workplace:

- All occupational injuries and illnesses can be prevented.
- Each employee is responsible for compliance with company safety and health requirements as a condition of employment.
- Each employee has the right and duty to question the adequacy of safety and health procedures established for their job.
- The contractor will proactively identify workplace deficiencies and take corrective action.
- The contractor will investigate events to understand why the event occurred; correct deficiencies identified, and then share and institutionalize the lessons learned.

Employee decisions will always be guided by contractor's commitments to safety. All site employees have the right to stop work if an unsafe or potentially unsafe condition is observed. The contractor must endorse these measures and principles and ought to exceed the highest standards of safety for industry.

The contractor is ultimately responsible for the implementation of the Project Safety and Health Program. As the project progresses, it may be necessary to modify certain organizational aspects/functions, such as personnel responsibilities and authorities, so that individual/specific tasks can be performed as efficiently, effectively and safely, as possible. The contractor personnel responsible for safety and health include; Safety and Health Manager, Project Manager and Site Supervisor(s).

*Table 8-1 Summary of anticipated accidents/emergencies and the action plans*

| Type of Possible Accidents | Action Plan |
|---|---|
| Workers' injury during construction | -First aid provision<br>-Maintenance of all machinery in good working condition at all times.<br>- Workers compensation<br>- Wearing of protective gear by the workers |
| Fire outbreak (electrical etc.) during construction | - Train staff on safety and fire precaution measures<br>- Provide firefighting equipment |
| Robbery | - Install security alarm systems<br>- Contract a reputable security firm to keep guard |
| Road Accidents | - First aid provision<br>- Insurance cover<br>- Avail the necessary warning/caution signs |
| Drainage blockages/flooding | - Proper maintenance of drainage systems<br>- Responsible disposal of waste |

## 8.2 Plans to Ensure the Health and Safety of Workers and the General Public

### 8.2.1 Noise

During the construction phase, noise will be produced by construction machines such as concrete mixers, grinders, excavators and the movement of construction vehicles to and from the site.

**Mitigation measures:**

- Sound-attenuated equipment will be used as much as possible.
- Workers shall be provided with Personal Protective Equipment (PPE) such as ear muffs for ear protection and their use thereof should be enforced.
- The consultants and contractors shall ensure that the works are carried out in a proper manner and planning so as to minimize the impact of the construction in terms of noise.
- Restrict noisy construction activities to recommended NCA working schedule.

### 8.2.2 Air Quality

The proposed development is not expected to emit fumes, dust or odor that it would affect the current air quality of the area. However fumes of Nitrogen Oxides {NOx} and Sulphur Oxides {SOx} generated from vehicles could be a major source of air pollutants, although it is not likely to cause any significant impact on the local air quality. It is however anticipated that during the construction phase, building works will generate dust.

**Mitigation measures:**

- All equipment on site shall be properly maintained and in good operating condition so as to emit minimal air pollution
- Masks to be provided to all personnel in dust generating areas throughout the construction period.
- The consultants and contractors shall ensure that the works are carried out in a proper manner so as to minimize the impact of the construction on the air quality
- Proper maintenance of construction vehicles to minimize on air pollution.
- Water shall be sprinkled on dusty areas in order to contain dust during construction

### 8.2.3 Road Safety

Traffic will need to be controlled during construction especially with heavy vehicles turning and by enforcing speed limits for construction vehicles. Warning/caution signs should be erected at the site.

### 8.2.4 Disturbance to the Public

Noise disturbance to the public would occur during construction works including construction traffic.

**Mitigation measures:**

- Warning / information signs should be erected when construction works are about to begin.
- Construction activities should not be carried out at night. Construction works will be carried out in adherence to NCA/NEMA stipulated hours. After construction the impact of noise will be insignificant.
- Liaise closely with the local community

### 8.2.5 Public Health and Occupational Safety

During construction there will be increased dust, noise and air pollution levels. These are considered to be negative impacts, although for the public they would be minor. The workforce would be more exposed to these hazards.

**Mitigation measures:**

- Emergency Response Plans (ERPs) should be well understood and communicated to all concerned parties including the local inhabitants of the area.
- Workmen should be provided with suitable protective gear (such as nose masks, ear plugs/muffs, helmets, overalls, industrial boots, etc.), and there should be fully equipped first aid kits on site.
- The project proponent will avail sanitary facilities to the construction workers
- Ensure adequate hoarding to protect passers-by from falling debris.

- Information and education on the operation and management of equipment, including all the environmental aspects should be offered to all concerned for purposes of project responsibility as well as safety.
- A health and safety expert shall be available on site at all times.

## 8.3 Site Organization

To ensure health and safety conditions and prevent accidents on site, effort will be made to have a clear site organization plan. These include:

- Developing a clear site organization plan and construction schedule
- Delivery and storage of materials at appropriate locations
- Right size of staff/workers with clear work schedule and appropriate protective gear
- Control staff and vehicle movement on site and keep out unwanted persons
- Site office with safety kit
- Site toilet
- Adequate water supply for both construction work and worker use.

## 8.4 Enforcement of Standards and Legal Requirement

The project must ensure that appropriate standards and legal requirements are met. These include:

- That the building works are in accordance to approved Architectural drawings and plans
- That building operations meet the building code specifications
- That requirements of the Factory Workers Act are followed
- That requirements of the Occupational Safety and Health Act are followed
- That requirements of the Public Health Act are followed
- That requirements as outlined in the Environmental Management Plan are Observed

## 8.5 Activities of Workers

The following activities by workers are clearly identified and must be closely monitored and organized to ensure health, safety and accident standards on site:

- Pushing of wheel barrows
- Hand packing of stones on road surface
- Lifting and laying of building material – stone, concrete etc.
- Plastering of walls
- Bending, cutting and laying of reinforcement steel
- Other general building works

## 8.6 Activities involving Machinery and Light Equipment

The activities involving machinery and plant must also be properly organized and monitored in order to ensure health and safety and prevent accidents. The machinery to be used on site include among others;

- Compacting machine
- Vibrators
- Concrete mixer
- Hoist machine
- Goods trucks
- Tippers

## 8.7 Insurance

The project proponent and building contractor will take appropriate insurance cover for the personnel and/or workers.

# CHAPTER 9: ENVIRONMENTAL MANAGEMENT/MONITORING PLAN

## 9.1 Overview

Environmental management and monitoring involves, among others, the putting in place of sustainable environmental mitigation measures and monitoring plans. It is essential that the project is both environmentally friendly and appreciated by local residents. As already noted in earlier sections of this report, the implementation of this project will have a lot of positive impacts on the local community, which include creation of employment directly or indirectly.

Environmental management and monitoring are essential in the project's lifespan as they are conducted to establish if the project implementation has complied with the set environmental management standards as articulated in the Environmental Management and Coordination Act (EMCA) Cap 387, and its attendant Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019.

## 9.2 Environmental Management Plan

Following the desk studies, field investigations and public consultations undertaken in this study, an Environmental Management Plan (EMP) has subsequently been developed. The EMP provides an outline of the environmental aspects, potential impacts, mitigation measures, responsibility for monitoring and associated [estimate] costs.

The responsibility for implementation of mitigation measures lies with the Project Manager, who must ensure that the Contractor implements all specified mitigation measures. In order for the Contractor to carry out environmental management activities during construction, the Contractor shall draw up an Environmental Management Plan of his own to show how he will address the mitigation measures during the construction period. The Project Manager is responsible for assessing the Contractor's Environmental Management Plan.

The benefits of including the EMP as part of the EIA are:

- Encouraging authorities to check the practicality and likelihood of implementation of mitigation measures;
- Ensuring that the mitigation measures are properly incorporated into the project design and contract documentation after authorization is granted;
- Encouraging the project proponent to meet the requirements of the EMP which form the basis for the conditions attached to authorization of the project; and
- Forcing the project proponent to internalize environmental impacts that would otherwise become an environmental cost.

**Table 9-1 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN FOR THE PROPOSED DEVELOPMENT**

| Environmental Issues | Potential Impacts | Recommended Mitigation Measures | Responsible Party | Monitoring Means | Cost (Ksh) |
|---|---|---|---|---|---|
| **Construction** | **Phase** | | | | |
| Pollution | -Air Pollution | • Exposed stockpiles of e.g. sand will be enclosed, covered, and watered daily to minimize dust<br>• Use of dust screens to minimize air pollution to adjacent users.<br>• All personnel working on the project will be trained prior to starting construction on methods of minimizing air and noise pollution.<br>• Workers shall be provided with proper PPE such as dust masks. Mechanisms shall be put in place to ensure PPE provided are for the right activities and are always worn within the project site.<br>• All machinery and equipment shall be maintained in good working condition in order to minimize emissions to acceptable standards.<br>• Construction trucks delivering materials to site shall be covered in order to minimize emissions to the surrounding areas<br>• No burning of materials shall be permitted at the project site.<br>• Frequent watering of the access road to minimize dust. | Contractor<br><br>Project Manager | -Routine Inspection<br><br>-Physical Inspection | 3,000,000.00 p.a |
| | -Noise Pollution | • Restrict noisy construction activities to the NCA/NEMA recommended working hours.<br>• Use quiet equipment (i.e. equipment designed with noise control elements).<br>• Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.<br>• Sensitize construction drivers to avoid hooting especially when passing through sensitive areas such as churches, offices, hospitals, residential houses and schools.<br>• Conduct periodic noise measuring and monitoring to determine levels and extent of harmful noise.<br>• Clearly label the high noise areas.<br>• Machines that exceed acceptable noise limits should be equipped with silencers or lagging materials or specially designed acoustic enclosures. | Contractor<br><br>Project Manager | -Routine Inspection<br><br>-Physical Inspection | 500,000.00 p.a |

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| | | • Provide PPE (Ear Muffs) to persons operating within or visiting identified high noise areas.<br>• Inform local residents when construction activities are likely to generate excessive noise in order to minimize disruption to local residents. | | | |
| | -Soil Pollution | • Ensure no spillage occurs by servicing the construction vehicles regularly.<br>• Prepare and display spill response procedures at the site.<br>• Training of workers on spill response procedures and management.<br>• In case of spillage the Contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent material and/or other materials approved by the Project Manager.<br>• All vehicles that have oil leaks shall be contained in one place to avoid chances of spillage in different parts of the site.<br>• Observe the requirements of the emission control regulations.<br>• Protect project area from fire by posting warning signs in areas where hydrocarbon fuels are used. | Contractor<br><br>Project Manager | -Routine Inspection<br><br>-Physical Inspection | 500,000.00 p.a |
| Health Hazards | -Littering of the Site and the immediate environment<br>-Occupational deafness<br>-Noise and dust from construction activities<br>-Uncontrolled human waste | • All workers on the site will be required to wear protective clothing (PPE) while on duty<br>• All hazardous materials shall be stored in appropriately sealed containers and clearly labeled.<br>• Workers operating equipment that generate noise shall be provided with noise protection gear including ear muffs and plugs. Workers operating equipment generating noise levels greater than 80 dBA continuously for 8 hours or more should use earmuffs whereas those experiencing prolonged noise levels of 70 – 80 dBA should wear earplugs.<br>• All solid waste on site likely to cause injury to workers or passers-by shall be removed and disposed offsite.<br>• Ensure all hazardous areas are marked.<br>• Provide safety regulations and first aid kits on site in visible accessible areas. | Project Manager<br><br>Contractor | -Physical inspection<br><br>-maintenance records<br>-Medical records<br>-Records of accidents, injuries and damages done | 1,000,000 .00 |

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| | | • Minimize or altogether eliminate mosquito breeding grounds<br>• Provide appropriate solid waste disposal facilities<br>• Provide a toilet on site for construction workers | | | |
| Health, Safety, Accident Risks | - Injuries from falling debris<br>-Occupational injuries<br>-Safety hazards | • Employ skilled and trained workers, and provide protective clothing<br>• Prepare clear work schedule<br>• Have adequate worker insurance cover<br>• Provide sanitation facilities and clean drinking water on site<br>• Enforce occupational health and safety standards.<br>• Mandatory construction of adequate hoarding around the project area prior to commencement of any construction activity.<br>• Ensure that all construction activities are carried out within the hoarded area.<br>• Maintain a record of incidents and accidents on site.<br>• The workers should receive requisite training especially on the operation of the machinery and equipment.<br>• There should be adequate warning and directional signs.<br>• Ensure that the prepared code of conduct for staff is followed to prevent accidents.<br>• Develop a site safety action plan detailing safety equipment to be used, emergency procedures, restrictions etc<br>• Provide first Aid kits within the construction site. | Contractor<br><br>Project Manager | -Physical inspection<br>-Medical records<br>-Maintenance records<br>-Training records | Included in development cost |
| HIV/AIDS | -HIV infections | • Sensitize workers and the surrounding communities on prevention and management of HIV/AIDS through staff training, awareness campaigns, multimedia and workshops or during community Barazas.<br>• Identify other players (local CBOs, NGOs, and government organizations) on HIV/AIDS for enhanced collaboration.<br>• Develop an intervention strategy compatible with the construction program to address success of the HIV/AIDS prevention and provide peer educators for sustainability in collaboration with other stakeholders. | Contractor | -Training Records | 500,000 p.a |

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| | | • Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs | | | |
| Mushrooming of Informal Business especially selling food | -Disease outbreaks e.g Cholera<br>-Littering | • Provide clean and safe drinking water at the site<br>• Provide a toilet at the site to ensure hygiene and proper sanitation is observed.<br>• The workers will have designated areas for eating and resting.<br>• Food vendors will only be allowed to sell food within the hoarded area to avoid littering of the surrounding areas. | -Contractor<br>-Project Manager | -Physical Inspection<br>-Water quality records | Included in development cost |
| Visual Impact | -Compromise the aesthetic value of the environment | • Mandatory construction of adequate hoarding around the project area prior to commencement of any construction activity.<br>• Ensure that all construction activities are carried out within the hoarded area. | -Contractor<br><br>-Project Manager | -Physical Inspection<br>-Maintenance records | Included in development cost |
| Generation of Solid Waste | Compromise the aesthetic value of the surrounding environment<br>-breeding of mosquitoes | • Adequate collection and storage of waste will be provided on site, and safe transportation to, and disposal methods at designated areas.<br>• A site waste management plan shall be prepared by the contractor prior to commencement of construction activities. This shall include designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring.<br>• Ensure no littering of the open spaces.<br>• Waste to be collected regularly to control air pollution and vermin/insects etc.<br>• Provide proper solid waste disposal and collection facilities.<br>• Waste will be collected by a licensed operator to avoid illegal final dumping at unauthorized sites.<br>• All persons involved in refuse collection shall be in appropriate protective gear. | Contractor<br><br>Project Manager | -Waste management records<br>-Physical inspection | 700,000.00 p.a |

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| | | • Use of an integrated solid waste management system i.e. through a hierarchy of options i.e. 1) Reduction 2) Recycling 3) Re-use 4) Land filling.<br>• The contractor shall select waste disposal locations based on the properties of the particular waste generated. | | | |
| Poor drainage and Soil Erosion | -Air pollution caused by wind erosion<br>-Flooding | • Ensure exposed stock piles of soil are watered regularly to minimize wind erosion.<br>• Ensure all construction activities and storage of materials are carried out within the hoarded area.<br>• In cases where it is identified that during construction there is a danger of increased run-off at the project site, temporary drainage channels or holding ponds shall be employed. | Contractor<br><br>Project Manager<br><br>Contractor | -Physical inspection<br><br>-Physical Inspection | 500,000.00 p.a<br><br>Included in development cost |
| Traffic congestion | -Traffic Snarl ups<br>-Construction vehicles are likely to damage roads. | • Provide adequate on-site parking dedicated for construction site personnel and heavy vehicles.<br>• All deliveries and collections to and from the site should be staggered and restricted to off-peak traffic hours to prevent obstruction of other road users.<br>• Traffic speeds for construction and other vehicles coming to and fro the project site shall be restricted to 20 Km/h to ensure pedestrian safety.<br>• Signage to identify the construction site shall be erected at the site entry point.<br>• Appropriate traffic warning signs, informing road users of a construction site entrance ahead and instructing them to reduce speed, shall be placed along the main road near the entrance to the site<br>• Train drivers on road safety.<br>• Limit idling time for pick-up trucks and other smaller equipment, observe a common-sense approach to vehicle use, and encourage workers to put off vehicle engines whenever possible.<br>• Repair any damages to the access road after completion of construction. | Contractor<br><br>Project Manager | -Maintenance records<br><br>-Physical inspection<br><br>-Random Checks | 300,000.00<br><br>1,000,000.00 |

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| Gender Equality | -Harassment of female workers. | • Ensure equitable distribution of employment opportunities between men and women.<br>• Provide toilets and bathrooms for both male and female workers on site<br>• Enforce workers code of conduct.<br>• The works contractor shall be required, under its contract, to prepare and enforce a No Sexual Harassment and Non-Discrimination Policy, in accordance with national law where applicable.<br>• The contractor shall prepare and implement a gender action plan | -Contractor<br><br>-Project Manager | -Workers registration records | Nil |
| Flora and Fauna Disturbance | -Loss of vegetation<br>-Displacement of fauna<br>-Introduction of invasive species | • The Contractor's Environmental, Health and Safety staff shall monitor regeneration of natural vegetation as well as the appearance/spread of invasive or opportunistic species within the disturbed areas. Monitoring should include spotting and uprooting of unwanted germinating plants.<br>• Ensure use of excavated soil for landscaping to ensure that invasive species of flora or fauna are not introduced at the site.<br>• Spare the vegetation that must not necessarily be removed especially trees.<br>• Minimize the amount of destruction caused by machinery by promoting non- mechanized methods of construction.<br>• Trees and grass shall be replanted on the open spaces after construction. | Contractor | Physical Inspection<br><br>Maintenance records | 200,000.00 p.a |
| **Operation** | **Phase** | | | | |
| Pressure on Existing Infrastructure Facilities and Services (roads, power and water supply) | -Increased consumption of water and electricity<br>-Water wastage<br>-Road damage | • Management and monitoring of water usage<br>• Installation of pressurized faucets<br>• Explore renewable sources of energy such as solar energy<br>• Repair all leaking taps and valves.<br>• Maximize on natural lighting to reduce the use of artificial lighting.<br>• Switch off electrical equipment, appliances and lights when not being used.<br>• Install occupation sensing lighting at various locations such as storage areas and stairways which are not in use all the time. | Property manager | -Annual Audits | 1,500,000.00 p.a |

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| | | • Install energy saving bulbs at all lighting points within the building<br>• Water storage tanks shall be provided<br>• Explore alternative sources of water such as harvesting of rain water and recycling<br>• Regular maintenance of the road | | | |
| Solid waste management | -Solid waste may attract disease vectors and vermins<br>-Health hazard | • Make arrangements for the regular collection of garbage from the site and appoint a licensed solid waste contractor to collect and transport the waste for dumping at approved dumping sites.<br>• Encourage waste separation at the generation points in order to ensure minimization of the waste stream and recover recyclable waste.<br>• Waste to be collected regularly to control air pollution and vermin/insects etc.<br>• Provide proper solid waste disposal and collection facilities.<br>• Provide a garbage chute protected from rain and animals<br>• All persons involved in refuse collection shall be in appropriate protective gear.<br>• Use of an integrated solid waste management system i.e. through a hierarchy of options i.e. 1) Reduction 2) Recycling 3) Re-use 4) Land filling.<br>• The contractor shall select waste disposal locations based on the properties of the particular waste generated. | Property manager | -Annual Audits | 1,000,000.00p.a |
| Liquid waste management | -Health hazard | • Ensure Regular checks of the waste water treatment reticulation system to ensure it's in proper working condition.<br>• Conduct regular inspection of the waste water pipes and repair blockages or damages appropriately<br>• Ensure regular monitoring of the waste water reticulation system to ensure that the stipulated effluent discharge rules and standards are not violated.<br>• All waste pipes should be accessible from outside and free at every part of the system for inspection, cleaning and repair. | Property manager | -Annual Audits | 100,000.00p.a |

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| Increased Surface run off | -Damage to property<br><br>-Flooding | • Use of permeable construction materials e.g. cabro paving where possible to allow for infiltration and reduce surface runoff<br>• Planting of trees and grass on site after completion of construction activities to reduce the speed of runoff and increase water retention capacity of the soil. | Property manager | -Annual Audits<br>-Physical inspection | -Included in development cost |
| Fire Risk | -Damage to property and loss of lives. | • Adhere to the provisions of the building code regarding fire safety<br>• Ensure all firefighting equipment is in proper working condition by conducting regular audits.<br>• Ensure all fire exits hare clear and visible signage<br>• Conduct regular fire drills | Property manager | -Fire Audits<br>-Training records<br>-Emergency Response Procedures<br>-Physical inspection | 500,000.00p.a |
| Environmental hazards | Non-compliance with the provisions of EMCA (Cap 387) could result in closure of the facility. | • Undertake initial Environmental Audit one year after commencement of operations, and once every consecutive year after that in compliance with the EMCA (Amendment) Act (Cap 387) | Property Manager | -maintenance records | 200,000.00p.a |
| Traffic Congestion | Traffic snarl ups | • Provide adequate parking within the facility to avoid vehicles parking along the access Road<br>• Carry out a Traffic Impact Assessment<br>• Provision of designated entry and exit points | Property Manager | -Physical inspection | 500,000.00 |

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| Air pollution | Generation of dust | • Plant trees around and within the proposed development to act as wind breakers which can help to minimize dust.<br>• Regular maintenance of the access road to contain dust<br>• Control traffic coming into and out of the proposed site e.g by having speed limits. | Developer<br><br>Property manager | -maintenance records<br><br>-Physical inspection<br><br>-Environmental Audits | 600,000.00 p.a |
| Climate Change Risk Assessment | -Flooding<br><br>-Drought<br><br>-Power Interruptions<br><br>-Human-Wildlife conflict<br><br>-High temperatures | • Construction of a soakage area within the development which shall collect storm water. The water can then be cleaned, stored and reused within the development especially during the dry seasons.<br>• Install solar batteries for storage of solar power as well as a stand by generator to cushion against power interruption.<br>• Construct a perimeter fence which will help to keep away the wild animals from causing injury to the residents and property.<br>• Incorporate building materials with anti-glare and thermal insulation properties as a cushion against high temperatures. | Developer<br><br>Property Manager | -maintenance records<br><br>-Physical inspection<br><br>-Environmental Audits | Included in development Cost |
| Health Hazards | -Accidents<br><br>-Loss of Lives | • Fence off the storm water soakage area and install warning signs<br>• Limit access into the soakage facility by authorized personnel only.<br>• Conduct regular checks and maintenance of the soakage facility to ensure it does not emit bad smell or become a nuisance to the public.<br>• Regular checks of the waste water treatment plant to ensure it is working properly. | Developer<br><br>Property Manager | -Maintenance Records<br><br>-Physical Inspection | 200,000 p.a |
| Oil Leaks and Spills | Soil Pollution<br><br>Water Pollution | • Fats and oil interceptors must be installed along the drainage channels leading from the kitchen and car parks.<br>• Car park areas must be well managed and the drains from these areas controlled | Developer<br><br>Property Manager | -Maintenance Records<br><br>-Physical Inspection | 50,000.00p.a |

| **Decommissioning** | **Phase** | | | | |
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| Pollution | -Air Pollution<br>-Noise pollution<br>-Soil pollution | • Exposed stockpiles of e.g. sand will be enclosed, covered, and watered daily to minimize dust.<br>• All personnel working on the project will be trained prior to starting construction on methods of minimizing air quality impacts.<br>• Workers in dusty areas on the site should be provided with dust masks during dry and windy conditions.<br>• Clear and visible warning signs shall be put up at visible areas within the site.<br>• Decommissioning activities to be limited to off-peak hours<br>• Install portable barriers to shield compressors and other equipment where necessary.<br>• Prescribe noise reduction measures if appropriate e.g. restricted working hours, transport hours and noise buffering. | Contractor | -Routine Inspection<br><br>-Physical Inspection | 800,000.00 |
| Soil Erosion | Soil erosion by wind and water. | • Ensure exposed stock piles of soil are watered regularly to minimize wind erosion.<br>• Ensure all excavation activities are carried out within the hoarded area<br>• Implement an appropriate re-vegetation program to minimize erosion<br>• Appropriate surface water run off controls will be taken to prevent surface erosion.<br>• Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences. | Contractor | -Physical inspection | 1,000,000.00 |

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| -Flora and Fauna disturbance | -Destruction of Fauna habitats<br>-Vegetation destruction | • Implement an appropriate re-vegetation program to restore the site to its original status.<br>• During the re-vegetation period, appropriate surface water runoff controls will be taken to prevent surface erosion.<br>• Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences.<br>• Fencing and signs restricting access will be posted to minimize disturbance to newly-vegetated areas. | Contractor | -Physical inspection | 700,000.00 |
| Health Hazards | -Worker injuries | • All workers on the site will be required to wear protective clothing while on duty<br>• All hazardous materials to be stored in appropriately sealed containers and clearly labeled<br>• Restrict noisy construction activities to off-peak hours.<br>• All debris shall be removed and disposed offsite at approved dumpsites<br>• Ensure proper signage and warning signs are put up<br>• Provide safety regulations and first aid kits in visible accessible areas<br>• A Hoarding shall be constructed and access to the site restricted to workers only | Contractor | -Physical inspection<br>-maintenance records<br>-Medical records<br>-Record of accidents, injuries and damages done | 2,000,000.00 |
| Proliferation of solid waste e.g. scrap material and other debris | -Solid waste can compromise aesthetic value of the environment | • Use of an integrated solid waste management system i.e. through a hierarchy of options i.e. 1) Reduction 2) Recycling 3) Re-use 4) Land filling.<br>• The contractor shall select disposal locations based on the properties of the particular waste generated.<br>• All solid waste/debris to be disposed offsite by a licensed contractor. | Contractor | -Waste management records<br>-Physical inspection | 1,000,000.00 |

## CHAPTER 10: CONCLUSION AND RECOMMENDATIONS

This Report has been prepared in compliance with the Environmental Management and Coordination Act (Cap 387) and in line with Environmental Regulations (Environmental Impact Assessment and Audits) 2003. The report evaluates the project in terms of the proposed development, possible adverse impacts during both construction and operation phases and provides an Environmental Management and Monitoring Plan.

Baseline data on the environmental characteristics of the project's area of influence, biological environment, socio-economic and socio-cultural environment was collected through physical observation, interviews with key informants and relevant secondary sources. The laws and regulations relevant to the proposed project were also reviewed and incorporated in the EIA report.

A comprehensive public participation exercise was undertaken by the consultant. This involved key informant interviews, public meetings and administration of structured questionnaires. All the project affected persons were consulted and their views incorporated in the report. These included; land owners, community leaders, government agencies, institutions, residents and the business community within the vicinity of the site.

The potential positive and negative environmental and social impacts were identified based on the different phases of project development. Appropriate mitigation measures were provided as well as an Environmental Management and Monitoring Plan. The impacts were characterized in terms of positive or negative impacts, direct or indirect impacts. The magnitude of each impact was also described in terms of being significant, minor or negligible, temporary or permanent, long-term or short-term, specific (localized) or widespread, reversible or irreversible. Some of the positive impacts from the development include: Employment creation, Promotion of local and National economy, optimal use of land among others. The major potential negative impacts include but not limited to; air and noise pollution, health and safety issues, storm water drainage and solid waste generation. Measures to mitigate the identified impacts have been provided in the Environmental Management and Monitoring Plan.

The EIA concludes that the environmental and socio-economic benefits that will be realized if the proposed project is implemented, far outweighs the identified negative impacts most of which are of a short term nature and can be mitigated successfully. Further, the identified adverse impacts on the physical and natural environment will not be cumulatively significant, and can be handled through the recommended mitigation and monitoring measures at a reasonable cost.

The proposed project design has integrated mitigation measures with a view to ensuring compliance with all the applicable laws and procedures. The proposed project will be implemented subject to the statutory approvals by Kajiado County and NEMA among other institutions.

During project implementation and occupation, Sustainable Environmental Management (SEM) will be ensured through avoiding inadequate/inappropriate use of natural resources, conserving nature sensitively and guaranteeing a respectful and fair treatment for all people working on the project, general public within the vicinity and inhabitants of the project.

It is our considerable opinion that the proposed development is a step in the right direction. Its implementation will bring about numerous positive economic impacts and other benefits as outlined in the EIA report.

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## APPENDICES

1. Property Ownership Documents
2. Location Map
3. Feedback from Public Consultation Exercise
4. WRMA and NEMA permits for the proposed borehole
5. Master Plan and Architectural Drawings for the proposed project
6. EIA License for the Lead Expert
7. PIN Certificate and Registration Certificate
8. Summary BoQ
9. Proposed Bio-Digester Design
10. TOR Approval Letter

## Appendix 1

Property Ownership Documents

## Appendix 2

Location Map

## Appendix 3

Feedback from Public Consultation Exercise

## Appendix 4

WRMA and NEMA permits for the proposed borehole

## Appendix 5

Master Plan and Architectural Drawings for the proposed project

## Appendix 6

EIA License for the Lead Expert

## Appendix 7

PIN Certificate and Registration Certificate

## Appendix 8

Summary BoQ

## Appendix 9

Proposed Bio-Digester Design

## Appendix 10

TOR Approval Letter