ENVIRONMENTAL IMPACT ASSESSMENT FULL STUDY REPORT

FOR THE PROPOSED CONSTRUCTION

OF RESIDENTIAL APARTMENT DEVELOPMENT ON PLOT L.R No. 209/6880, ALONG GATUNDU CRESCENT, KILELESHWA, WESTLANDS SUB COUNTY, NAIROBI COUNTY.

EIA/EA LEAD EXPERT

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PROPONENT

MINARA HOMES LIMITED,

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JUNE, 2022

CERTIFICATION

This EIA Full Study Report was prepared in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (Amended, 2015) and the Environmental (Impact Assessment and Audit) Regulations, 2003 for submission to the National Environment Management Authority (NEMA). This report has been prepared by Bio Savanna Limited; NEMA registered and licensed EIA/EA Firm of Experts.

To the best of our knowledge we certify that all the information contained in this report is correct and righteous.

EIA/EA LEAD EXPERT:

Name: BIO SAVANA LIMITED

Signature: ……....

Date: ……

PROPONENT:

Company: MINARA HOMES LIMITED

Signature: ……....

Date: ……

ABBREVIATIONS

ALARP	As low as reasonably practicable
CO_x	Carbon Oxides
EHS	Environmental Health and Safety
EHS	World Bank General Environmental Health and Safety Guidelines
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EPRA	Energy and Petroleum Regulatory Authority
EPRP	Emergency Preparedness and Response Plans
GIIP	Good international Industry Practice
GRS	Grievance Redress System
HAZID	Hazard Identification
HSE	Health Safety & Environment
HSEMP	Health & Safety Environmental Management Plan
IFC	International Finance Corporation Performance Standards
KEBS	Kenya Bureau of Standards
KPLC	Kenya Power and Lighting Company
MSDS	Material Safety Data Sheet
NEMA	National Environment Management Authority
NO_x	Nitrogen Oxides
OHS	Occupational Health and Safety
OSH	Occupational Health & Safety
OSHA	Occupational Safety and Health Act
PDCA	Plan-Do-Check-Act
PM	Particulate Matter
SO_x	Sulphur Oxides
TOR	Terms of Reference
WHO	World Health Organization

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EXECUTIVE SUMMARY

The proposed project for which this EIA full study report has been prepared is the proposed construction of Residential Apartments development project shall be constructed on a 1 Acre piece of land on Plot L.R No: 209/6880, along Gatundu Cresent, off Gatundu road, Kileleshwa, Westlands Sub County, in Nairobi County.

In compliance with the requirements and provisions of the Environmental Management and Coordination Act No. 8 of 1999 and Regulation 10 of the Environmental (Impact Assessment and Audit) Regulations, 2003 Legal Notice No. 101 and Legal Notice 15 of the Environmental (Impact Assessment and Audit) Regulations, 2016, the Authority requires the proponent to initiate an Environmental Impact Assessment full study. Pursuant to the afore-mentioned regulations, in June, 2022, Terms of Reference (TOR) initiating an Environmental Impact Assessment Full Study were prepared and submitted to NEMA **(NEMA/TOR/5/2/438)** and approved.

The proposed development comprises construction of Residential Apartments and all its facilities and infrastructure located on co-ordinates 1˚ 16' 43.35" S and 36˚ 47' 0.67" E on Plot L.R No: 209/6880, along Gatundu Cresent, off Gatundu road, Kileleshwa, Westlands Sub County, in Nairobi County. This construction project shares impacts similar to most construction activities ditto urban development projects, and are thus manageable through the proposed EMP that shall be developed commensurate to the assessment of its potential environmental and social impact in this study report.

The Environment Management and Co-ordination Act (EMCA), 1999 (Amended 2015), is the legislation that governs EIA studies. The second schedule of the Act lists the projects that are supposed to undergo EIA studies in accordance with section 58 (1-4) of the Act. It makes it mandatory for any proponent of a project, to, before financing, commencing, proceeding with, carrying out, executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the second schedule in the Act, submit a project report to the National Environment Management Authority (NEMA), in the prescribed form, giving the prescribed information.

The overall objective of the study was to construct Residential Apartments and all its facilities and infrastructure to provide better and affordable housing facilities and services. On the other hand,

the major objective of the EIA full study was to evaluate the effects/impacts of proposed development in relation to the general environmental aspects i.e. physical, biological, and social-economic environments. It aims at influencing the protection and co-existence of the development with the surroundings as well as the compatibility of the proposed development to the area; to ensure and enhance sustainable environmental management during implementation and operational phases.

The project will be implemented on a plot with generally flat and sloppy landscape on some sections measuring approximately 1 Acre .The site is in an open field currently occupied by a single dwelling residential town house that will be removed to pave way for the proposed residential apartments facility. The development once completed, will provide quality, better and affordable housing facilities and services to local residents in Kileleshwa and Nairobi County as whole as well as target international clients visiting Kenya. The proposed residential apartment development shall will have the following infrastructural facilities including but not limited to;

a. **Parking;** Basement 01 Parking: 110 Bays; Basement 02 Parking: 110 Bays; Ground floor Parking: 15 Bays. This total to **235 No. of Parking Bays**
b. **Ground Floor Amenities** comprising of; Reception; Apartment Management office; Gaming room; Residents' Lounge & terrace; Children's play area; Male pool & changing rooms; Female pool & changing rooms; Steam/sauna; and Guard house.
c. **A 15 Floors Residential Apartment** facility with 11 No. of apartments per floor consisting of the following; 1 Bedroom apartment: 15 units; 2 Bedroom apartments: 30 units; 3 Bedroom apartments: 30 units; 4 Bedroom apartments: 76 units; 4 Bedroom duplex apartments: 14 units. This totals to **165 No. of Residential Units**

The scope of EIA study was to identify impacts likely to be caused to the environment, public health, socio-economic wellbeing, carrying out of environmental investigations in line with current legislations. The methodologies for EIA full study were environmental screening, environmental scoping, desktop studies, site visits, public and stakeholder participation and finally study report writing.

The study covered the physical extent of the project site and its immediate environs, implementation works of the proposed development and installation of key utilities and other

facilities required for the project to function optimally. The baseline survey included physical, biological and the socio–economic environment.

This Environmental Impact Assessment full study examined the potential positive and negative environmental and social impacts of the project on the immediate surroundings with due regard to all the phases of construction, operation and eventual decommissioning of the residential facilty. It encompassed all aspects about the physical, ecological, socio-cultural, health and safety conditions at the site and its environs during and after construction.

The EIA full study has revealed that there are both positive and negative impacts. The main positive impacts of the project include but not limited to: Creation of employment throughout all of its phases and indirect employment creation from construction and construction related industries; Economic benefits that include the capital investment that will be directly injected into the economy by the developer; Stimulation of development through revenue and taxes that will be levied by the National and County Governments;

Other positive impacts are: Creation of market for goods and services that will be utilized in the entire project such as; design and consultancy services, raw materials, plumbing services, electrical fittings, transport and landscaping; Improvement of infrastructure; Generate income to the proponent; Optimal land utilization; and Creation of business opportunities for various companies and individuals which is in line with the vision 2030.

The significant negative impacts include: Generation of solid and liquid wastes; Air pollution: gaseous, dusts and particulates; Increased pressure on social amenities and utilities; Increased traffic impacts along Gatundu road; Public safety risks/Occupational health and safety hazards; Noise generation; Public utilities disruption; Soil erosion and sedimentation; and Impacts on material sourcing.

To avoid, reduce, and/or minimize for potential significant, negative environmental and social impacts, mitigation measures were proposed and environmental and social management plan (ESMP) formulated. Recommendations were proposed to carry out annual environmental audits and follow ups once the project is in operation. However, a monitoring program was also developed to not only track down occurrence of impacts, but also to check on compliance requirements. Outlined below is a summary of impacts and mitigation measures;

Impact	Mitigation Measure
Noise Pollution	• Complying with the EMCA noise regulation Legal Notice 61 including: ✓ Observe normal working hours during noisy construction works (00800 to 1700) hours ✓ Ensure that all generators and heavy duty equipment are insulated or placed in enclosures ✓ Sensitize drivers to avoid unnecessary gunning of vehicle engines ✓ Regular servicing of engines &other machines shall be adhered to ✓ Site workers to wear ear muffs if working in noisy
Air/Dust Pollution	• Ensure strict enforcement of on-site speed limit regulations • Avoid excavation works in extremely dry weathers if and where possible • Sprinkle water on graded access routes whenever necessary to reduce dust generation by construction vehicles • Enclosing the structures under construction with dust proof nets. • Using efficient machines with low emission technologies for the ones that burn fossil fuels. • Regular maintenance and services of machines and engines. • Use of clean fuels e.g. unleaded and low sulphur fuels. • Educate and raise awareness of construction workers on emission reduction techniques.
Working at High Heights	• Use construction barrier tape to isolate and guard site visitors from accidents & injuries; • Implement a fall protection program that includes training in climbing techniques and use of fall protection measures, • Use of helmets and other PPEs to mitigate against injuries • Providing First Aid facilities at site
Generation of Solid Waste	• Following EMCA regulations on Waste Management, Legal Notice 121 including: ✓ Using waste minimization techniques such as buying required quantities in bulk. ✓ Identifying all sources of wastes, and ensuring wastes are handled by licensed personnel ✓ Making available suitable facilities for the collection, segregation and safe disposal of the wastes.

	✓ All construction materials left over at the end of construction should be used in other projects or sold ✓ Ensure proper handling and storage of construction materials to reduce damage ✓ Accurately estimate the sizes and quantities of materials required to reduce amounts left ✓ Excavated upgrading waste should be re-used or backfilled
Occupational Health and Safety Risks	• Provide all workers with the necessary protective gears • Ensure all workers are in protective gears all the time when on site • Place fire extinguishers in strategic areas within the deport • Designate and mark smoking areas • Workers to be trained as fire marshals • Fire escape routes to be shown clearly • Provide enough first aid kits within the project site • Train workers in administering first aid • Ensuring all potential hazards such as movable machine parts are labelled. • Raising awareness and educating workers on risks from equipment and ensuring they receive adequate training on the use of the equipment. • Placing visible and readable signs around where there are risks. • Ensuring there is security in and around the site to control the movement of people. • Providing safe and secure storage for equipment & materials in the site. • Placing visible and readable signs to control the movement of vehicles and notify motorists and pedestrians around the, and workers in the site
Change in Soil Characteristics	• Sprinkling water on the soil to prevent dust from rising. • Creating specific paths for the trucks • Ensuring there is enough space for normal percolation of water. • Preventing pollution from construction wastes by having specific sites for collection, sorting and transport of wastes. • Proper installation and configuration of drainage structures to ensure their efficiency.

	• Installing cascades to break the impact of water flowing into the drains. • Controlling the earthworks and ensuring the management of excavation activities. • Compacting areas with loose soil. Landscaping. • Providing soil erosion control structures on the steeper areas of the site & controlling activities during the rainy season.
Pressure on Utilities	• Employing water conservation techniques and using the required amounts of water to prevent wastage. • Employing power saving techniques such as switching off equipment when not in use, using natural light whenever possible. • Using machines with power saving technologies. • Providing proper sanitary facilities for construction workers. • Inspecting the drainage facilities regularly to ensure they are free of debris that may reduce their efficiency
Population Influx	• Workers to be issued with jobs cards to monitor their movements in the site area • Only authorized personnel should be allowed entrance to the site Presence of a work registry book where workers sign in and out • Educating the workers on proper sanitation methods Sensitizing the worker on HIV/AIDS • Making available suitable facilities for the collection, segregation and safe disposal of the wastes. • Ensuring all waste is dumped in their designated areas and legally acceptable methods
Increased Traffic	• Placing signs around the site notifying other vehicles about the heavy traffic and to set the speed limit around the site. • Ensuring all drivers for the project comply to speed regulations. • Making sure the construction doesn't occupy the road reserves and complying with traffic and land demarcation obligations. • Ensuring all vehicles used for the project are in good working condition both legally and commensurate to their intended use.
Fire Hazards and Accidents	• Keep well stocked and functional first aid box • Ensure proper storage of inflammables at the site. • Maintain fire-fighting equipment and ensure that they are regularly inspected • Create awareness among residents on proper safety measures.

Surface Run-Off and Waste Water Disposal	• Waste water should empty to the septic tank via well laid sewage pipes • Empty septic tank whenever its full by a licensed exhauster services • Landscaping to ensure there are areas where water will percolate underground. • Constructing proper drains and monitoring them to ensure there are no blockages
Socio-cultural Impacts	• Integrating Equal Opportunity Principles in human resource policies. • Promoting social cohesion and integration among people in the area. • Creating awareness towards the diversity of cultures and different economic background of the people within residents • Allowing the residents and businesses to form social groups and networks that build social capital. • Targeting social investment programs towards the local communities and region.
Insecurity Impacts	• Employing competent security firm at the premises • Security to always searching all vehicles and people entering the premises • Use of CCTV cameras to monitor security within the premises • Collaborating with the local police on security matters • Placing alarms around the premises and establishing emergency preparedness and response procedures
Increase in Value and Land Use Changes	• Complying to zoning bylaws • Collaborating with public and planning officials on current and future developments • Aligning the project's objectives with those of National and County Development Policies

In conclusion, results from EIA study show that the proposed project will have numerous positive socio-economic impacts as outlined earlier. However, the negative environmental impacts resulting from establishment of the facility are mitigate-able. Therefore, implementation of the Environmental Management Plan will assist in dealing with environmental issues during the project cycle. There are also guidelines for addressing environmental health and safety.

This project is recommendable for approval by the National Environment Management Authority (NEMA) for the issuance of an EIA license subject to periodic monitoring and evaluation from the day of commencing construction operations and decommissioning phases, as long as the set standards, measures and regulations are thoroughly upheld and adhered to. This will be in compliance with the Environmental Management and Coordination Act of 1999 (Amended 2015) and the Environmental Impact Assessment and Audit regulations, 2003.

CHAPTER ONE: INTRODUCTION

1.1 Introduction and Background Information

This Environmental Impact Assessment (EIA) full study report has been prepared for the purpose of seeking licensing for the proposed construction of Residential Apartments development project and all its facilities and infrastructure on a 1 Acre piece of land on Plot L.R No: 209/6880, along Gatundu Cresent, off Gatundu road, Kileleshwa, Westlands Sub County, in Nairobi County.

In compliance with the requirements and provisions of the Environmental Management and Coordination Act No. 8 of 1999 and Regulation 10 of the Environmental (Impact Assessment and Audit) Regulations, 2003 Legal Notice No. 101 and Legal Notice 15 of the Environmental (Impact Assessment and Audit) Regulations, 2016, the Authority requires the proponent to initiate an Environmental Impact Assessment full study. Pursuant to the afore-mentioned regulations, in June, 2022, Terms of Reference (TOR) initiating an Environmental Impact Assessment Full Study were prepared and submitted to NEMA **(NEMA/TOR/5/2/438)** and approved.

This Environmental Impact Assessment report (EIA) seeks to examine both the positive and negative effects that the proposed commercial development project is likely to have on both the physical and socio-economic environment in order for sound decision making to promote human activities that align synergistically with the natural world within a sustainable development framework.

A comprehensive environmental policy was therefore needed to take care of the environment in a holistic way. This was achieved through enactment of the Environmental Management and Coordination Act (EMCA), 1999 (Amended, 2015). The Act stipulate that Environmental Impact Assessment be carried out on projects in the Second Schedule. It is in response to this provision that this EIA full study report has been prepared.

1.2 Justification of the Proposed Project.

The project once implemented, is anticipated to provide better and affordable housing facilities and services. Further, it will also increase the business activities in the area. Additionally, The main positive impacts of the project include but not limited to: Creation of employment throughout all of its phases and indirect employment creation from construction and construction related industries; Economic benefits that include the capital investment that will be directly injected into

the economy by the developer; Stimulation of development through revenue and taxes that will be levied by the National and County Governments;

Other positive impacts are: Creation of market for goods and services that will be utilized in the entire project such as; design and consultancy services, raw materials, plumbing services, electrical fittings, transport and landscaping; Improvement of infrastructure; Generate income to the proponent; Optimal land utilization; and Creation of business opportunities for various companies; and Eempower the proponent and the country at large, economically in the future considering the fact that the Kenyan Government has pledged to be middle income state in Vision 2030.

1.3 Objectives of the Project

The overall objective of the project is to construct Residential Apartment and all its facilities and infrastructure, to meet the high demand of accommodation facilities in Nairobi County.

1.3 Specific Objectives of the Project

This project seeks to achieve the following objectives:

1. Maximize returns on investment for the proponent while taking due consideration of policy, legal and administrative procedures governing the operations of a facility of this nature.
2. To ensure that the concerns of the neighboring community in this environment are captured and addressed in all stages of the project's cycle.
3. Ensure that implementation of the project does not in any way interfere with the environmental sustainability of the area in question giving due consideration to:
    - Neighboring population and land uses.
    - Facilities and infrastructure within the project area
4. Put in place mitigation measures that will ensure that any potential negative impacts resulting from project activities are taken care of at the earliest opportunity to alleviate any harmful effect to the neighboring populations and the environment.

1.4 Objectives of the EIA

The overall objective of the study is to assess the potential significant adverse impacts of the proposed development and articulate appropriate mitigation measures.

The specific objectives of this study include the following:

1. To identify and evaluate the significant environmental impacts of the proposed project.
2. To assess the environmental costs and benefits of the proposed project to the local and national economy.
3. To determine the compatibility of the proposed facility with the local environmental setting.
4. To evaluate and select the best project alternative from the various options.
5. To propose mitigation measures for the negative environmental impacts
6. To incorporate Environmental Management Plans and monitoring mechanisms during implementation, operation and decommissioning phases of the project.

1.5 Scope of the Study

The study has been conducted to evaluate the potential and foreseeable negative impacts of the proposed development. The physical scope is limited to the proposed site and the immediate environment as may be affected by or may affect the proposed project. Any potential impacts, are also evaluated as guided by EMCA 1999 and the Environmental (Impact Assessment and Audit) Regulations 2003. This report includes an assessment of impacts of the proposed site and its environs with reference to the following:

1. A review of policy, legal and institutional framework.
2. Description of the proposed project.
3. Review of baseline information.
4. Assessment of the potential negative environmental impacts of the proposed project.
5. Analysis of alternatives.
6. Development of mitigation measures and future monitoring plans.
7. Occupational and Environmental health and safety management.

1.6 Methodology

1.6.1 Environmental Screening.

The environmental screening was carried out to determine whether an EIA study is necessary for this project and at what level of evaluation.

1.6.2 Environmental Scoping.

In environmental scoping, the focus was on environmental impacts of great concern. Environmental issues were categorized into physical, natural/ecological and social, economic and cultural aspects. Impacts were also classified as immediate and long-term impacts.

1.6.3 Desktop Study.

The desktop study and review provided a detailed description of the project with respect to the intended revisions i.e. spatial coverage, preliminary design layout, magnitude, implementation schedules, costs and human resources. Relevant documents were reviewed to obtain information on the baseline information in general but specifically at the proposed project site.

Proposed project documentary review provided further understanding the project design (site plan and architectural drawings), land use, local micro-environmental conditions, data on demographic trends, land use practices, development strategies and plans (local and national) as well as the policy and legal documents among others.

Others included area maps, current and past survey documents, Development Plans of the Nairobi City, relevant policy, legal and institutional frameworks, regulations, guidelines and standards were also relied upon.

1.6.4 Field Site Visits

Physical evaluation of the project area was carried out with specific focus on landform trends, land use patterns, biodiversity, natural resources, hydrology and climatic variations. This was also an evaluation of the current environmental status with respect to physical, biological and socio-cultural perspectives. It was a systematic field inspection backed with available documentation and direct interviews.

In addition to identifying the potential positive and negative impacts, field assessments contributed understanding the additional proposed works to be undertaken. The field survey adopted various techniques of baseline data collection on the existing environmental conditions, namely:

- Field observations and recordings including photography the project site and its vicinity.
- Use of checklists for determining potential environmental impacts of the proposed project.
- Consultations and public participation within the neighborhood of the project site.

1.6.5 Field Observations

Detailed field observation assessment was undertaken to enable existing determination of the exact socio-economic activities within the proximity of the project site. Among the broad focal areas for which observation was done included; current settlement patterns and land use, commerce, and trade industry among others. Checklists were used along with observations to check on additional/ possible environmental impacts of the project would have on the environment during both construction and operational phases. In this assessment, checklists were utilized to:

- Facilitate identification of potential additional environmental impacts;
- Provide a means of comparing the predicted environmental impacts;
- Indicate the magnitude of the additional developments environmental impacts both positive and negative;
- Indicate possible adverse environmental impacts that are potentially significant but about which sufficient information can be obtained to make a reliable prediction on the additional developments; and
- Indicate negative potential environmental impacts in the project area, which merit mitigation measures and monitoring during project implementation based the additional developments.

1.6.6 Public Participation and Stakeholders Engagement

Structured stakeholder engagement was undertaken in the Kileleshwa neighborhood to capture the views and concerns of interested and affected parties. Photos of the project site and the immediate neighboring developments were taken from the initiated field visits and physical inspections for inclusion in this full study report. The engagement process entailed face to face meetings and interviews.

The study also sought public opinion/views of neighbors, interested or affected parties of the proposed project if any through Consultation and Public Participation (CPP) exercise. Clip board questionnaires were administered to the public and interviews held with neighbors. The local county administration and relevant lead government agencies were engaged in the organization and participation of this meetings with key stakeholders. The questionnaires have been included in this report.

1.7 Impact Assessment Methodology

To identify potential and assess impacts associated with or resulting from Project activities, the Consultant used professional judgment, fieldwork, and desk-top analysis to identify potential impacts and their interactions. The significance of potential impacts that may result from the proposed Project was determined to assist in preparing recommendations for evaluation of the proposed Project. The methodology that was used to identify and assess potential impacts of the proposed project is described below:

1.7.1 Steps in Impact Assessment/Analysis

Socio-Environmental Impact Assessment and Analysis was conducted as below:

a. Baseline characterization: Involves examination of the current baseline and existing conditions before the project is undertaken and any potential impacts generated;
b. Impact Identification: Involves identification of sources of potential impacts and the project phase where the potential impacts are generated;
c. Impact Mitigation: Having identified the potential impacts and their sources, here monitoring and mitigation measures are recommended and costed to the impact;

1.7.2 Potential Impact Rating

Potential Socio-Environmental Impact are rated to:

a. Provide a basis for prioritization of impacts to be dealt with;
b. Provide a method of assessing the effectiveness of proposed mitigation measures; and
c. Provide a scale which shows the level of impact both before and after a proposed mitigation measure has been implemented.

1.7.3 Impact Rating Criteria

An impact rating is the product of two elements:

a) The severity of the potential impact; and
b) The likelihood of the event occurring.

1.7.4 Severity Criteria

The severity or enhancement of each impact was rated using the criteria identified in Table 1 and Table 2.

Table 1: Impact Rating Criteria

Severity	Negative Social/Health Impacts					Negative Environmental Impacts
	Duration	**Geographic Extent**	**Ability to Adapt**	**Socio-cultural effects**	**Health Effects**	
Low	Short-term: Less 1 year Low frequency	Individual household	Those affected will be able to adapt to the changes with relative ease, and maintain pre-impact livelihoods, culture, quality of life and health.	Inconvenience but with no consequence on long-term Livelihoods, culture, quality of life, resources, infrastructure and services.	Events resulting in annoyance, minor injury or illness that does not require hospitalization.	Affects environmental conditions, species, and habitats over a short period of time, is localized and reversible.
Moderate	Medium term: 1-6 years Medium or intermittent frequency	Small number of households	T hose affected will be able to adapt to change, with some difficulty, and maintain pre-impact livelihoods, culture, quality of	Primary and secondary impacts on livelihoods, culture, quality of life, resources, infrastructure and services	Event resulting in moderate injuries or illness, which may require hospitalization	Affects environmental conditions, species and habitats in the short to medium term. Ecosystems integrity will not be adversely affected long term, but the effect is likely to be significant in the short or medium term to some species or receptors. The area may recover naturally through regeneration and restoration.

			life and health but only with a degree of support			
	Long-term/ Irreversible > 6 years Constant frequency	Large part of the community	Those affected will not be able to adapt to changes and continue to maintain pre-impact livelihood	Widespread and diverse Primary and secondary impacts likely to be impossible to reverse or compensate for.	Catastrophic event Resulting in loss of life, severe injuries or chronic illness requiring hospitalization.	Affects environmental conditions, species and habitats for the long term (i.e., over the life of the Project) may substantially alter the local and regional ecosystem and natural resources, and may affect sustainability. Regeneration to its former state would not occur without intervention. Affects environmental conditions or media over the long term, has local and regional affects and/or is irreversible

1.7.5 Impact Likelihood Criteria

Likelihood of the event occurring is comprised of the following categories:

a. Low likelihood Rare (e.g., few or no occurrences in related projects);
b. Medium likelihood Uncommon (e.g., documented occurrences in related projects); and
c. High likelihood Common (e.g., occurs within the Petroleum industry projects).

1.7.6 Determining Rating of Impacts

The overall rating of the impacts will be determined by using the following matrix

It should be noted that these matrices act as a guide and there may be situations where their rigid application is inappropriate and where stakeholder perceptions and feedback have a significant role to play. For specific impacts where this is the case, the rating is clearly explained in the evaluation of the impact.

Table 2: Overall Rating of Impacts

Severity	**Likelihood**		
	Low	**Medium**	**High**
High Level	Moderate	Major	Major
Medium Level	Minor	Moderate	Major
Low Level	Insignificant	Minor	Moderate
Low severity	Insignificant	Minor	Moderate
Medium severity	Minor	Moderate	Major
High severity	Moderate	Major	Major

Criteria for assessing the significance of impacts stem from the following key elements:

- Status of compliance with relevant Kenyan legislation, policies and plans and any relevant Kenyan or industry policies, standards or guidelines;
- The magnitude (including nature, scale and duration) of the change to the natural or socio-economic environment (e.g. An increase in noise, an increase in employment opportunities), expressed, wherever practicable, in quantitative terms. The magnitude of all impacts is viewed from the perspective of those affected by taking into account the likely perceived importance as understood through stakeholder engagement;

- The nature of the impact receptor (physical, biological, or human). Where the receptor is physical (e.g. the air shed) its quality, sensitivity to change and importance are considered. For a human receptor, the sensitivity of the household, community or wider societal group is considered along with their ability to adapt to and manage the effects of the impact; and
- The likely that the identified impact will occur.

1.8 Impact Mitigation Measures

In developing mitigation measures, the first focus is on measures that will prevent or minimize impacts through the design and management of the Project rather than on re-instatement or compensation measures. A hierarchy of mitigation measures for planned activities and unplanned events is outlined below:

a. ***Avoid at Source; Reduce at Source:*** avoiding or reducing at source through the design of the Project (e.g. avoiding by sitting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity);
b. ***Abate on Site:*** Add something to the design to abate the impact (e.g. pollution control equipment); Abate at Receptor: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g. traffic measures);
c. ***Repair or Remedy:*** Some impacts involve unavoidable damage to a resource (e.g. material storage areas) and these impacts require repair, restoration and reinstatement measures.
    - ✓ Compensate in Kind; Compensate through other means where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g. financial compensation for degrading agricultural land and impacting crop yields).
    - ✓ It is emphasized that compensation to individuals with residual impacts to livelihood or quality of life will generally be non-financial and will have a focus on restoring livelihoods.
d. ***Control:*** This aims to prevent an incident happening or reduce the risk of it happening to as low as reasonably practicable (ALARP) through reducing the likelihood of the event (e.g. preventative maintenance regimes, traffic calming and speed limits, community road safety awareness training);

e. ***Reducing the consequence*** (e.g. Bunds to contain hazardous substance spills); and a combination of both of these;

f. ***Recovery/Remediation:*** This includes contingency plans and response, e.g. Emergency Response Plans and Procedures.

1.9 Reporting.

In the entire exercise, the proponent and EIA experts contacted each other on the progress of the study and signing of various documents. Ten copies of this report alongside a soft copy will be submitted to the National Environment Management Authority for review and issuance of an EIA license. All the materials and workmanship used in the execution of the work shall be of the best quality and description.

CHAPTER TWO: PROJECT DESCRIPTION

2.1 Nature of the Project

The proposed development project is a Residential Apartment consisting of One Hundred and Sixty Five (165) No. of Apartments comprising of; 1 Bedroom Apartment: 2 Bedroom Apartments: 3 Bedroom Apartments: 4 Bedroom Apartments: and 4 Bedroom Duplex Apartments and all its associated infrastructure that will provide housing facilities and services for residents within the project area in Kileleshwa and the surrounding environs.

2.2 Site Ownership

The land where the proposed residential units will be situated is absolutely owned by the proponent as appended to this report.

2.3 Justification of the Proposed Project

The proposed project will entail construction of a Residential Apartment. The project is anticipated to provide better and affordable housing facilities and services to its clients. The project once implemented, is anticipated to provide better and affordable housing facilities and services. Further, it will also increase the business activities in the area.

Additionally, The main positive impacts of the project include but not limited to: Creation of employment throughout all of its phases and indirect employment creation from construction and construction related industries; Economic benefits that include the capital investment that will be directly injected into the economy by the developer; Stimulation of development through revenue and taxes that will be levied by the National and County Governments.

Other positive impacts are: Creation of market for goods and services that will be utilized in the entire project such as; design and consultancy services, raw materials, plumbing services, electrical fittings, transport and landscaping; Improvement of infrastructure; Generate income to the proponent; Optimal land utilization; and Creation of business opportunities for various companies; and Empower the proponent and the country at large, economically in the future considering the fact that the Kenyan Government has pledged to be middle income state in Vision 2030.

2.4 Project Design

The proposed development project is a Residential Apartment consisting of One Hundred and Sixty Five (165) No. of Apartments comprising of; 1 Bedroom Apartment: 2 Bedroom Apartments: 3 Bedroom Apartments: 4 Bedroom Apartments: and 4 Bedroom Duplex Apartments.

The project will consist of Fifteen (15) floors excluding the ground floor, basement 01, and basement 02. The proposed residential apartment development shall will have the following infrastructural facilities including but not limited to;

1. **Parking**
    a. Basement 01 Parking : 110 Bays
    b. Basement 02 Parking : 110 Bays
    c. Ground floor Parking : 15 Bays

    Total: 235 Parking Bays

2. **Ground Floor Amenities**
    a. Reception
    b. Management office
    c. Gaming room
    d. Residents' Lounge & terrace
    e. Children's play area
    f. Male pool & changing rooms
    g. Female pool & changing rooms
    h. Steam/sauna.
    i. Guard house
3. **Apartments (Typical 1st to 15th Floor)**
    a. No of apartments per floor – 11 Units
    b. 1 Bedroom apartment : 15 units
    c. 2 Bedroom apartments : 30 units
    d. 3 Bedroom apartments : 30 units
    e. 4 Bedroom apartments : 76 units
    f. 4 Bedroom duplex apartments: 14 units

    Total No. of Residential Units: 165 Units

The upper floors shall be accessed by both lifts and staircases. All the necessary Physical Planning regulations such as plot ratio and plot coverage's were taken into account by the consultant during the design of the proposed development project.

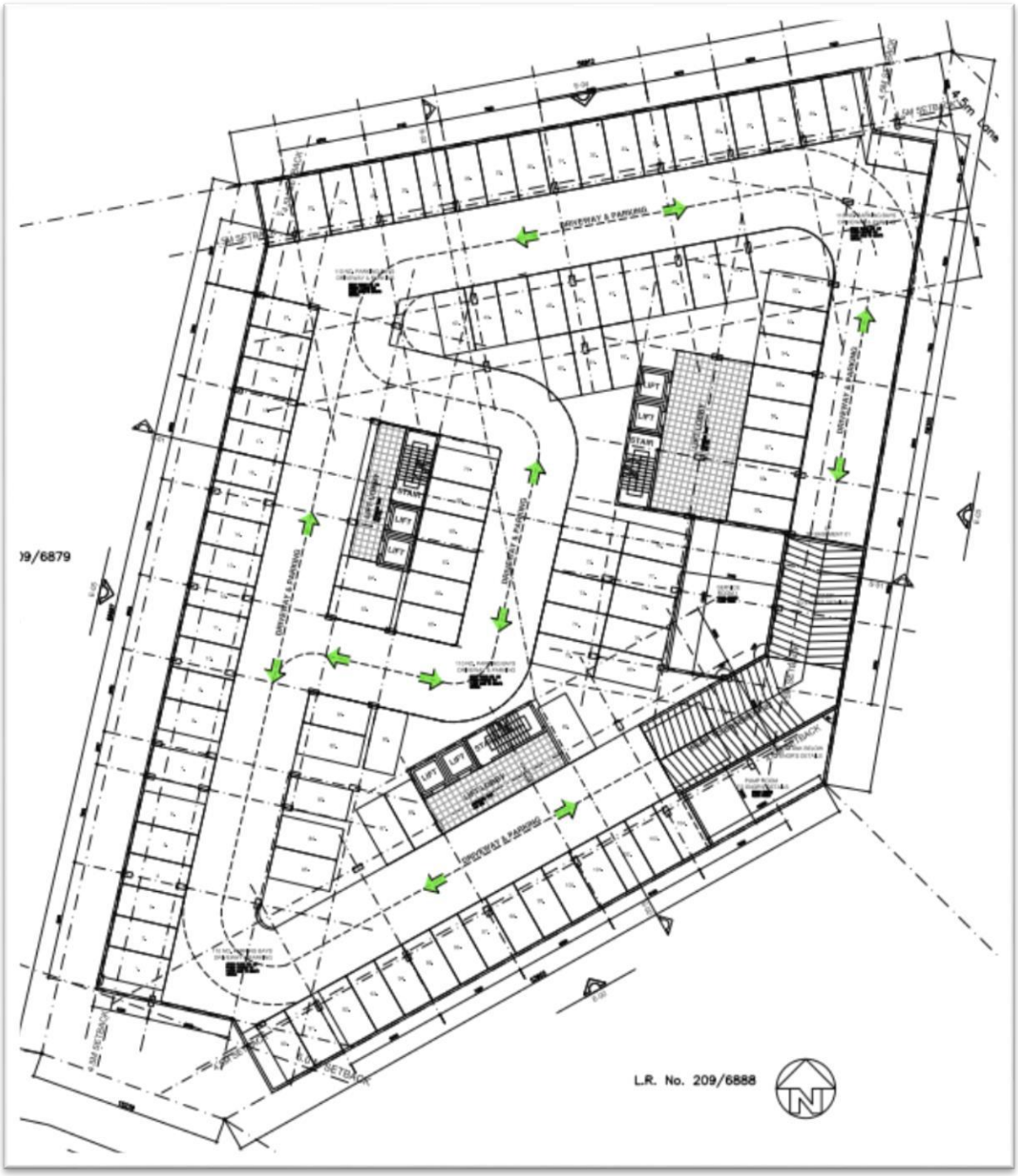

Figure 1: Proposed residential apartments Typical Basement 1 and 2 layout design

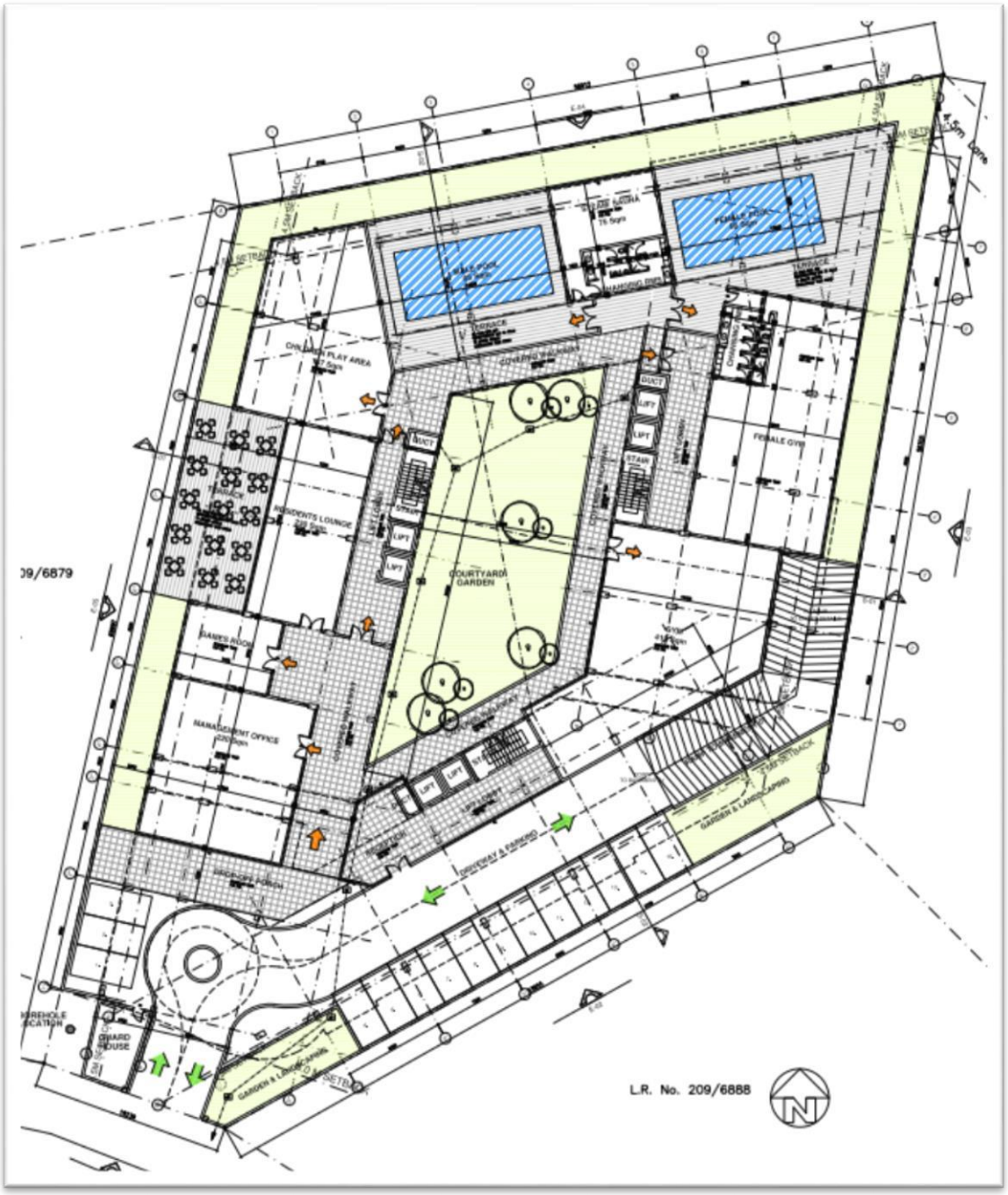

Figure 2: Proposed residential apartments typical ground floor layout design

Figure 3: Proposed residential apartments Typical 1st to 15 floor layout design

Figure 4: Image showing the proposed Lower Floor Duplex Units

Figure 5: Image showing the proposed Lower Floor Duplex Units

Figure 6: Image showing the proposed One Bedroom Units

Figure 7: Image showing the proposed Two Bedroom Units

Figure 8: Image showing the proposed Three Bedroom Units

Figure 9: Image showing the proposed Four Bedroom Units

Figure 10 & 11: Side elevations of the proposed residential apartment

Figure 12 & 13: Side and aerial elevations of the proposed residential apartment

2.5 Construction Raw Materials

The construction phase of this project will utilize a lot of inputs and raw materials. The proponent and contractor are expected to procure building materials from licensed dealers. Besides, they must meet both local and international safety and quality standards. Main inputs during construction include building blocks, sand, gravel, hand cut construction stones, timber for making structural formwork and interior design, and floor tiles. Others are pre-cast units for drains, PVC pipes for sewer and water reticulation, roofing tiles, water tanks and gutters. Window casement and glasses, earthmovers, spades and other hand held tools are also to be used during construction.

2.6 Technology and Activities

The contractor shall employ modern and best building technologies. They should not be inferior to locally and internationally established building standards. Construction of these units will involve ground excavations; making foundations; building courses; and roofing. This will be followed by fixing water pipes, connection to the sewer system and furnishing the building.

2.7 Description of the Project's Construction Activities.

2.7.1 Excavation/Earthworks.

In order to prepare the site for construction of the building, some excavations will be carried out. In this regard, machinery and human labor will be relied upon. Debris and excavated materials from earthworks, especially soil and stones shall be used in refilling and various construction activities. Debris and other materials not required at the site will be dumped in sites approved Nairobi County.

2.7.2 Foundation and Masonry

Completion of excavations will be followed with setting a foundation for the building. Thereafter masonry which entails building courses, basement, ground and other floors, pavements, drainage systems, parking areas, and perimeter wall shall take place. Other masonry activities include stone carvings, concrete mixing, and plastering, slab construction, reinforcing walls/lintels and curing of walls.

2.7.3 Roofing

The residential unit shall have a concrete flat roof.

2.7.4 Electrical Works

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

2.7.5 Plumbing

Plumbing will entail fixing pipes water pipes and conduits within the floors. Likewise, storm water will be channeled to a peripheral storm water drainage system. Plumbing activities include metal and plastic cutting, the use of adhesives, metal grinding and wall drilling among others.

2.8 Staff Amenities

2.8.1 Site Office

The proponent is to construct a modest site office and a sample materials store with iron sheet walls and timber framing and concrete floor. The roof will be made using iron sheets whereas the ceiling board will be constructed using soft board on timber framing.

2.8.2 Site Workers' Toilets

The proponent will put up semi-permanent toilets within the premises to be used by the construction staff. The foul water drainage will be connected to the sewerage system on site.

2.8.3 Material Storage and Handling

All materials to be used shall conform to the Kenya Bureau of Standards requirements for quality or equal and approved.

2.8.4 Non-Hazardous Materials

The store for non-hazardous materials will be accommodated within the site office. Materials to be stored in this store shall include samples for review by consultants and inspectors.

2.8.5 Hazardous Materials

Hazardous materials shall include paints, oil, grease and fuel. The store for these materials shall have iron sheet walling and roof and a waterproof concrete floor to contain spills. Storage and handling of all Hazardous chemicals shall be in accordance with manufacturer's instructions as outlined on the material safety data sheets.

2.8.6 Bulk Construction Materials

The bulk materials to be stored on site include: sand, ballast, stones, cement, quarry chips and timber. These materials will be sourced from local suppliers within Nairobi and neighboring environs.

2.9 Description of the Project's Operational Activities

Completion of construction activities will be followed by occupation of the Residential Apartment. Both solid and liquid wastes will be produced during this phase of the project. To manage solid wastes (domestic), the proponents will avail litterbins/receptacles within the compound for temporary storage. In addition, solid waste handlers will be contracted to collect and dump wastes in approved dumping sites.

Effluent from toilets and washrooms will be discharged into the existing Nairobi City Council sewer line system within the project site. Storm water will be conveyed to the council's storm water drainage system. Carpenters and plumbers among others will be contracted to carry out repairs and maintain these flats during the operational phase of the project. Also ground man will be hired to do repairs, painting and landscaping open spaces.

2.10 Project's Decommissioning Activities

Decommissioning will also entail restoring the project area to its original state. Activities during restoration include removal of debris, landscaping, planting of trees and removal of barriers among others. It will be upon the proponent and the contractor to ensure restoration is done in an orderly manner.

During decommissioning, buildings, pavements, drainage systems, parking areas and perimeter fence will be demolished in order to restore land to its original state. Different kind of workers and equipment shall be deployed to carry out these tasks. This will produce a lot of construction waste, which will be reused for other construction works or if not reusable, disposed off appropriately by a licensed waste disposal company.

2.11 Total Project Costs

The total project cost KShs **100,000,000.00.** (One Hundred Million, One Hundred Thousand Shillings only). This cost includes construction cost, cost of labor, and cost for technical experts/consultants among other activities.

CHAPTER THREE: BASELINE INFORMATION OF THE STUDY AREA

3.1 Introduction

Baseline information (background information on the biophysical, social and economic settings) is important reference point for conducting EIA. Baseline data is essential for the assessment of the potential impacts of the project. The conditions of the natural environment forms a basis for the selection by planners of the area to be developed for various land uses for the sustainability of the proposed project and therefore evaluation of the baseline information is important in understanding the existing environmental set up. The main objective of baseline information is to provide adequate and accurate environmental baseline information and this can be broken down as follows:

- To provide a description of the status and trends of environmental factors, against which predicted changes can be compared and evaluated in terms of importance
- To provide a means of detecting actual change by monitoring once the project is implemented.

3.2 Location of the Project

The proposed Residential Apartment development project shall be constructed on a 1 Acre piece of land on Plot L.R No: 209/6880, along Gatundu Cresent, off Gatundu road, Kileleshwa, Westlands Sub County, in Nairobi County. The GPS coordinates of the proposed project site are 1˚ 16' 43.35" S and 36˚ 47' 0.67" E.

Photo 1: The proposed project site

4.2.2 Site Status and Land Use

The proposed Residential Apartment site is the larger Nairobi's Kileleshwa area, both a residential and commercial area. The site is in an open field currently occupied by a single dwelling residential town house. The site is along Gatundu Cresent, off Gatundu road, Kileleshwa. Within this part of Kileleshwa area are similar developments and the project site is surrounded by high rise residential apartments comprising of already existing and occupied apartments/commercial units, as well as under construction residential and commercial units.

The terrain of the proposed project site is generally flat and sloppy on some sections. The project site is not located close to any environmental sensitive areas whatsoever. The proposed project site is in a mixed development urban zone.

Photo 2 & 3: The similar neighbouring developments

Photo 4 & 5: Neighbouring occupied/ under construction apartments/commercial units

3.3 Topography

Nairobi County lies within the latitudes 1°9'N and 1°28'S, and longitudes 36°4'W and 37°10'E. It is located 30 km to the east of the Great Rift Valley and occupies an area of about 696km^2. Altitude varies between 1600 and 1850 meters above sea level. There is however an eastward slope of land with maximum altitude of 2300m in the northwest and 2000m in the southwest. The western part of Nairobi is on high ground of the Kikuyu highlands that rise from an altitude of between 1600-1800 meters with rugged topography. The eastern side is generally low, approximately 1600 meters, and flat.

The physiography of Nairobi is consequent upon the volcanic rocks found and the tectonic movements which have affected them. It is part of the lava plains that are bordered to the north-west and west by the Kikuyu highlands, an extension of the high ground of the eastern flank of the Rift Valley; and to the south-west by the Ngong hills. The Kikuyu highlands are characterized by a steep downward slope in an easterly direction. The northern boundary between the two physiographic units of the Kikuyu highlands and the plains is roughly along the east-west line across the Nairobi city center. The plains are made up of two parts, i.e. the Athi plains and the northern section of the Kapiti plains, both of which extend further southwards and eastwards.

3.4 Climate and Meteorology

The project lies in Kileleshwa, Nairobi County which has a temperate tropical climate with two rainy seasons. The highest rainfall is received between March and April and the short rainy season is between November and December. The average annual rainfall in Nairobi is about 900m, but the actual amount in any one year may vary from less than 500 mm to more than 1900 mm and the seasons of rainfall coincide approximately with the time of changeover of the monsoon currents which affect Eastern Africa, the South-West Monsoon becoming established in April, and north-east monsoon in November.

The average daily temperatures in Nairobi varies only from about 17°C during July and August to 20°C in March, the daily range of temperature is quite large, averaging about 10°C in May and 15°C in February. These leads to Nairobi having an annual average temperature maximum of 24.9°C and an average minimum of 13.3°C and average mean relative humidity value is 78.3% in the morning and 50.5% in the afternoons.

3.4.1 Winds

The wind near the ground is very predominantly easterly throughout the year, generally between north-east and east from October to April, and between east and south-east from May to September. The strongest winds occur during the dry season just prior to the "Long Rains" when speeds of 20 to 25 mph are common from mid-morning to early afternoon; at other times of the year winds speeds are usually 10 to 15 mph. During the night the wind is usually light. In the squalls sometimes associated with thunderstorms, short-lived of up to 70 mph. have been known to occur.

3.4.2 Precipitation

Nairobi has a bimodal rainfall pattern, in which the maxima occur in March-April (long rains) and November-December (short rains). This simple rainfall regime is complicated by the uncertainty of rainfall from year to year. Thunderstorms may occur, nearly always during the afternoon or evening, during most months of the year but they are rare during the period June/August. Hail is comparatively rare in Nairobi, being reported on average less than once a year unlike other areas such as the western part of Kenya.

3.4.3 Sunshine and Solar Radiation

Nairobi experiences a total of about 2,500 hours of bright sunshine per annum, which is equivalent to an annual mean of approximately 6.8 hours of sunshine per day. July and August are characterized by cloudiness and during these months the average daily sunshine in Nairobi is 4 hours. Often there are several days in succession when the sun fails to penetrate the thick stratocumulus cover, although on other days the cloud cover does break for a short period. There is about 30% more sunshine in the afternoon than in the morning, and it follows that westerly exposures receive more insulation than easterly ones.

3.4.4 Ambience and Air Quality

The project area lies in Nairobi, an urban area, where the major sources of air pollution are as a result of industrial, construction, increased development activities and their related amenities (majorly cars). However the project area falls out of the central business and industrial districts thus enjoys better air quality and this forms part of the reason as to why the area is majorly residential.

3.5 Geology

The project and its surrounding area lie in Nairobi which is covered mainly by Tertiary volcanic material overlying folded Precambrian Basement System rocks of the Mozambique Belt. The youngest Tertiary rocks are the Limuru Trachytes, which are subsequently underlain by Kerichwa Valley Tuffs, Nairobi Trachytes, the Athi Series and the Kapiti Phonolites. In Nairobi lava sheets from subsequent lava flows are superimposed on top of each other and on outcrop they form extensive and remarkably flat volcanic terraces, such as the Embakasi Plains (Nairobi Phonolites), Athi Plains (Mbagathi Phonolitic Trachytes), the Karen-Langata and Kilimani-Lavington Areas (Nairobi Trachytes) and Kapiti Plains (Kapiti Phonolites).

Weathering from this Tertiary period resulted in Old Land Surfaces which have the characteristic reddish-brown color inherent of the soil in the project area. Aquifers were formed when the lava flows produced voids in permeable and semi-permeable lava series due to joints and fractures. The geological history of Nairobi has been dominated by volcanic activity since Miocene times. These areas are currently underlain by a series of volcanic rocks as a result of successive lava flows that originated from centers and fissures on the high eastern flank of the Rift region to the west. The main rocks exposed in the area and its surroundings are:

- Basement system (Precambrian metamorphic rocks of the Mozambique Belt),
- Tertiary volcanic and sediments,
- Pleistocene sediments, and
- Recent deposits

3.6 Soil Types

The soils of the Nairobi region consist of red soils that increase in their depth westwards and north-westwards from about 4 m at the City center to over 10 m in the vicinity of the Rift Valley. Other soils include alluvium, clays and swamp soils occupying former river valleys or swamps. The main types of soil in the project area region are silty clays of moderate to high plasticity. Other soils are sandy-clayey silt with thixotrophic characteristics.

3.7 Drainage and Hydrology

The main drainage in Kileleshwa as that of Nairobi, is consequent upon the regional topography and prevailing slope of the volcanic rocks. Nairobi is characterized by two main drainage basins. The Nairobi River and its tributary valleys (Kirichwa Kubwa, Kirichwa Dogo, Gitathuru and

Mathare) dissect and drain the northern and north-western parts; while the tributaries of Athi River (Sosian, Makoyeti, Ormanya, Donga and Mbagathi valleys) drain the southern and south-western parts. River Rui Ruaka also drains the northwest and is joined by the Karura stream before it enters Nairobi River at a point about 2.5 km off Dandora railway station. The Nairobi sub-basin drains eastwards, while the flow in the Athi river basin is mainly to the south and south-east. A smaller sub-basin occurs mid-way across Nairobi and consists of the Ngong River and its tributary of Motoine valley both of which flow eastwards.

The uplifting and deposition of volcanic materials have given rise to streams that are characterized by young valleys with steep gradients and narrow and/or sharp V-shapes in the north-western and western parts. The rapid down-cutting, together with the relatively soft character of the younger volcanic rocks have resulted in the streams flowing in generally parallel courses, with limited instances of river capture. The streams are most active during the period of heavy rains and head-ward erosion of gullies and tributaries is common. The transported load is mainly a result of erosion of the thick soil cover which gives rise to flowing streams of red mud.

3.8 Demographic Features

Nairobi County's population projections in 2009, 2018, 2020 and 2022 based on the 2009 Kenya Population and Housing Census by age cohort and gender with an inter-censual growth rate of 3.8 per cent. In 2009, the County population was projected to be 3,138,369 and is expected to rise to 4,941708 in 2018, 5,433,002 in 2020 and 5,958,338 in 2022 respectively.

3.9 Infrastructure Development

3.9.1 Road, Railway Network and Airports

The current road network in the County is inadequate in terms of coverage to meet current and future demands as envisaged in the Vision 2030. There is heavy congestion on most of the City's roads especially during the morning and evening peak hours. The total road network covers 3,602 Km out of which 1,735 Km are tarmac while 1867 Km are earth roads.

Nairobi County hosts three airports; Jomo Kenyatta International Airport, Wilson Airport and Eastleigh Airport. Jomo Kenyatta International Airport (JKIA) is the biggest airport in East and Central Africa, and is the focal point for major aviation activities in the region. The County has a railway network of 75 Km and a total of 10 functional railway stations which are: Embakasi,

Kileleshwa, and Nairobi main terminal, Dandora, Githurai, Kahawa, Kibra, Dagoretti, JKIA and Syokimau. The established Kileleshwa and Imara Daima railway stations and expansion of Nairobi platform has improved public transportation in Nairobi and with it socio-economic development.

Photo 6: A section of Gatundu Crescent currently serving the project site

3.9.2 Information and Communication and Technologies

Posts and telecommunication sub-sector has experienced mixed growth in the recent past. While the County has 38 post office branches, the growth of postal services has been declining due to increase in penetration of mobile telephony and internet. Mobile telephony has the highest coverage in Nairobi compared to other parts of the country with over 95 per cent of the inhabitants having access to mobile communication.

The players engaged in mobile telecommunication include: Safaricom, Airtel, Telkom, while those in mailing services include Kenya Postal Corporation, Group 4 Securities (G4S), DHL and Wells Fargo among others.

3.9.3 Waste Water and Sewer line System

Completion of construction activities will be followed by occupation of the Houses by tenants. Both solid and liquid wastes will be produced during this phase of the project. To manage solid wastes (domestic), the proponents will avail litterbins/receptacles within the compound for temporary storage awaiting sound disposal. Effluent from toilets and washrooms will be

discharged into the existing sewer line running next to the Houses that joins the main Nairobi City Water & Sewerage Company Sewer line system along the site. Storm water will be conveyed to the council's storm water drainage system.

Photo 7: A connection Nairobi City Water & Sewerage Company Sewer-line along the site

3.10 Energy Access

The main sources of energy in Nairobi County are electricity, solar, liquefied petroleum gas (LPG), biogas, paraffin, charcoal and firewood For instance, 63.2 % of the population use paraffin as cooking fuel. Other sources of energy for cooking include LPG (20.2 %), charcoal (10.5 %) and firewood (1.8 %). About 68.2 % of households use electricity as a means of lighting 28.8 % use paraffin while 2.9 % and 1.7 %use grass and dry cells respectively.

Photo 8: KPLC power line connection along the project site

3.11 Housing Types

Materials used in the construction of dwelling units are an indicator of housing conditions. Availability of materials, cost, weather and cultural conditions have a major influence on the type of materials used in different localities. The housing type by wall materials in Nairobi County is mainly characterized by stone, brick/block, mud/wood and corrugated iron sheet. Stone and block walled houses are 65.9 % while wood and corrugated iron sheet are 31.1 %.

The classification by floor type indicates that 75.8 % of household have cement floor, 14.2 % earthen floor, 7.5 % tiles and 2.2 % for those with wooden floor. Most of the households in Nairobi have corrugated iron sheet roofed houses which accounts for 56.6 %. Tiles and concrete roofs account for 12.4 % and 27.9 % respectively.

3.12 Vegetation

The proposed site is already a developed site previously consisting of a residential facility with no natural vegetation. However, the surrounding has a lot planted/secondary trees within the residential homes for aesthetic purposes. Some trees might be cleared to pave way for the proposed development and be replanted along the hedges after construction and among other spaces within the site during landscaping.

3.13 Tourism and Wildlife

Nairobi County is a major center of tourism in the region. Its relative proximity to many tourist attractions areas both in Kenya and East Africa makes it an asset of great importance in the tourism sector. As the capital city and commercial center, it attracts many business and leisure tourists. This is partly because the Jomo Kenyatta International Airport (JKIA), the main point of entry to Kenya by air, is located in the County.

3.13.1 Main Tourist Attractions, National Parks and Reserves

Nairobi County has major parks and museums which serve as the main tourist attraction and activities centers. The main national parks are Nairobi National Park, Nairobi Safari Walk and Nairobi Mini Orphanage. The Nairobi Safari Walk is a major attraction to tourists as it offers a rare foot experience for wildlife viewing. The County boasts of the Nairobi National Museum which houses a large collection of artifacts portraying Kenya's rich heritage through history, nature, culture and contemporary art. Other important museums include Nairobi Gallery and the Nairobi Snake Park.

CHAPTER FOUR: POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORKS

4.1 International and National Policy and Legislative Framework Context

4.1.1 Sustainability

The principle of sustainability requires that natural resources should be utilized in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations. It strives for equity in the allocation of the benefits of development and decries short-term resource exploitation which does not consider the long-term costs of such exploitation.

4.1.2 Principle of Intergenerational Equity

The principle of sustainability should be examined together with that of intergenerational equity, which focuses on future generations as a rightful beneficiary of environmental protection. Essentially, the principle of intergenerational equity advocates fairness, so that resent generations do not leave future generations worse off by the choices they make today regarding development. Its implementation requires the utilization of natural resources in a sustainable manner while avoiding irreversible environmental damage.

4.1.3 Principle of Prevention

The principle of prevention states that protection of the environment is best achieved by preventing environmental harm in the first place rather than relying on remedies or compensation for such harm after it has occurred. The reasoning behind this principle is that prevention is less costly than allowing environmental damage to occur and then taking mitigation measures.

4.1.4 Precautionary Principle

The precautionary principle recognizes the limitations of science, as it is not always able to accurately predict the likely environmental impacts of resource utilization. It calls for precaution in the making of environmental decisions where there is scientific uncertainty.

4.2 General Overview

Kenya has a policy, legal and administrative framework for environmental management. Under the framework, the National Environment Management Authority (NEMA) is responsible for ensuring that environmental impact assessments (EIAs) are carried out for new projects and

environmental audits on existing facilities as per the environmental management and coordination Act 1999. EIAs are carried out in order to identify potential positive and negative impacts associated with the proposed project with a view to taking advantage of the positive impacts and developing mitigation measures for the negative ones.

The government has established regulations to facilitate the process on EIAs and environmental audits. The regulations are contained in the Kenya Gazette Supplement No. 56, Legislative Supplement No. 31, and Legal Notice No. 101 of 13th June 2003. The guidelines on EIAs are contained in Sections 58 to 67 of the Act. In the past, the government has established a number of National policies and legal statutes to enhance environmental conservation and sustainable development.

The proponent will need to observe the provisions of the various statutes that are aimed at maintaining a clean, healthy and sustainable environment. Some of the policy, legal and institutional provisions are explained in the following sub-sections

4.3 Policy Framework

The Kenya Government policy on all new projects, plans, programs or activities requires that an Environmental Impact Assessment is carried out at the planning stages of the proposed development. This is to ensure that significant potential impacts on the environment and health are taken into consideration during the design, construction, operation, and decommissioning of the facility. The EIA report will include but not limited to the following information:

- Human Environment: socio-economic, socio-cultural and socio-legal aspects.
- Built Environment: material assets.
- Natural Environment: flora, fauna, soil, water, air, climate, landscape, historical landmarks, archeological and ecological aspects.

Environmental policies cut across all sectors and government departments. As such policy formulation should be consultative steered by interdisciplinary committees.

4.3.1 National Environmental Action Plan (NEAP)

National Environmental Action Plan was a deliberate policy effort to integrate environmental concerns into the country's development initiatives/plans. This assumed a consultative and multi-sectoral approach. Such an approach ensured that environmental management and the conservation becomes integral in various decision making platforms.

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 and/or are in the process of development. Under the NEAP process, Environmental Impact Assessments were introduced targeting the industrialists, business community and local authorities.

4.3.2 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 governments' inability to provide sufficient shelter for all its citizens. The government was to simply facilitate other actors such as developers to invest in shelter.

4.3.3 National Policy on Water Resources Management and Development

While the National Policy on Water Resources Management and Development (1999) 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.

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, a process that is ongoing. 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.

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

The key objectives of the Policy include: -

- To ensure that from the onset, all development policies, programmes and projects take environmental considerations into account,
- To ensure that an independent environmental impact assessment (EIA) report is prepared for any industrial venture or other development before implementation,

- To come up with effluent treatment standards that will conform to acceptable health guidelines.

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. It also encourages participation of stakeholders in the management of wastes within their localities. Regarding human settlement, the paper encourages better planning in both rural and urban areas and provision of basic needs such as water, drainage and waste disposal facilities among others.

4.4 Environmental Legal Framework

4.4.1 The Constitution of Kenya

The Constitution of Kenya bestows the right to a clean and healthy environment, which includes the right:

a. To have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and
b. To have obligations relating to the environment fulfilled under Article 70.

69. (1) The State shall:

a. Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
b. Encourage public participation in the management, protection and conservation of the environment;
c. Protect genetic resources and biological diversity;
d. Establish systems of environmental impact assessment, environmental audit and monitoring of the environment;
e. Eliminate processes and activities that are likely to endanger the environment; and
f. Utilize the environment and natural resources for the benefit of the people of Kenya.

(2) 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.

70. (1) If a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.

(2) On application under clause (1), the court may make any order, or give any directions, it considers appropriate:

a. To prevent, stop or discontinue any act or omission that is harmful to the environment;
b. To compel any public officer to take measures to prevent or discontinue any act or omission that is harmful to the environment; or
c. To provide compensation for any victim of a violation of the right to a clean and healthy environment.

(3) For the purposes of this Article, an applicant does not have to demonstrate that any person has incurred loss or suffered injury.

48. The State shall ensure access to justice for all persons and, if any fee is required, it shall be reasonable and shall not impede access to justice.

4.4.2 Environmental Management and Co-ordination Act No. 8 of 1999. Cap 387

This EIA project report has been undertaken in accordance with the provisions of Section 58 of Environment Management and Coordination Act, 1999 and subsequent EMCA (Environmental Impact Assessment /Environmental Audit regulations, 2003). Part II of EMCA, 1999 states that every person is entitled to a clean and healthy environment and had the duty to safeguard the same. In this regard, development proposals should not compromise the quality of the environment. Section 58 of EMCA No.8 of 1999 and EIA/EA regulations, 2003 underscore the need for environmental impact assessments for development activities such as this new commercial development.

The Environment Management and Coordination Act (EMCA), 1999 provides for the establishment of an umbrella legal and institutional framework under which the environment in general is to be managed. EMCA is implemented by the guiding principle that every person has a right to a clean and healthy environment and can seek redress through the High court if this right has been, is likely to be or is being contravened. Entitlement to a clean and healthy environment in:

1. Every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment.
2. The entitlement to a clean and healthy environment under subsection (1) includes the access by any person in Kenya to the various public elements or segments of the environment for recreational, educational, health, spiritual and cultural purposes.
3. If a person alleges that the entitlement conferred under subsection (1) has been, is being or is likely to be contravened in relation to him, then without prejudice to any other action with respect to the same matter which is lawfully available, that person may apply to the High Court for redress and the High Court may make such orders, issue such writs or give such directions as it may deem appropriate to—
    a. Prevent, stop or discontinue any act or omission deleterious to the environment;
    b. Compel any public officer to take measures to prevent or discontinue any act or omission deleterious to the environment;
    c. Require that any on-going activity be subjected to an environment audit in accordance with the provisions of this Act;
    d. Compel the persons responsible for the environmental degradation to restore the degraded environment as far as practicable to its immediate condition prior to the damage; and
    e. Provide compensation for any victim of pollution and the cost of beneficial uses lost as a result of an act of pollution and other losses that are connected with or incidental to the foregoing.
4. A person proceeding under subsection (3) of this section shall have the capacity to bring an action notwithstanding that such a person cannot show that the defendant's act or omission has caused or is likely to cause him any personal loss or injury provided that such action—

a. Is not frivolous or vexatious; or
b. Is not an abuse of the court process

5. In exercising the jurisdiction conferred upon it under subsection (3), the High Court shall be guided by the following principles of sustainable development—
    a. The principle of public participation in the development of policies, plans and processes for the management of the environment;
    b. The cultural and social principles traditionally applied by any community in Kenya for the management of the environment or natural resources in so far as the same are relevant and are not repugnant to justice and morality or inconsistent with any written law;
    c. The principle of international co-operation in the management of environmental resources shared by two or more states;
    d. The principles of intergenerational and intra-generational equity;
    e. The polluter-pays principle; and
    f. The pre-cautionary principle

4.4.2.1 The Environmental Management and Co-ordination (Water Quality) Regulations, 2006

These Regulations were published in the Kenya Gazette Supplement No. 68, Legislative Supplement No. 36, and Legal Notice No. 120 of 29th September, 2006. The Regulations provides for sustainable management of water resources including prevention of water pollution and protection of water sources (lakes, rivers, streams, springs, wells and other water sources).

Regulation No. 14 (1) requires every licensed person generating and discharging effluent into the environment to carry out daily effluent discharge quality and quantity monitoring and to submit quarterly records of such monitoring to the Authority or its designated representatives.

The proponent will have to ensure that appropriate measures to prevent pollution of underground and surface water are implemented throughout the project cycle.

4.4.2.2 The Environmental Management and Co-ordination (Waste Management) Regulations, 2006

These Regulations were published in the Kenya Gazette Supplement No. 69, Legislative Supplement No. 37, and Legal Notice No. 121 of 29th September, 2006. The regulations provide

details on management (handling, storage, transportation, treatment and disposal) of various waste streams including:

- Domestic waste
- Industrial waste,
- Hazardous and toxic waste
- Pesticides and toxic substances
- Biomedical wastes and
- Radioactive waste

Regulation No. 4 (1) makes it an offence for any person to dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle.

The proponent shall ensure that the main contractor adopts and implements all possible cleaner production methods during the construction phase of the project.

Regulation 6 requires waste generators to segregate waste by separating hazardous waste from non-hazardous waste for appropriate disposal.

Regulation 14 (1) requires every trade or industrial undertaking to install at its premises anti-pollution equipment for the treatment of waste emanating from such trade or industrial undertaking.

Regulation 15 prohibits any industry from discharging or disposing of any untreated waste in any state into the environment.

Regulation 17 (1) makes it an offence for any person to engage in any activity likely to generate any hazardous waste without a valid Environmental Impact Assessment license issued by NEMA.

Regulation 18 requires all generators of hazardous waste to ensure that every container or package for storing such waste is fixed with a label containing the following information:

- The identity of the hazardous waste
- The name and address of the generator of waste
- The net contents

- The normal storage stability and methods of storage
- The name and percentage of weight of active ingredients and names and percentages of weights of other ingredients or half-life of radioactive material
- Warning or caution statements which may include any of the following as appropriate- The words "WARNING" or "CAUTION"

Regulation 19 (1) requires every person who generates toxic or hazardous waste to treat or cause to be treated such hazardous waste.

The proponent shall ensure that the main contractor implements the above mentioned measures as necessary to enhance sound environmental Management of waste.

4.4.2.3 The Occupational Safety and Health Act, 2007

This is an act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. The Act was published in the Kenya Gazette Supplement No. 111 (Acts No.15). It received presidential assent on 22nd October, 2007 and became operational on 26th October, 2007.

The key areas addressed by the Act include:

a) General duties including duties of occupiers, self-employed persons and employees
b) Enforcement of the act including powers of an occupational safety and health officer
c) Registration of workplaces.
d) Health General Provisions including cleanliness, ventilation, lighting and sanitary conveniences
e) Machinery safety including safe handling of transmission machinery, hand held and portable power tools, self-acting machines, hoists and lifts, chains, ropes & lifting tackle, cranes and other lifting machines, steam boilers, air receivers, refrigeration plants and compressed air receiver
f) Safety General Provisions including safe storage of dangerous liquids, fire safety, evacuation procedures, precautions with respect to explosives or inflammable dust/gas
g) Chemical safety including the use of material safety data sheets, control of air pollution, noise and vibration, the handling, transportation and disposal of chemicals and other hazardous substances materials

h) Welfare general provisions including supply of drinking water, washing facilities, and first aid
i) Offences, penalties and legal proceedings

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

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.

4.4.2.4 Noise and Vibration Pollution (Control) Regulations, 2009

These regulations were published as legal Notice No. 61 being a subsidiary legislation to the Environmental Management and Co-ordination Act, 1999. The regulations provide information on the following:

a) Prohibition of excessive noise and vibration
b) Provisions relating to noise from certain sources
c) Provisions relating to licensing procedures for certain activities with a potential of emitting excessive noise and/or vibrations and
d) Noise and excessive vibrations mapping.

Regulation 5 further makes it an offence for any person to 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.

Regulation 12 (1) makes it an offence for any person to operate a motor vehicle which- *(a)* produces any loud and unusual sound; and *(b)* exceeds 84 dB(A) when accelerating. According to sub regulation 2 of this regulation, No person shall at any time sound the horn or other warning device of a vehicle except when necessary to prevent an accident or an incident.

Regulation 16 (1) stipulates that where a sound source is planned, installed or intended to be installed or modified by any person in such a manner that such source shall create or is likely to emit noise or excessive vibrations, or otherwise fail to comply with the provisions of these Regulations, such person shall apply for a license to the Authority. According to regulation 18 (6), the license shall be valid for a period not exceeding seven (7) days.

The project proponent will be required to comply with the above mentioned regulations in order to promote a healthy and safe working environment.

4.4.3 Public Health Act Cap 242

Part IX section 115 of the Act states that no person or institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires that local Authorities take all lawful necessary and reasonable practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to injuries or dangerous to human health. As such, proponents and contractors of housing projects should ensure that health and safety concerns of workers, neighboring communities and occupants of the building are taken into consideration.

4.4.4 The Physical and Land Use Planning Act, 2019

Physical Planning Act, 2019 gives the local authority power to prohibit or control development activities in their jurisdictions. Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective local Authority.

Finally, section 36 states that if development with a development action, local authority is of the opinion that the proposed development activity will have injurious impacts on the environment, the applicant will be required to submit together with the application the EIA report.

4.4.5 Building Code 2000

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

4.4.6 The Kenya Water Act, 2016

The Kenya Water Act of 2016 was enacted to ensure equitable and sustainable use of water resources in the country. It establishes the Water Resource Management Authority to manage water resources in the country that are vested in the state.

The Cabinet Secretary also formulates, and publishes in the Gazette, the national water resources management strategy in accordance with which the water resources of Kenya are being managed, protected, used, developed, conserved and controlled, the Water Resources Management Authority

(WRMA) in turn formulate a catchment management strategy through which water catchment areas are managed.

WRMA may also with approval from the Cabinet Secretary declare an area to be a protected area where it is satisfied that special measures are necessary for the protection of a catchment area or part thereof and the Authority may impose such requirements, and regulate or prohibit such conduct or activities, in or in relation to a protected area as the Authority may think necessary to impose, regulate or prohibit for the protection of the area and its water resources.

Schemes are categorized hierarchically with state schemes taking precedence over community schemes and by notice in the Kenya gazette land may be acquired for purposes of a state scheme under means prescribed in the law as to how land may be acquired. Community water resources projects are only allowed if the proposed project is approved by the persons owning or occupying at least two-thirds of the particular area concerned in the project; and provision is made by the project for an adequate alternative supply of water to be supplied to permit holders likely to be adversely affected and unable to benefit from the scheme.

In term of water work permits will be required for the following purposes except in state schemes; any use of water from a water resource (except as provided in section 26); drainage of any swamp or other land; the discharge of a pollutant into any water resource; any purpose, to be carried out in or in relation to a water resource, which is prescribed by rules made under the Act to be a purpose for which a permit is required. Further exceptions for permit requirement are for;

i. The abstraction or use of water, without the employment of works, from or in any water resource for domestic purposes by any person having lawful access thereto;
ii. Any development of ground water, where none of the works necessary for the development are situated within one hundred meters of any body of surface water (other than in-closed spring water); or within a ground water conservation area; or
iii. The storage of water in, or the abstraction of water from, a dam constructed in any channel or depression which the Authority has declared, by notice published in the Gazette, not to constitute a watercourse for the purposes of the Act.

Permits may be applied for from WRMA and in may be subject to EIA in accordance with the requirements of the EMCA of 1999, payment of a prescribed fee and completion of an application form. The WRMA determines an application for a permit as soon as practicable after its lodgment

but where an application duly made in accordance with the procedure is not determined by the Authority within six months after lodgment, any fee paid by the applicant will be refunded to the applicant. Every permit will be subject to subsequent variation by the Authority after hydro graphic survey of the relevant body of water has been made, and after reasonable notice has been given to all parties affected.

Thus the Kenya Water Act of 2016 will also provide guidelines and framework for the project's activities and through compliance the project will align its objectives with those of this act.
The main contractor will be required to implement necessary measures to ensure water conservation and also to prevent potential for water contamination during the construction phase to comply with this the developer will use a channel to direct water to the main channel just like the houses in the surrounding neighborhood.

4.4.7 The County Governments Act, 2012

An Act of Parliament giving effect to Chapter Eleven of the Constitution; to provide for county governments' powers, functions and responsibilities to deliver services and for connected purposes.

Section 102 of the Act: The principles of planning and development facilitation empowers the County to

a) Integrate national values in all processes and concepts;
b) Protect and develop natural resources in a manner that aligns national and county government's policies;

Section 103 of the Act: The objectives of county planning shall be to—

a) Ensure harmony between national, county and sub-county spatial planning requirements;
b) Facilitate the development of a well-balanced system of settlements and ensure productive use of scarce land, water and other resources for economic, social, ecological and other functions across a county;
c) Maintain a viable system of green and open spaces for a functioning eco-system;
d) Protect the historical and cultural heritage, artefacts and sites within the county;
e) Make reservations for public security and other critical national infrastructure and other utilities and services;

f) Work towards the achievement and maintenance of a tree cover of at least ten per cent of the land area of Kenya as provided in Article 69 of the Constitution.

Section 104 of the Act: Obligation to planning by the county.

a) The county planning framework shall integrate economic, physical, social, environmental and spatial planning.
b) The county government shall designate county departments, cities and urban areas, sub-counties and Wards as planning authorities of the county.
c) To promote public participation, non-state actors shall be incorporated in the planning processes by all authorities.
d) County plans shall be binding on all sub-county units for developmental activities within a County.

4.4.8 The Penal Code (Cap. 63)

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

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

4.4.9 Institutional Framework

At present there are over twenty (20) institutions and departments which deal with environmental issues in Kenya. Some of the key institutions include the National Environmental Council (NEC), National Environmental Management Authority (NEMA), the Forestry Department, Kenya Wildlife Services (KWS) and others. There are also local and international NGOs involved in environmental activities that impact on the environment in one way or the other in the country.

Table 3: Institutions and Departments which deal with Environmental issues in Kenya

Institution	Mandate/EIA Relevance
NEMA	The National Environment Management Authority (NEMA) is established under the Environmental Management and Coordination Act (EMCA) No. 8 of 1999, as the principal instrument of government in the implementation of all policies relating to the environment. (*Source: GoK. (2012). National Environmental Management Authority. www.nema.go.ke*).
Nairobi County Government	The onset of the 2010 constitution of Kenya ushered in the County Government of Nairobi. The county took over from the defunct County Council of Nairobi that was created by then Local Government Act, Cap 265 of the Laws of Kenya. Its mandate is to provide services to residents of the Nairobi city. Among other functions, the County government is responsible for the provision of essential services like water, sewer and public safety (Functions of County Governments Part 2 (Fourth Schedule, Article 185 (2), 186 (1) and 187 (2)). Some of the county departments whose functions are pertinent to the project include the following: • Planning Department • Public Health Department • Social Services and Housing Department • Housing Development Department • Inspectorate Department • Engineer's Department • Department of Environment
Nairobi City Water and Sewerage Company (NCWSC)	The Nairobi Water Company is a water service provider charged with the provision of the water and sewerage services in Nairobi. Those services were previously offered by the Water and Sewage Department of the County Government of Nairobi .Nairobi Water Company's formation arose from the enactment of the Water Act 2002 and amendment in 2016, which created new institution to manage water resources in the country. Under the new Act, water service providers will be licensed by water service boards to retail water in their jurisdictions. Nairobi Water Company is one such water service provider, which has been appointed by the Athi Water Service Board to provide water and sewerage services to the residents of Nairobi and its environs.
Ministry of Energy-KPC	The Ministry of Energy derives its mandate from Cap.112 and 435 of the Laws of Kenya. In addition, a Sessional Paper (No.4 of 2004) provides the policy framework and direction on Energy Development

	in Kenya for the next 20 years. The Cabinet Secretary of Energy oversees policy formulation while the Permanent Secretary oversees efficiency and effectiveness in the implementation of formulated policies. The Ministry has three technical departments namely; Geo-Exploration, Electric Power and Renewable Energy. The Ministry of Energy's mission is to facilitate provision of clean, sustainable, affordable, reliable and secure energy sources for national development while protecting the environment, (*Source: GoK, MoE, www.energy.go.ke).*
Ministry of Labor	This ministry's mandate is to: enforce labour laws, maintain industrial peace, industrial training and promote safety and health of employees. We also develop and coordinate implementation of policies and strategies for human resource development, micro and small enterprise sector and productivity improvement. Our mandate is derived from Presidential Circular No 1/2006 of March 2006 and also from the following Acts of Parliament and other policy documents: • Employment Act, Cap. 226; • The Regulation of Wages and Conditions of Employment Act, Cap. 229; • The Trade Disputes Act, Cap. 234; • The Workmen's Compensation Act, Cap. 236; • The Trade Unions Act, Cap. 233; • The Industrial Training Act Cap 237; • The Factories and Other Places of Work Act, Cap. 514; • National Social Security Fund (NSSF) Act, Cap 258; • ILO Conventions and Recommendations; • The Industrial Relations Charter of 1984; • Economic Recovery Strategy for Wealth and Employment Creation; • The 9th National Development Plan; • Session Paper No.2/2005 on MSE development; and • The Legal Notice 7354 of September 2002 on the establishment of the • Productivity Centre of Kenya (PCK). (Source: GoK, Ministry of Labour,) *www.labour.go.ke*)
Ministry of Finance Planning,	The Ministry of Finance, Planning and National Development is mandated to facilitate and coordinate the national development planning process and to provide leadership in national economic policy management. Its core functions include:

National Development	• The coordination of government economic policies, including regional and international cooperation policies; • The coordination and preparation of the planning components of the Medium Term Expenditure Framework (MTEF); the Fiscal Strategy Paper and the requisite budget documents; • The provision of leadership and coordination in the preparation of the main National Development Plan documents, including the integration of County Integrated Development Plans (CIDP); National Development Plans, and specific socio-economic programmes and plans; • The coordination and management of population, economic and national statistical services within government; and • The Coordination and provision of leadership in the national Monitoring and Evaluation (M&E) framework. (*Source: GoK. MoFPND and Vision 2030. www.planning.go.ke*)
Ministry of Health	This ministry is charged with the functions of: • Public health and sanitation policy • Preventive and promote health services • Community health services • Health education • Reproductive health • Food quality and hygiene • Health inspection and other public health services • Quarantine administration • Oversight of all sanitation services • Preventive health program including vector control • National public health laboratories • Government chemist • Dispensaries and health centers (i.e., levels 2 & 3) • Kenya Medical Research Institute (KEMRI) • Radiation Protection Board • Member of KEMSA Board • Member of Kenya Medical Training College (KMTC) Board (*Source: GoK, (2013) Ministry of Public Health and Sanitation, www.publichealth.go.ke*)
Ministry of Transport and Infrastructure	The development of integrated Nairobi metropolitan areas growth and development strategy covering among other things: • Integrated roads, bus and rail infrastructure for metropolitan area • Efficient mass transport system for Nairobi metropolitan area

	• Replacement of slums with affordable low cost/rental housing provision of adequate housing • Development and enforcement of planning and zoning regulations • Preparation of spatial planning for metropolitan area • Efficient water supply and waste management infrastructure • Promotion, development and investment in sufficient public utilities, public services and world class infrastructure for transforming Nairobi into a global competitive city for investment and tourism • Identification and implementation of strategic projects and programmes requiring support by government • Promotion of Nairobi metropolitan area as a regional and global services centre for financial, information and communication technology, health, education, business, tourism and other services • The development of a sustainable funding framework for the development of identified urban and metropolitan areas (*Source: GoK. (Ministry of Transport and Infrastructure Development, Mandate.*)
Kenya Urban Roads Authority	The mandate of KURA as defined in the Kenya Roads Act, 2007 is the Management, Development, Rehabilitation and Maintenance of all public roads in the cities and municipalities in Kenya except where those roads are national roads. KURA's core functions include: • Constructing, upgrading, rehabilitating and maintaining roads under its control. • Controlling urban road reserves and access to roadside developments. • Implementing roads policies in relation to urban roads. • Ensuring adherence by motorists to the rules and guidelines on axle load control prescribed under the Traffic Act and under any regulations under this Act. • Ensuring that the quality of road networks is in accordance with such standards as may be defined by the Cabinet Secretary. • In collaboration with the Ministry responsible for transport and the police department, overseeing the management of traffic and road safety on urban roads. • Monitoring and evaluating the use of urban roads. • Planning the development and maintenance of urban roads. • Collecting and collating all such data related to the use of urban roads as may be necessary for efficient forward planning under the Roads Act.

	• Preparing the road works programs for all urban roads. • Liaising and coordinating with other road authorities in planning and on operations in respect of roads. • Advising the Cabinet Secretary on all issues relating to urban roads. • Performing such other functions related to the implementation of the Roads Act as may be directed by the Cabinet Secretary (*Source: GoK (2012) Kenya Urban Roads Authority. Retrieved July 4, 2012 from www.kura.go.ke*)
County Environment Committees.	According to EMCA, 1999 and amended 2015, the Governor by notice in the gazette appoints County Environment Committees of the Authority in respect of every county respectively. The Environment Committees are responsible for the proper management of the environment within the county in respect of which they are appointed to. They are also to develop a county strategic environmental action plan every five years and perform such additional functions as are prescribed by the Act or as may, from time to time be assigned by the Governor by gazette notice. The decisions of these committees are legal and it is an offence not to implement them.
National Environmental Complaints Committee.	The Committee is charged with the following functions: Investigating allegations/ complaints against any person or against the Authority (NEMA) in relation to the condition of the environment and its management, Prepare and submit to the Council periodic reports of its activities which shall form part of the annual report on the state of the environment, and to perform such other functions and excise such powers as may be assigned to it by the Council.
National Environment Action Plan Committee.	This 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 the EMCA specifies.
National Environmental Tribunal.	This 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. Any person who feels aggrieved may challenge the tribunal in the High Court.

CHAPTER FIVE: ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 Description of the Anticipated Impacts

5.1.1 Anticipated Impacts

An impact assessment was undertaken following full characterization of the environmental and social baseline, and identification of all project aspects. The anticipated impacts of the proposed project on the environmental elements are both positive and negative. The magnitude of each impact is described in terms of being significant, minor or permanent, short-term or long term, specific (localized) or widespread, reversible or irreversible.

The scope of the assessment will cover the proposed project site, and will be undertaken in accordance with, the National Environmental legal requirements, and guidelines triggered for the project. All the relevant environmental, social and economic aspects will be identified for the proposed activities, the activities will be considered in terms of their potential to interact with the (physical, biological, socio-economic) environment. The EIA project report shall distinguish the impacts through the following phases

- Construction phase
- Operational phase
- Decommissioning phase

Most of the impacts have been addressed in the proactive design of the project and other mitigation measures can only be guaranteed through active and responsible management committed to the propositions of the environmental management plan.

Table 4: Checklist of the Proposed Project's Potential Impacts

Environmental Aspect	Project Phase			
	Planning/Design	**Construction**	**Operational**	**Decommissioning**
Bio-diversity				
Habitat Change		×		×
Loss of Flora/ Fauna		×		
Social Dynamics				
Population influx		×	×	
Amenities		×	×	×
Job creation	×	×	×	×
Quality of life		×	×	
Land uses		×	×	×
Economy	×	×	×	×
Soil				
Contamination		×	×	×
Soil erosion		×		×
Compaction		×		
Water				
Water pollution		×	×	×
Surface run off		×	×	×
Over-utilization		×	×	×
Air				
Noise		×	×	×
Pollution		×	×	×
Other Aspects				
Environmental Opportunities	×	×	×	×
Landscaping		×		×

5.2 Positive Impacts

5.2.1 Better and Affordable Housing

Construction of the proposed Residential Apartment project is anticipated to provide better and affordable housing facilities and services to its clients around Kileleshwa area and Nairobi Count at large.

5.2.2 Stimulation to Urban Development

Cumulatively with other developments in the area Kileleshwa area and Westlands Sub County at large, the proposed development project will lead to reinforcing Kileleshwa area as a world class business area and residential upper tier urban area. This has benefits of increasing the quality of life and revenue generation from increased business activities.

This development project together with other projects being carried out in the area will increase the viability of the area to develop more residential areas and commercial establishments since it will increase the market and labor available, and the socioeconomic status of the region. This is together with other projects being carried out in the area

5.2.3 Decongestion

The propose Residential Apartment is anticipated to ease congestion on the current housing facilities around the project site in Kileleshwa as well ease pressure on available social amenities like drainage through development of infrastructure/drainage

5.2.4 Creation of Employment Opportunities

The proposed project development will create employment to some Kenyan citizens. Several employment opportunities will be created for construction workers during the construction phase of the project. This will be a significant impact since unemployment is currently quite high in the country at large.

5.2.5 Increased Access to Goods, Services and Social Amenities

The commercial area of the project and the recreational facilities created by the project will increase both the social facilities and health of residents in the area, which is psychologically linked to human wellbeing and productivity. This will stimulate other economic activities linked to these services and goods on top of improving the quality of life that is linked this access of goods and services

5.2.6 Provision of Market for Building Materials

The proposed project will require supply of building materials most, of which will be sourced locally in Nairobi and the surrounding areas. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

5.2.7 Increased Business Opportunities

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

5.2.8 Optimal Land use

The project will lead to the optimal use of the land as the land is currently less developed.

5.2.9 Generation of Revenue

The project will also increase the economic activities that will be carried in the area through those that will be primarily as a result of: the project's internal and ancillary activities; its supply chain; its value chain, and those that will be formed as a result of the project to support its occupants. All these businesses activities will be taxed and generate revenue for the county and national government in addition to providing a market for their supply and value chains.

5.2.10 Generation of Income

Economic investment hence more income to the proponent and a source of livelihood to employees in the apartment facility

5.2.11 Increase Economic/Commercial Value of Surrounding

The establishment of the project in the area, the goods and services it will offer will increase the commercial viability of the area and will consequently increase the land values in the surrounding area due to the potential high returns after development. This will attract more high income investors into the region as well as more middle income groups as settlers.

5.2.12 Aesthetic Improvement

The proposed project will result in beautification of the site and its surrounding environment. This will include establishment and maintenance of flower beds and greenery belt, walk ways and paths. The design concept has been inspired by modern lifestyle expectation of space interacting with nature to produce lifestyle targets which uphold current quality of living.

5.2.13 General Infrastructural Development

Such huge investments by the proponent in Kileleshwa area will provide an impetus for the County Government to improve the much needed amenities and infrastructure around the site. The population influx will also create the need to improve the existing and shared facilities i.e. schools,

hospitals, shops or establish new ones. This will have the indirect effect of creating job opportunities in the area. Companies also in the business of providing services such as telecommunication will also be encouraged to extend their networks to the region since it will be a ready and capable market for their services.

5.2.14 Environmental Conservation and Restoration

The recycling of the waste to be used as raw materials in other construction process reduces the demand for raw materials. This in turn reduces the potential impact to the environment that would have been felt if the demand of the raw materials hadn't reduced.

5.3 Potential Negative Environmental Impacts

The impacts that are seen as likely to negatively affect the environment and local population include the following:

5.3.1 Occupational Health and Safety (OHS)

During the proposed works, there may be increased hazards to health and safety such as dust, air, and noise pollution. The workforce and general public involved would be more subjected to these environmental hazards and disturbances. Foods for the construction workforce are usually provided by itinerant individuals most of who operate without license. This can compromise health of the workers especially if such foodstuff is prepared in an environment devoid of hygiene.

Table 5: OHS Risks and their Sources

OSH Risk	Source
Fire	• Flammable liquids & gases, chemicals, electricity, welding, open flames, heated materials and heat producing processes such as grinding, burning fuels etc.
Injurious substances, materials and equipment	• Moving parts of equipment e.g. saws, tractors, grinders etc. • Moving heavy materials • Open foundation pits • Raised building materials and equipment e.g. bricks, saws, hammers, steel pipes & fittings etc. • Sharp edges of nails, knives, saws, glass • Open flames, heat generating or using processes. • Working at heights o Emission of radiation i.e. EMFs from electrical equipment and bright lights from welding operations

	• Corrosive chemicals
Intoxication	• Toxic substances, corrosive chemicals, adhesives, waste gases, smoke, dusts and emitted particulate matter.

5.3.2 Solid Waste

The proposed activities will generate related solid wastes during construction phase will also lead to generation of construction wastes from the civil works and operations on the materials involved in the processes as well as during decommissioning. These wastes include: plastics, metal shavings, wood shavings, food wastes, plants, gases (Carbon, Nitrous and Sulphurous Oxides), fumes (from glues and other hydrocarbons), stone shavings, ceramics, bricks, glass, cardboard, soil, cement, asphalt, sand, concrete, paper, paints, sealants, adhesives, fasteners, construction effluent (grey water).

Some environmental impacts would include soil contamination, water and air pollution, whereas health risks include: breathing complications and respiratory diseases, cancer, skin disorders, poisoning etc.

Table 6: Waste Sources and their Risks if not properly managed

Waste	Source	Risks
Municipal Waste, Solid Waste, Garbage, Kitchen & Office Wastes	Kitchen, restaurants, shops, supermarkets, residential area, offices, repair works, plants, plastics (tubes, binders, , wrappings, metals (from clips, pins, lids), paper, cloth etc.	• **W**ater pollution, • Nuisances, • Air pollution on decomposition, • Soil contamination, • Water borne diseases, Respiratory illnesses
Municipal Waste, Liquid Waste Grey-water, Sewerage	Kitchen, , shops, offices, recreational areas, residential area, washings, cooking oils, adhesives, fuel, chemicals, toilets, soaps and detergents	• Water pollution (surface & subsurface), • Air pollution, • Soil contamination, and Water borne diseases
Waste Heat	Electronics, Vehicles, Air Conditioning, Power Generators, Water Pumps, Cooking and Heating activities (in house), Cooling water for machines	• Thermal Pollution of rivers from run-off Microclimate modification

5.3.3 Water Use and Management

Implementation and operation phases of the project will create additional demand to the water supply within the project vicinity.

5.3.4 Surface Drainage/Surface Run-off

The paved surfaces and the project structures created from the construction phase of the project can lead to increased run-off by preventing the natural percolation of water through the soil. This will also aggregate to the changes in the surface and subsurface hydrology as a result of the project. Additionally the increased run-off may lead to soil erosion in the areas where the water drains off to or drainage blockages by overloading the present drainage systems in the area. The increased run-off from the project and other construction projects may also cumulatively cause urban flooding and inundation of low lying areas during the rainy season.

5.3.5 Site Security

Security of the site and those working within is of utmost significance and their security must be assured at all the times.

5.3.6 Fire Hazards

A fire outbreak is a natural disaster and usually leaves on its trail detrimental effects to the environment. The operations that lead to fire outbreaks include poor handling of electricity systems, faulty electrical equipment and carelessness among others.

5.3.7 Traffic Implication

The delivery of construction materials and water supply by trucks to the project site may create traffic snarl up especially on Gatundu road.

5.3.8 Socio Cultural Impacts

The proposed project will involve a mixed use development that will attract different Kenyans and foreigners to the site. Social cohesion and blending with the existing communities may pose a conflict of interests in the short term since the influx population will come with their differing cultural and social practices.

However this may be treated as a minor impact since most communities in Kenya are welcoming and easy to interact with. Also since Nairobi is a predominantly urban and developed area that has a higher level of social permissiveness than most other urban areas in the country.

5.3.9 Noise Pollution

The construction activities and processes may generate noise above the ambient levels of the area. One of the sources of this noise would be from the trucks' and tractor's engines moving in the area either undertaking the civil works or ferrying materials, wastes and equipment to and fro the project site and these will form the mobile sources of noise during this phase.

Some point sources of noise will include civil works which will be operation specific or localized at the site due to the scope of the activities. This category of noise will include activities such as excavation, hammering, sawing, grinding; moving of material to and fro storage and also the use of generators.

However this is a minor negative impact since the site area is largely an urban area with high activity levels. One of the risks of the noise would be to the surrounding areas where they may create a nuisance or disturbance.

5.3.10 Increased Pressure on Social Amenities

The processes and activities involved in the construction of the project would place added pressure on infrastructure services and utilities such as roads, water, drainage and energy. This may contribute to service disruptions since the utility and service requirements of this stage are intensive. This impact is made more probable due to the challenges faced in the county to provide these services and compounded by the growth of the population.

5.3.11 Population Influx

During the construction phase there will be an influx of people mainly working in the development. There will also be an increase of population due to the opportunities presented in providing goods and services to primary population increment for the construction activities and employees. This secondary increase will mainly entail retailers of foodstuffs and other commodities. Waste from such commodities might pollute the area if a designated dumping place is not allocated.

The population will increase since the opportunities will be open to both local and people from other areas and thereby increasing the population. This increase in population will create pressure on utilities as well as present social risks through the interaction of people. Also it may present a health and security risk to both the residents and staff in the project.

5.3.12 Increased Land Value and Land Use Changes

It is predicted that as a result of the completion of the project and other projects being carried out in Kileleshwa area, the values of land in the area may increase at rates significantly more than normal. This is because the increase in population will increase demand for land and since its supply can't be increased, the value of land will increase.

Further, similar development projects will cumulatively turn the area into a more commercial middle/high income region therefore pushing the value per acre in the region since more and more commercial establishments and higher value residential areas will be created out of opportunity. This increase of land values and attraction of businesses to the area will cause land use changes in the region both in terms of uses of land (residential to commercial) and changing its character (areas that are highly built-up).

This will have impact on of loss of vegetation, emissions of GHGs, and surface run-off in addition to increasing the cost of living in the region, which may socially push the residents of the region further away if their econometric capacities are not improved in commensurate.

5.3.13 Change in Surface and Sub-Surface Hydrology

Together with the clearing of plants to pave way for development, changing the characteristics of the project site from its present state to a more built state (85-90% built) and changing the soil's characteristics, the proposed project will lead to a change in the water regime at the project site.

This is because the built areas will increase run-off while reducing percolation of water into the ground and thereby also changing the sub-surface hydrology. The wastes from the construction activities also pose a threat to the quality of water that will be drained from the site through run-off.

5.3.14 Change in Soil Characteristics

Several changes in the characteristics of the soil may result due to the excavation and compaction of soil for the foundation. The excavation may lead to losses in the accumulated soil carbon. Compacting the soil to lay the foundation, erecting temporary structures, and also from the heavy vehicles (trucks, tractors etc.) can reduce the soil's percolating ability and thereby increasing run-off either on the specific routes or large area.

Together with the laying of foundation and erecting of ancillary structures, this will further lead to changes in surface and sub-surface hydrology by changing the flow and recharge rates at the project site.

5.4 Mitigation Measures for Potential Negative Impacts

5.4.1 Mitigation Measures for Occupational Health and Safety

During construction of the premises, the contractor will be required to prepare a waste management plan for the work sites at the start of the project. The site is to be kept clean, neat and tidy at all times. The contractor shall implement measures to minimize occupational health and safety risks:

- Workmen shall be provided with suitable protective gear (such as dust masks, ear muffs, helmets, overalls, industrial boots etc.) particularly during construction. There must be fully equipped first aid kits on site and a safety officer who has a first aid training and knowledge of safety procedures. In addition, the contractor must have insurance for the workmen.
- The contractor will be required to adhere to Factories and Other Places of Work Act, especially the building operations and works of engineering construction rules and its subsidiary and supplementary regulations on safety and public health in the construction activities.

5.4.2 Mitigation Measures for Solid Wastes

The contractor shall implement measures to minimize waste and develop a waste management plan to include the following:

- Express condition shall be put in the contract that before the contractor is issued with a completion certificate; he will clear the site of all debris and restore it to a state acceptable to the supervising architect and environmental consultant.

- Bins/ receptacles shall be placed at strategic locations within the site as collection centres to facilitate separation and sorting of the various types of wastes. These bins shall be placed with clear markings e.g. plastics, paper and others, to receive different solid waste materials.
- The contractor and proponent shall work hand in hand with private refuse handlers that are already on the ground and local council to facilitate sound waste management.
- The wastes shall be properly segregated and separated to encourage recycling of some useful waste materials.
- Use of an integrated solid waste management system through a hierarchy options i.e. source reduction, recycling, composting and reuse shall be encouraged. This will facilitate proper handling of solid waste during operation stage.

5.4.3 Mitigation Measures for Water Use and Management

The contractor and proponent shall implement the following water use and management to maximum utilization:

- Provision of notices and information signs within the project site to notify on means and need to conserve water resource.
- Installation of water conserving taps that turn-off automatically when water is not in use will be done
- Encouragement of water re-use/recycling during both construction and operation phases of the project.

5.4.4 Mitigation Measures for Surface Drainage

- Drainage channels shall be installed in all areas that generate or receive surface water. The channels will be covered with metal gratings or other suitably approved materials to prevent occurrence of accidents and dirt entry that may affect flow of run-off.
- The channels shall be designed with regard to peak volumes.
- Paving of the sidewalks, parking and other open areas shall be done using pervious materials

5.4.6 Mitigation Measures for Site Security

- The management shall strategically install lighting as well as security alarms and backup systems including surveillance of the area on a 24 hours basis.
- Security guards shall protect the property in a 24-hour basis and document any suspect movement within the facility and its environs.

5.4.7 Mitigation Measures for Fire Hazards

- All fire control and fighting facilities shall be installed following local council fire master's requirements and approval e.g.
    - Provision of 2NO 2*9 liters carbon dioxide fire extinguisher
    - Provision of fire blanket
    - Provision of long fire hose reel
    - Provide illuminated exit signs
- The occupants will ensure that all firefighting equipment are strategically positioned, regularly maintained and serviced
- Installation of an automatic fire alarm system for the entire facility

5.4.8 Mitigation Measures For Traffic Implication

- The contractor shall be required to erect clear road signs showing speed limits and warning other motorists of turning vehicles.
- Ensuring all drivers for the project comply to speed regulations.
- Making sure the construction doesn't occupy the road reserves and complying to traffic and land demarcation obligations.
- Ensuring all vehicles used for the project are in good working condition both legally and commensurate to their intended use

5.4.9 Mitigation Measures for Change in Surface & Sub Surface Hydrology

- The drainage system design should ensure that surface flow is drained suitably into the public drains provided to control flooding within the site.
- Drainage channels should be installed in all areas that generate or receive surface water such as car parking, driveways and along the building block-edges of the roofs.
- The channels should be covered with gratings/suitable and approved materials to prevent occurrence of accidents and entry dirt that would compromise flow of run-off.

- The channels should be designed with regards to the peak volumes such as periods or seasons when there is high intensity of rainfall which is also not common in the project area but just in case such an event occurs.
- The channels should never at any time be full due to the resulting heavy downpours.
- The drainage channels should ensure the safe final disposal of run-off /surface water and should be self-cleaning which means it should have a suitable gradient.
- Paving of the side walkways, driveways and other open areas should be done using pervious materials such as cabro to encourage water recharge reducing run-off volume
- Storm water generated from roof catchments should be harvested, stored and made use in various household activities such as general cleaning. This will reduce run-off reaching the drainage channels.

5.4.10 Mitigation Measures for Change in Soil Characteristics

- Sprinkling water on the soil to prevent dust from rising.
- Creating specific paths for the trucks
- Ensuring there is enough space for normal percolation of water. Preventing pollution from construction wastes by having specific sites for collection, sorting and transport of wastes.
- Proper installation and configuration of drainage structures to ensure their efficiency.
- Installing cascades to break the impact of water flowing into the drains.
- Controlling the earthworks and ensuring the management of excavation activities.
- Compacting areas with loose soil.
- Landscaping.
- Providing soil erosion control structures on the steeper areas of the site & controlling activities during the rainy season.

5.4.11 Mitigation Measures for Population Influx

- Workers to be issued with jobs cards to monitor their movements in the site area
- Only authorized personnel should be allowed entrance to the site
- Presence of a work registry book where workers sign in and out
- Educating the workers on proper sanitation methods

- Sensitizing the worker on HIV/AIDS Making available suitable facilities for the collection, segregation and safe disposal of the wastes.
- Ensuring all waste is dumped in their designated areas and legally acceptable methods

5.4.12 Mitigation Measures for Increase Land Values and Land Use Changes

- Collaborating with public and planning officials on the current development and future developments
- Complying to zoning bylaws
- Aligning the project's objectives with those of national, county and district development policies

5.4.13 Mitigation Measures for Sociocultural Impacts

- Integrating & implementing Equal Opportunity Principles in human resource policies.
- Promoting social cohesion and integration among people in the area.
- Creating awareness towards the diversity of cultures and different economic background of the people in the project staff and residents
- Allowing the residents and businesses to form social groups and networks that build social capital.
- Targeting social investment programs towards the local communities and region.

5.4.14 Mitigation Measures for Noise Generation

Complying with the EMCA noise regulation Legal Notice 61 including;

- Using equipment with noise suppressing technologies.
- Providing workers with PPEs against noise e.g. ear plugs.
- Placing signs around the site to notify people about the noisy conditions.
- Regular maintenance of equipment to ensure they remain efficient and effective.
- Construction works should be carried out only during the specified time which is usually as from 0800 hrs to 1700 hrs.
- There should not be unnecessary horning of the involved machinery.

- Provision of bill boards at the construction site gates notifying of the construction activity and timings.

CHAPTER SIX: PROJECT ALTERNATIVES

6.1 Introduction

This section examines alternatives of the proposed project in terms of the site, products, materials, technology and waste management options. It also compares impacts of each alternative *vis-a-vis* those of the proposed project. This becomes an aid to decision making process.

6.2 Zero or No Project Alternative

The No Project Option is the least preferred from the socio-economic and partly environmental perspective since if the project is not done:

- The economic benefits especially during construction i.e. provision of jobs for skilled and non-skilled workers will not be realized.
- There will be no generation of income by the developer and the Government.
- The social-economic status of Kenyans and local people would remain unchanged.
- The local skills would remain under-utilized.
- No employment opportunities will be created for Kenyans who will work in the project area.
- Discouragement for investors to produce this level of standard and affordable developments.

If the project is stopped then the trickle-down effect of financial resources will not be felt in this area. In this respect, the "No project alternative" is not deemed appropriate.

6.3 Alternative to Site

Currently, the proponent doesn't own another land to implement the proposed project. Looking for an alternative land may take many years of which there is no guarantee that it will be acquired. This will also mean that the proponent redesigns the project and commit himself to additional expenses.

6.4 Alternative Land Use Activities

Most buildings in the project area are for residential purposes. Alternative land use activities such as farming, grazing land and garage will conflict with the current land uses. For uniformity and conformity, the proponent is interested in construction of residential unit.

6.5 Solid Waste Management Alternatives

Throughout construction, the project will produce wastes such as soil, wood chips, metal scraps and paper wrappings among others. The proponent will observe the EMCA (Waste Management Regulations, 2006). Receptors/litterbins will be placed at strategic positions in all floors of the building for temporary storage of general solid wastes. Thereafter, contracted solid waste handling firm will collect these wastes to dumping sites.

Occupants of the building will be advised to sort solid wastes generated according to their compositions. The option of burning solid wastes is discouraged since it is likely to emit smoke and noxious gases.

6.6 Domestic Waste Water Management Alternatives

Waste water from the premises will come from the toilets and surface runoffs. Viable alternatives to handle these wastes include connection to the existing sewer system.

6.6.1 Connection to the existing sewer system

This will solve the waste water management problem at minimal costs and environmentally efficient way.

CHAPTER SEVEN: CONSULTATION AND PUBLIC PARTICIPATION

7.1 Introduction

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 the public consultation and public participation followed to identify the key issues and impacts of the proposed project.

Public consultation was carried out in this Project with the objectives of minimizing probable adverse impacts of the project through alternate working hours and to achieve speedy implementation of the project by creating awareness amongst the community on the benefits of the project. The purpose of the public consultation includes the following:

- To ascertain the public views on various environmental issues related to the proposed development.
- To encourage and provide for people's participation in project development.
- To obtain new insight and site specific information, and to appropriating possible mitigation measures based on local knowledge of the communities
- To facilitate and open and inclusive approach to consultation that provided timely and transparent information to the stakeholders;
- To provide an opportunity for stakeholders to provide feedback on the project raise their concerns;
- To aid project planning and development of mitigation measures and monitoring plans to address issues raised.

7.2 Stakeholder Engagement Plan

7.2.1 Objectives of the Stakeholder Engagement Plan (SEP)

The SEP seeks to define an environmentally, technically and culturally appropriate approach to stakeholder consultation and public participation process. The goal of this SEP is to improve and facilitate decision making and create a platform for communication that actively involves, and fosters in a timely manner, a common understanding between all project stakeholders and project affected persons/neighbors.

The SEP ensures that all groups of affected persons are provided sufficient opportunities to voice their opinions and concerns in regard to the proposed project, which will importantly help the Authority with decision making on the sound development of the proposed project. The key objectives of the SEP can be summarized as follows:

a. Understand the stakeholder engagement requirements,
b. Identify key stakeholders that are affected by the development project,
c. Identify the most effective methods and structures through which to disseminate project information (potential environmental impacts and proposed mitigation measures) to ensure regular, accessible, transparent and appropriate consultations and public participation,
d. Develop a stakeholders' engagement and public participation process that provides stakeholders with an opportunity to positively influence project planning and design,
e. Establish formal grievance/resolution mechanisms,
f. Define roles and responsibilities for the implementation of the SEP, and
g. Define reporting and monitoring measures to ensure the effectiveness of the SEP and periodical reviews of the SEP based on ESIA study findings:

Key elements for a successful stakeholder engagement and consultations include the following:

- Proponent to ensure adequate engagement with affected communities throughout the project cycles by disseminating and disclosing relevant environmental and social information,
- Take account of the outcome of the engagement process with affected communities in the identification of risks and impact associated with the project,
- Provide affected communities with access to relevant information on:
    - ✓ The purpose, nature, and scale of the proposed project,

- ✓ The duration of the proposed project activities,
- ✓ Any risks to and potential impacts on such communities and relevant mitigation measures,
- ✓ The envisaged stakeholder engagement process, and
- ✓ The grievance mechanism.

- Undertake a process of consultation in a way that provides the affected communities with opportunities to express their views on project risks, impacts and mitigation measures, and allows the client to consider and respond to them, and
- Particular attention is to be paid to vulnerable individuals and communities in designing and implementing consultations.

7.3 Stakeholder Analysis and Identification

Stakeholder analysis determines the likely relationship between stakeholders and the proposed project and helps to identify the appropriate consultation methods for each stakeholder group during the various project phases. To this purpose, a process for identifying the environmental and social risks and impact of the proposed project will be established, along with identification of affected persons and the proposed mitigation measures.

The stakeholder analysis will be carried out to identify:

- Who will be adversely affected by the impacts of the proposed project
- Who are the most vulnerable among the potentially impacted persons and where special engagement efforts are necessary,
- At which stage of the Proposed Project development will stakeholders be most affected (e.g. planning, construction, operations, decommissioning or both?),
- Which stakeholders might help to enhance the proposed project design,
- Which stakeholders can best assist with the early scoping of issues and impacts,
- Who strongly supports or opposes the changes that the project will bring and why, and
- Who is critical to engage with first, and why?

Table 7: Stakeholders Analysis and Categorization

No.	Community Category	Actual Community
1	Landowners whose property is impacted by the proposed project	Immediate neighbors, Apartment facilities & businesses within project site
2	Local Media	They include; • 2 Local Nation-wide Newspaper/ Dailies • One Local Nation-wide Radio station • The Kenya Gazette Important for carrying the media adverts informing the public of the proposed development project
3	National & County Government Administrative Authorities	National Gov't: Interior Ministry ✓ Deputy County Comm./Asst. County Commissioner: Westlands Sub County) ✓ Local Administration ▪ Area Chief, ▪ Kileleshwa Police Station County Government of Nairobi Ministries • National Environment Management Authority (NEMA) • Ministry of Environment • Kenya Forest Service (KFS) • Water Resource Authority (WRA)
4	Infrastructural Sector Government Agencies	They include • National Construction Authority (NCA)
5	Local Political Class	Area Member of Parliament & County Assembly (MP/MCA)
6	Community Based Organizations (CBOs)	Churches, mosques
7	Business Groups	This includes Matatus, Boda-boda Associations in Kileleshwa
8	Residence Associations	This is the area resident association: Kileleshwa Ward Neighborhood Association (KIWANA)

7.4 Stakeholder and Public Consultation Process

This process consists of a voluntary process of prior engagement with immediate locals, neighbors and relevant National and County Government and the general public/citizens of local communities directly affected by the proposed development project works. This process involves the open sharing of the proposed development with the said stakeholder to get their opinions and the search for a shared solution of potential impacts/mitigation measures regarding the new development.

In the context of the Proposed Project, stakeholder and public consultation is an important step that will be completed and improved throughout the Proposed Project cycle, in particular during the preparation of the ESIA report and any other potential mitigation measures and instruments. The main objective of the consultation process is to inform stakeholders about the Proposed Project and its impacts (positive and negative) and to enable them to articulate their different points of views, concerns and values. This process will ensure greater transparency and accountability that will greatly help the licensing authority in decision making.

In that regard, the proponent through EIA/EA Lead Expert shall organize for a public consultation and participation meeting to gather the views of the various stakeholders and the general public in a way that is technically, socially and economically feasible. In attendance are the above listed stakeholders and neighbors (**Table 7**).

The CPP meetings shall be organized by the proponent, and chaired by the Deputy County Commissioner (or a representative appointed by the County Commissioner) in conjunction with the County National Environment Management Authority (NEMA) officials.

7.5 Methodology Used in the Public Consultation Process

On Monday to 27th to 30th June 2022, a public participation exercise was conducted in two ways namely;

- Key informant interviews, and
- Field survey and observations

From the CPP conducted, below are neighbors' comments

- Additional quality housing facilities within the project area

- Decongestion of current residential apartments
- Development of existing infrastructure
- Provision of employment to the youth who are unemployed
- Provision of ready market for building and construction materials
- Provision of market to small scale business operators like food vendors within the construction site
- Generation of revenue to the county and revenue governments
- Enhanced and improved security
- Build more housing facilities thus ensuring affordable houses
- Noise during construction
- Pressure on water resources
- Generation of construction waste

CHAPTER EIGHT: ENVIRONMENTAL MONITORING AND MANAGEMENT PLAN (EMMP)

8.1 Significance of EMP

EMP involves the protection, conservation and sustainable use of the various elements or components of the environment. The EMP for the proposed project provides all the details of project activities, impacts, mitigation measures, time schedules, costs, responsibilities and commitments proposed to minimize environmental impacts. The main activities include monitoring and evaluation and environmental audits during implementation and decommissioning phases of the project.

8.2 Introduction to EMMP & Key Issues

Some of the potential impacts of the proposed Residential Apartments development project include but not limited to;

- Air, Soil/Water and Noise pollution,
- Pressure on social amenities; water, electricity, drainage,
- Generation of construction waste,
- Traffic impacts.
- Public safety risks

Table 8: The EMMP indicating analysis of the proposed Apartment's potential Impacts (HIGH, MODERATE and some LOW)

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
CONSTRUCTION PHASE					
Noise Pollution	• Complying with the EMCA noise regulation Legal Notice 61 including: ✓ Observe normal working hours during noisy construction works (00800 to 1700) hours ✓ Ensure that all generators and heavy duty equipment are insulated or placed in enclosures ✓ Sensitize drivers to avoid unnecessary gunning of vehicle engines ✓ Regular servicing of engines and other machines shall be adhered to ✓ Site workers to wear ear muffs if working in noisy	Contractor; Management	Amount of noise generated (dB) Quality of PPEs (ear muffs, ear plugs)	Daily	Within project cost
Construction Waste	• Following EMCA regulations on Waste Management, Legal Notice 121 including: ✓ Using waste minimization techniques such as buying required quantities in bulk. ✓ Identifying all sources of wastes, and ensuring wastes are handled by licensed personnel ✓ Making available suitable facilities for the collection, segregation and safe disposal of the wastes.	Contractor; Management NEMA Members of the public County Public Health Officer	Amount of waste on site Maintained receptacles at site Central collection points	Daily/Weekly	Within project cost

	✓ All construction materials left over at the end of construction should be used in other projects or sold ✓ Ensure proper handling and storage of construction materials to reduce damage ✓ Accurately estimate the sizes and quantities of materials required to reduce amounts left ✓ Excavated upgrading waste should be re-used or backfilled				
Occupational Health and Safety Risks	• Provide all workers with the necessary protective gears • Ensure all workers are in protective gears all the time when on site • Place fire extinguishers in strategic areas within the deport • Designate and mark smoking areas • Workers to be trained as fire marshals • Fire escape routes to be shown clearly • Provide enough first aid kits within the project site • Train workers in administering first aid • Ensuring all potential hazards such as movable machine parts are labelled. • Raising awareness and educating workers on risks from equipment and ensuring they receive adequate training on the use of the equipment.	Proponent Contractor NEMA County Government of Nairobi County Public Health Officer	Number of incidents/ accidents per monthly Availability of PPEs Number of fire drills conducted Visibility and clarity of signage and alerts Efficiency of equipment such as fire-fighting equipment Level of awareness of workers Number of fire assembly points	One off Daily Weekly Monthly Quarterly After every drill Daily and Spot checks	Within project cost

	• Placing visible and readable signs around where there are risks. • Ensuring there is security in and around the site to control the movement of people. • Providing safe and secure storage for equipment and materials in the site. • Placing visible and readable signs to control the movement of vehicles and notify motorists and pedestrians around the, and workers in the site				
Change in Soil Characteristics	• Sprinkling water on the soil to prevent dust from rising. • Creating specific paths for the trucks • Ensuring there is enough space for normal percolation of water. • Preventing pollution from construction wastes by having specific sites for collection, sorting and transport of wastes. • Proper installation and configuration of drainage structures to ensure their efficiency. • Installing cascades to break the impact of water flowing into the drains. • Controlling the earthworks and ensuring the management of excavation activities. • Compacting areas with loose soil. Landscaping. • Providing soil erosion control structures on the steeper areas of the site & controlling activities during the rainy season.	NEMA Contractor Management	Amount of dust per volume of air. % of paved area to vegetated area. Amount of run-off i.e. flow rate of run-off in m^3 /s Amount of soil in run-off or drained water – kg/m3	Weekly	Within project cost

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
Change in Sub Surface Drainage	• Surface flow to drain suitably into the public drains provided to control flooding at site. • Drainage channels should be installed in all areas that generate or receive surface water such as car parking, driveways and along the building block-edges of the roofs. • Cover channels with gratings to prevent occurrence of accidents and entry dirt that would compromise flow of run-off. • The channels should be designed to suitably function even during the peak volumes of rainfall in the event such an event occurs. • Channels should never at any time be full due to the resulting heavy downpours. The drainage channels should ensure the safe final disposal of run-off /surface water and should be self-cleaning which means it should have a suitable gradient. • Storm water generated from roof catchments should be harvested, stored and made use in various household activities such as general cleaning to reduce run-off reaching the drainage channels. • Paving of the side walkways, driveways and open areas should be done using pervious materials such as cabro to encourage water recharge and reduce run-off volume • Implementation of roof water harvesting	Contractor; Management	Presence of drainage channels % of paved area	Always	Within project cost

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
Pressure on Utilities	• Employing water conservation techniques and using the required amounts of water to prevent wastage. • Employing power saving techniques such as switching off equipment when not in use, using natural light whenever possible. • Using machines with power saving technologies. • Providing proper sanitary facilities for construction workers. • Inspecting the drainage facilities regularly to ensure they are free of debris that may reduce their efficiency	Management Contractor County Government of Nairobi KPLC NCWSC The Public Ministry of Transport and Infrastructure Development	Amount of water consumed/day Amount of electricity consumed/day Number of machines and equipment serviced/month Amount of fuel consumed/day Number of drainage blockages/month	Daily Daily Monthly Daily Monthly	Within project cost
Population Influx	• Workers to be issued with jobs cards to monitor their movements in the site area • Only authorized personnel should be allowed entrance to the site Presence of a work registry book where workers sign in and out • Educating the workers on proper sanitation methods Sensitizing the worker on HIV/AIDS • Making available suitable facilities for the collection, segregation and safe disposal of the wastes. • Ensuring all waste is dumped in their designated areas and legally acceptable methods	Contractor; Management	Presence of work registry book Issuing of job cards Presence of sanitary services	Daily Monthly Quarterly	Within project cost

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
Increased Traffic	• Placing signs around the site notifying other vehicles about the heavy traffic and to set the speed limit around the site. • Ensuring all drivers for the project comply to speed regulations. • Making sure the construction doesn't occupy the road reserves and complying with traffic and land demarcation obligations. • Ensuring all vehicles used for the project are in good working condition both legally and commensurate to their intended use.	Contractor; Management	Availability of signage Number complaints recorded/month Number of incidences and accidents recorded/month	Weekly Monthly	Within project cost
Air/Dust Pollution	• Ensure strict enforcement of on-site speed limit regulations • Avoid excavation works in extremely dry weathers if and where possible • Sprinkle water on graded access routes whenever necessary to reduce dust generation by construction vehicles • Enclosing the structures under construction with dust proof nets. • Using efficient machines with low emission technologies for the ones that burn fossil fuels. • Regular maintenance and services of machines and engines. • Use of clean fuels e.g. unleaded and de-sulphurized fuels. • Educate and raise awareness of construction workers on emission reduction techniques.	Contractor; Management	Amount of gaseous emissions Amount of particulate emission	Daily	Within project cost

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
Loss of Flora/Fauna & Habitats	• Landscaping with indigenous species on completion of construction. • Maintaining of landscaped gardens, terraces, conservation and management of the vegetation and gardens. • Clearing vegetation only in construction areas and demarcating areas where no clearing will happen	Contractor Management Government of Nairobi NEMA	% of paved area to vegetated area at site	One off	Within project cost
Oil spills and leaks	• Machinery should be well maintained to prevent oil leaks. • Contractor should have a designated area where machinery servicing and maintenance is carried out and that is protected from rain water. • All oil products should be stored in a site store and handled carefully.	Contractor; Management	No oil spills or leaks on site	Daily Weekly	Within project cost
Insecurity	• Ensure the general safety and security at all times by providing day/night security guards • Adequately lighting within and around the at night premises.	Proponent Contractor	Availability of security guards Theft cases reported	Daily No. of reported cases	Within Project Cost
Working at High Heights	• Use construction barrier tape to isolate and guard site visitors from accidents & injuries; • Implement a fall protection program that includes training in climbing techniques and use of fall protection measures, • Use of helmets and other PPEs to mitigate against injuries • Providing First Aid facilities at site	Proponent Contractor	Availability of appropriate Safety Gear/Records Proper use of PPE	Daily	Within Project Cost

Impact	**Mitigation Measure**	**Responsibility**	**Indicator**	**Frequency**	**Cost**
OPERATIONAL PHASE					
Generation of Noise	• Erecting signs and notifying other users of noisy activities. • Conducting all noisy activities during the day when permissible levels are higher. • Provision of PPEs such as ear plugs for employees working in noisy conditions or with noisy equipment. • Using equipment with low noise ratings or noise reduction technologies such as for the generators	Management Contractor	Visibility and Clarity of Signs Amount of noise generated/day: dB Adequacy and quality of noise PPEs (ear muff, ear plugs)	Daily As often as needed	Within project cost
Fire Hazards and Accidents	• Keep well stocked and functional first aid box • Ensure proper storage of inflammables at the site. • Maintain fire-fighting equipment and ensure that they are regularly inspected • Create awareness among residents on proper safety measures.	Management Contractor	Number of fire drills carried. Proof of inspection on firefighting equipment. Fire Signs put up in strategic places. Availability of fire-fighting equipment.	Quarterly As often as needed	Within project cost

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
Occupational Health and Safety Risks	• Provision of PPEs to all and replacing the PPEs on wear and tear. • Placing readable signs alerting people of flammable hazardous petroleum materials. • Servicing equipment and machine to ensure efficiency. • Providing fire-fighting equipment and maintaining them to ensure they are fully functional. • Delineating fire and emergency assembly points and creating awareness to ensure all people at site are aware of them, e.g. through the use map. • Putting in place and ERP and ensuring all people in the project are aware of it and the procedures to follow commensurate to the level of emergency. • Providing adequate storage for hazardous and flammable substances and controlling access to them. • Monitoring the movement, handling and management of wastes to ensure they safely managed and don't present any EHS risks. • Performing emergency drills on a frequent basis, setting benchmarks for response and evaluating performance to ensure continuous improvement of response and preparedness.		Number of incidents/ accidents/month Number of drills per year Effectiveness of drills Visibility and clarity of signs and alerts Efficiency of equipment such as fire-fighting equipment Level of awareness of workers Presence of assembly points Separate washrooms Copies of Annual Audit Reports	Daily Weekly Monthly Quarterly Annually	Within Project cost
Solid Waste Generation	• Waste should be properly segregated and separated	Proponent Management	Amount and type of waste	Daily	Within project cost

	• Provide litter bins • Ensure regular waste collection • Making available suitable facilities for the collection, segregation and safe disposal of the wastes. • Creating waste collection areas with clearly marked facilities such as color coded bins and providing equipment for handling the wastes. The bins should be coded for plastics, rubber, organics, glass, paper, electrical equipment etc. • Ensuring all wastes are dumped in their designated areas and that the bins are regularly cleaned and disinfected. • Assessing and creating opportunities for Regulation, Reducing, Reusing, Recycling, Recovering, Rethinking and Upgrading. • Creating adequate facilities for the storage of materials and chemicals and controlling access to these facilities. • Ensuring waste bins are protected from rain and animals.	County Government of Nairobi NEMA County Public Health Officer	generated per day Presence of waste collection bins	Weekly	
Surface Run-Off and Waste Water Disposal	• Waste water should empty to the septic tank via well laid sewage pipes • Empty septic tank whenever its full by a licensed exhauster services • Landscaping to ensure there are areas where water will percolate underground. • Constructing proper drains and monitoring them to ensure there are no blockages	Proponent; Management	Effluent presence on open drains	Daily Weekly As often as needed	Within Project Cost

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
Pressure on Available Utilities	• Implementing water conservation techniques. • Using only the required amounts of water during normal operations. • Creating awareness through signs of conservation of water and electricity. • Using natural light during the day for lighting purposes. • Using machines and equipment with a high level of power efficiency in the station and servicing them as often as required to maintain their efficiency. • Using gas in the kitchens for cooking purposes.	Proponent; Management County Government of Nairobi Residents	Water consumed per day: m^3/day Electricity consumed per day: Kwh Machines and equipment serviced/month Fuel consumed per day: m^3/day No. of drainage blockages per month	Daily Weekly Monthly	Within project cost
Socio-cultural Impacts	• Integrating Equal Opportunity Principles in human resource policies. • Promoting social cohesion and integration among people in the area. • Creating awareness towards the diversity of cultures and different economic background of the people within residents • Allowing the residents and businesses to form social groups and networks that build social capital. • Targeting social investment programs towards the local communities and region.	Proponent Residents	Reported number of discrimination incidences Number of social groups Number of social investment and strategies Level of integration of cultural appreciation within residents	Quarterly Yearly	Within project cost

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
Insecurity Impacts	• Employing competent security firm at the premises • Security to always searching all vehicles and people entering the premises • Use of CCTV cameras to monitor security within the premises • Collaborating with the local police on security matters • Placing alarms around the premises and establishing emergency preparedness and response procedures	Proponent Residents Security personnel Police	Presence of a security personnel No. of security incidences Number of security drills and emergency response drills	Daily Weekly Monthly Quarterly	Within project cost
Increase in Value and Land Use Changes	• Complying to zoning bylaws • Collaborating with public and planning officials on current and future developments • Aligning the project's objectives with those of national, county and district development policies	Proponent NMS KURA/KENHA Ministry of Housing Ministry of Transport and Infrastructure Development	Land use types	Semi-annually	Within project cost

8.3 Decommissioning Phase

Decommissioning is an important phase in the project cycle and comes last to wind up the operational activities of a particular project. Decommissioning phase will involve; notification of intent to all relevant agencies and liaising with the project engineers, architects and environmentalists in a bid to ascertain guidelines on possible impacts and mitigation measures.

It refers to the final disposal of the project and associated materials at the expiry of the project lifespan. If such a stage is reached, the proponent needs to remove all materials resulting from the demolition/decommissioning from the site. The following should be undertaken to restore the environment.

- Remove all underground and aboveground residential apartments facilities from the site
- The site should be well landscaped by flattening the mounds of soil and
- Planting indigenous trees and flowers as well grass
- All the equipment should be removed from the site
- Fence and signpost unsafe areas until natural stabilization occurs
- Back-fill surface openings if practical

Monitoring will be aimed at improving the management of the project. There will be periodic visits to the project site in order to observe and assess activities on the site and changes on the environment. A checklist for monitoring will include, among others, the state of the environment, land use activities; variations in project plan, adherence to provisions in EMP

Table 9: EMMP for Decommissioning Phase with Potential Impacts Analysis (HIGH, MODERATE and LOW)

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
DECOMMISSIONING PHASE					
Disturbed Environment	• Undertake a complete environmental rehabilitation program • Landscaping and introducing appropriate local vegetation	Proponent Contractor	Rehabilitated site	One off	500,000
Working at High Heights	• Use construction barrier tape to isolate and guard site visitors from accidents & injuries; • Implement a fall protection program that includes training in climbing techniques and use of fall protection measures, • Use of helmets and other PPEs to mitigate against injuries • Providing First Aid facilities at site	Proponent Contractor	Availability of appropriate Safety Gear/Records Proper use of PPE	Daily	300,000
Noise Pollution	• Complying with the EMCA noise regulation Legal Notice 61 including: ✓ Observe normal working hours during noisy construction works (00800 to 1700) hours ✓ Ensure that all generators and heavy duty equipment are insulated or placed in enclosures ✓ Sensitize drivers to avoid unnecessary gunning of vehicle engines	Contractor; Management	Amount of noise generated (dB) Quality of PPEs (ear muffs, ear plugs)	Daily	200,000

	✓ Regular servicing of engines and other machines shall be adhered to ✓ Site workers to wear ear muffs if working in noisy				
Demolition Waste	• Following EMCA regulations on Waste Management, Legal Notice 121 including: ✓ Using waste minimization techniques such as buying required quantities in bulk. ✓ Identifying all sources of wastes, and ensuring wastes are handled by licensed personnel ✓ Making available suitable facilities for the collection, segregation and safe disposal of the wastes. ✓ All construction materials left over at the end of construction should be used in other projects or sold ✓ Ensure proper handling and storage of construction materials to reduce damage ✓ Accurately estimate the sizes and quantities of materials required to reduce amounts left ✓ Excavated upgrading waste should be re-used or backfilled	Contractor; Management NEMA Members of the public County Public Health Officer	Amount of waste on site Maintained receptacles at site Central collection points	Daily/Weekly	600,000.00

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
Occupational Health and Safety Risks	• Provision of PPEs to all and replacing the PPEs on wear and tear. • Placing readable signs alerting people of flammable hazardous materials. • Servicing equipment and machine to ensure efficiency. • Providing fire-fighting equipment and maintaining them to ensure they are fully functional. • Delineating fire and emergency assembly points and creating awareness to ensure all people at site are aware of them, e.g. by map • Putting in place and ERP and ensuring all people in the project are aware of it and the procedures to follow commensurate to the level of emergency. • Providing adequate storage for hazardous and flammable substances and controlling access to them. • Monitoring the movement, handling and management of wastes to ensure they safely managed and don't present any EHS risks. • Performing emergency drills on a frequent basis, setting benchmarks for response and evaluating performance to ensure continuous improvement of response and preparedness.		Number of incidents/ accidents/month Number of drills per year Effectiveness of drills Visibility and clarity of signs and alerts Efficiency of equipment such as fire-fighting equipment Level of awareness of workers Presence of assembly points Separate washrooms Copies of Annual Audit Reports	Daily Weekly Monthly Quarterly	400,000.00

Impact	Mitigation Measure	Responsibility	Indicator	Frequency	Cost
Increased Traffic	• Placing signs around the site notifying other vehicles about the heavy traffic and to set the speed limit around the site. • Ensuring all drivers for the project comply to speed regulations. • Making sure the construction doesn't occupy the road reserves and complying with traffic and land demarcation obligations. • Ensuring all vehicles used for the project are in good working condition both legally and commensurate to their intended use.	Contractor; Management	Availability of signage Number complaints recorded/month Number of incidences and accidents recorded/month	Weekly Monthly	80,000.00
Air/Dust Pollution	• Ensure strict enforcement of on-site speed limit regulations • Avoid excavation works in extremely dry weathers if and where possible • Sprinkle water on graded access routes whenever necessary to reduce dust generation by construction vehicles • Enclosing the structures under construction with dust proof nets. • Using efficient machines with low emission technologies for the ones that burn fossil fuels. • Regular maintenance and services of machines and engines.	Contractor; Management	Amount of gaseous emissions Amount of particulate emission	Daily	300,000.00

	• Use of clean fuels e.g. unleaded and low-sulphur fuels. • Educate and raise awareness of construction workers on emission reduction techniques.				
Grand Total					**2,380,000**

8.4 Environmental Policy

The management policy of the proposed development is ensuring a clean and safe environment within the site and support of environmental health and safety both within and outside the project through proactive and responsible activities. The measures that are to be enforced would be implemented under the following framework

8.4.1 Land

- Ensuring the presence of floral cover on unpaved surfaces so as to maintain the soil's structure within the project area and where flora has been lost landscaping should be undertaken
- Ensuring proper waste management of both solid and liquid wastes is implemented to prevent soil contamination and creation of an unsightly environment

8.4.2 Biodiversity

- Maintain where possible trees and larger flora by planting more trees at or near the site during and after construction phase of the development
- Buffer creation and maintenance between the project and other land uses to mitigate micro climate changes

8.4.3 Air

- Maintenance of low levels of dust generation during construction through either surfacing the bare areas of any roads as well as by watering areas that are not paved.
- Installation of scrubbers on all the machinery used during construction that has a certain level of emission
- Setting up screens and buffer fences to reduce the amount of fugitive dust and noise generated during construction
- Use of noise absorbent padding in fixed installations
- Use of silencers in heavy earth moving machines, DG sets and pumps
- Use of ear-muffs by staff to reduce any exposure to increased noise
- Retention and consistent planting of green-belts barriers between source and receiver, although a long term strategy trees are effective noise barriers and flower bushes or shrubs can be grown around noise emitting utilities

8.4.4 Water

- Ensure conservation of water in the construction phase through wise and only necessary use and recycling where possible
- Maintenance of floral cover within the non-paved areas in order to reduce direct evaporation and maintain the micro-climate or the area
- Management of any liquid and solid wastes to ensure that they don't lead to pollution of surface and sub-surface waters
- Using water catchment techniques such as roof catchment where water harvested can used for cleaning or lawn maintenance purposes
- Employing sustainable drainage measures that mimic the normal drainage of water to prevent increasing run-off to high levels as result of the development. These methods include;
    - ✓ Using materials that allow water percolation in making paved surfaces such as the parking lot;
    - ✓ Using green roofs where possible or water catchment.

8.4.5 Hazards

- Hazards especially from moving vehicles and trucks in and out of the site could be handled properly
- Erecting hazards warning signs
- Using smaller trucks that make narrow turnings
- Construct storm water drains to channel flood waters
- Keep the percentage of the area of impervious surface as low as possible to reduce runoff during storm periods and in respect to the slope of the project area.
- Developing an OSHMP and HSM

8.5 Training Program

The successful implementation of the risk management plans presented through this ESMP, the EAP and HSE management plan will enable the project to co-exist with its ecosystem and the social systems. However to ensure the staff charged with implementing them have the capacity to do so, training will be a fundamental aspect through which the staff will be made aware of the project's aspects, risks and the know-how of reducing these risks. Thus training is a key

recommendation of this EMP whereby the proponent is recommended to develop a training program on HSE and all the aspects of the EMP and EAP, thereby ensuring the project's employees are up to date with new HSE procedures and they can also respond or be proactive towards risks.

HSE training can be integrated into other career development training or be held as standalone training courses with certifiable curricula. The choice of this will depend on the level of engagement in HSE for the particular training target group. Also all training should be recorded and reported as well as its effectiveness, productivity and efficiency towards HSE management in the project.

CHAPTER NINE: HEALTH, SAFETY AND ENVIRONMENT MANAGEMENT PLAN

9.1 Introduction

This HSE Management Plan outlines how the proposed project will manage its HSE risks commensurate to the significance and magnitude of these risks. The purpose of this management plan is not only to ensure that the project complies with the relevant HSE legislation and guidelines but also that it avoids (where possible), reduces or minimizes its risks. Together with the actions proposed in the Environmental Management Plan of this study report this management plan will synergistically enable the project to set environmental performance objectives, goals and targets and achieve them. This HSE Management Plan (HSEMP) is guided by both national HSE/OSH legislation and GIIP, which should always be made available in the project, these include:

9.2 National Legislation

- EMCA of 1999 revised 2015, and its subsidiary legislations
- OSHA of 2007
- The Public Health Act of 2005
- The Physical Planning Act, Cap 286
- The Energy Act of 2005
- The Kenya Water Act of 2016

9.3 Good international Industry Practice (GIIP)

- The World Bank General EHS Guidelines, April 30,2007
- The IFC Performance Standards of Environmental and Social Sustainability of 2012: Performance Standards 1, 2, 3, 4 & 6.
- The WHO Guidelines on indoor and outdoor Air Pollution

9.4 Health & Safety EMP Scope

This HSEMP covers all aspects that the project proponent has an influence over and all activities in the project's area of influence. This area of influence includes:

- The project's main and ancillary activities in the project site;

- Any works financed as part of the project that will be carried outside the project's site;
- Any works carried out by third parties or employees of the project, and
- The areas where the project's direct impacts will be felt and will cause a HSE risk.

This area of influence delineates the proponent scope of liability as legally defined and the measures proposed will assign adequate management control over these aspects and activities in order to manage risks.

9.4.1 Health & Safety Purpose

The primary purpose of this HSEMP is to ensure the proponent has an established benchmark for HSE legislative compliance and to ensure the project is carried out safely environmentally and ergonomically. This can be broken down in the following objectives:

- To ensure the project is undertaken without any incidents or accidents to its primary employees.
- To ensure the project is undertaken without any incidents or accidents to its secondary employees and members of the public.
- To ensure adequate facilities are put in place to carry out the project's principal and ancillary activities.
- To ensure that all of the project's employees are adequately trained, aware of and committed to of all HSE procedures.
- To ensure adequate resources are assigned towards HSE management.
- To ensure that period monitoring of HSE performance is undertaken so as to improve this performance.
- To ensure the project's compliance to HSE legislation is continuously and continually evaluated.

The proponent should also develop a HSE policy creating an umbrella of guidance for all its HSE functions and practices. This policy should be converted into sectoral goals (water, energy, OSH etc.) using the above objectives and targets developed for HSE performance. The proponent's top management should lead the commitment to the policy and it should be made available to all employees, contractors, sub-contractors and members of the public. This policy should also be integrated into the project's human resource and labor policies, which

would delineate what the proponent would be liable to and what contractual obligations the project would have on the second and third parties involved in its supply and value chain.

9.4.2 Health & Safety Management Framework

In order for the project to successfully carry out all HSE procedures and achieve the goals of this HSEMP adequate human resources will be required on the part of the client to take a leading role of HSE. As a preliminary dependent on the resources available, the leading HSE responsibilities may be integrated into the roles of either primary or secondary staff charged with site and employee management. However if adequate resources are available it is suggested that the proponent creates a responsibility for an overall HSE manager who will oversee and direct all HSE functions of the project.

Under the HSE manager's docket, the HSE manager or person charged with HSE management duties will be responsible for monitoring, evaluation, reporting and developing internal HSE guidelines in line with national legislation and GIIP. Additionally HSE should be integrated into the procurement and human resources policies of the project, and thus roles should be defined for contractors working on behalf of the proponent. Each contractor should have a role in their company for HSE management if their activities fall within the scope of this HSEMP. They will report to the overall HSE manager and assist in the achievement of the project's HSE goals.

On an administrative scale the effectiveness of the HSEMP will depend upon the collaboration of other key institutional players who are mandated with HSE responsibilities legally and on national and locals scales. These include state agencies and offices who are charged with HSE responsibilities and they should be involved early in the project when developing the final HSE Management Plan and during its implementation.

9.4.3 Training and Capacity Building in HSEM

To ensure that the project staff with a role to play in HSEM and the implementation of this HSEMP, the proponent should always ensure all staff are recruited with adequate skills and knowledge in HSE and the HSE aspects of their roles. This also includes making sure the staff are medically fit to carry out their roles as part of its HRM and HSE policies. In addition to this the proponent should integrate training and capacity building in HSEM in its staff and career development training program. This also includes the training suggested in the ESMP.

Training can be undertaken in several ways dependent on its objectives, the initial capacity of the audience, and the level of control the audience has over the project's HSE performance. Some methods can include: Induction training, Supervisor and management training, On-the-job training, Specific hazard training, Work procedures and skills training, Emergency procedure training, and First aid training among other trainings. All training and its content should be documented to enable monitoring and evaluation, and they should also training and education on social wellbeing and employee welfare through raising awareness of the principles of equal opportunity as well as communicable diseases.

Additionally, the proponent should as part of its capacity building program, create awareness on HSE practices, risks and new developments. This can be done through several ways such as: circulars, white papers, notices on notice boards, email, text messages, social media, meetings, workshops. Similarly these should also be documented to enable monitoring and evaluation.

9.4.4 Monitoring, Evaluation and Reporting

All aspects of the HSEMP should be recorded as required by its guiding principles, legislation and GIIP. Records should be kept onsite and backed up in case of any eventualities that may damage them. A monitoring plan should be developed as part of the HSEMP through which its different aspects will be monitored and documented based on aspect specific frequencies. The monitoring and records will include: training, training content, incidents, accidents, complaints, internal and external communications, levels of emissions, MSDS etc.

In this regard, the proponent should also develop adequate and efficient communication channels and procedures for the project through which all HSE will be communicated. The records should allow for the HSEMS to be audited or its performance evaluated periodically so that it may be improved continuously through a Plan-Do-Check-Act (PDCA) framework. Additionally audits should be undertaken as required by legislation such EMCA of 1999 (Amended 2015) and OSHA of 2007 and reported to the relevant authorities.

Incident and accidents should also be reported both internally and externally as required by legislations. A reporting schedule should also be developed as part of the HSEMP, which will guide the required reporting procedures based on their frequencies and format. Reporting and documentation should also cover corrective actions taken to close out non-conformities.

9.4.5 HSE Risk Management Measures

Several risk management measures are proposed in this subsection through which the project will adopt safe and self-improving measures in line with national legislation and GIIP, as part of its HSEMP. However, it is proposed that risks are best avoided early in the design and planning phases of the project following the hierarchy as below:

9.4.5.1 Risk Register

During all phases of the project, the proponent and their third parties where applicable such as contractors, should develop a risk register of all HSE risks in the project. This identification of risks can be done through an aspects-impacts register or log, which links the project's aspects to impacts and ranks the level of risk by analyzing its probability and likely consequences. Importantly, the risk register should also take into perspective the level of public concern over the risks involved and identified, as a matter of good practice.

As a matter of policy and good practice the proponent should ensure third parties have adequate skills in risk management and systems are put in place to manage all risks. Linked to the risks register are the remedial actions which reduce or avoid the risk where possible. The proponent through either the HSE manager and/or engineers should always seek to avoid risks early enough through design and planning but this is not possible they should develop the requisite remedial actions or plans to legally acceptable standards (such as EMCA of 1999 and OSHA of 2007) and GIIP standards.

The information of the risk register and these remedial actions should be documented, readily available and regularly updated to ensure it stays relevant and actual. Some of the HSE risks from the project will come from the following aspects:

9.4.5.2 Construction Phase HSE Aspects

- Air emissions
- Water emissions
- Moving parts
- Heavy equipment and trucks
- Inflammable materials
- Hazardous/Poisonous chemicals and substances

- Storage areas
- Ladders
- Working at heights
- Electricity
- Open pits
- Heated surfaces, solids and fluids
- Wastes
- Raised materials and equipment, etc.

9.4.5.3 Operational Phase HSE Aspects

- Slippery floors
- Moving parts and barriers
- Storage areas
- Heated surfaces, solids and fluids
- Cold surfaces, solids and fluids
- Hazardous/Poisonous chemicals and substances
- Inflammable materials
- Electricity
- Wastes
- Air emissions
- Water emissions
- Vehicles and service trucks, etc.

9.4.5.4 Decommission Phase HSE Aspects

- Falling debris
- Air emissions
- Water emissions
- Heated surfaces, solids and fluids
- Hazardous/Poisonous chemicals and substances
- Moving vehicles and trucks
- Heavy equipment and materials, etc.

9.4.6 HSE Resources and Responsibilities

An important part of the HSEMP is to delineate all the resources required for its effective implementation so as to ensure it remains as cost effective as possible. This will be the duty of the HSE Manager and all the resources human and financial should be listed alongside the remedial actions employed against each of the project's risks. Financial records should be maintained to ensure the HSE remains accountable and basically makes business sense by showing the costs avoided by maintaining the system in terms of lives saved, man hours saved, health care etc.

Whereas the human resources responsible for undertaking all activities that carry or create risk should be kept in record and maintained. This will ensure the project has a documented, maintained and established method of managing HSE responsibilities. This will in addition keep all the staff undertaking these activities abreast with not only the policies in place but also with the risks involved with their activities and importantly know how to manage the risks and carry out their duties safely. This information will also be vital when undertaking audits and targeting training towards the staff and foster greater accountability in the staff in terms of monitoring and reporting since all duties will be known and documented.

9.4.6.1 Medical Program and Insurance

The proponent and his contractors should also ensure the medical program is maintained for the project's staff on induction, during the job and include rehabilitation where appropriate and commensurate to the risks that the staff will be exposed to. This program should include regular check-ups to ensure the project's staff are medically and mentally fit to undertake their duties. It should also form part of training through an ergonomic and social curricular that will also include facilitations for lifestyle improvement and raise knowledge on diseases such as HIV/AIDS, STIs and other infectious illnesses.

The proponent and his contractors should additionally ensure adequate facilities and services are in place which promote employee rest, relaxation and rejuvenation. This may include rest and recreational areas, provision of clean water, undertaking stress relieving activities such as games, counselling and peer chats among others.

Importantly and as legally required the proponent and his contractors should provide a medical/insurance cover for all staff. The cover should in the least be able cover for all

injuries, illnesses and incidents that may occur on the job and follow up with rehabilitation that at least returns the employee(s) to their initial state before the occurrence where possible. It should be noted that although the proponent may provide insurance, it should be mitigation based by firstly promoting the actions of the HSEMP which when followed all risks will well managed.

9.4.6.2 Emergency Preparedness and Response Plans

The proponent through an all-inclusive process should develop an EPRP as part of the HSEMP and through which the project will stay ahead of risks presented by both man-made and natural hazards that have the capacity to turn into disasters. The proponent and his contractors should do this by first identifying all hazards pertinent to the project and its site in line with the risks register but with specific difference being that these hazards will have greater potential of turning into a disaster.

This should also be done in line with national policies on disaster management such as the National Disaster Management Response Plan of 2009, and involve all key players in disaster management nationally. This stakeholder involvement will enable the EPRP to be cross sectoral and multidisciplinary and the proponent should lead the process.

9.4.7 Grievance Redress System

The proponent should also develop a GRS and make it accessible to all stakeholders internal and external. The GRS should always seek to address grievances through legally acceptable methods and as fast as possible whilst not preventing any complainants from seeking other legally acceptable methods to justice. Such a GRS should be made available to staff on recruitment and to members of the public either through government agencies/offices through grievance application forms, and internally by establishing procedures for investigation and quick redress that will be recorded and tracked.

The GRS should be monitored through indicators of its efficiency and effectiveness of solving the grievance and producing lessons learnt through which corrective actions can be undertaken to improve the project's HSEMP. Additionally, as part of monitoring and review all grievances should be reported to the relevant authorities and the corrective actions taken, to ensure the system is credible and transparent. The process should also be culturally appropriate, transparent and non-coercive.

CHAPTER TEN: CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusion and Recommendations

The proposed development has been well designed as per the standards of the Physical Planning department and the relevant regulatory agencies. The proposed development project will have economic benefits such as generation of income to the proponent, creation of employment, making use of un-utilized plot and increasing revenue to the National and County Governments.

10.2 Recommendations

The recommendations for the prevention and mitigation of adverse impacts are as follows;

- It is important that informative signs (bill board) to be erected at the site. These should indicate the operation hours and when works are likely to be started and completed. List of all Engineers, Contractor, details of the proposed project and all the Approval numbers.
- All solid waste materials and debris resulting from excavation and construction activities must be disposed off at approved dumpsites. The wastes should be properly segregated and separated to encourage recycling of some useful waste materials; i.e. some excavated stone materials can be used as backfills.
- All construction materials and especially sand, gravel, hardcore and wood must be sourced/procured from legalized dealers.
- Construction activities must be undertaken only during the day i.e. between 0800 hours to 1700 hours. This will minimize disturbance to the general public within the proximity of the site/project especially the nearby residents
- Proper and regular maintenance of construction machinery and equipment will reduce emission of hazardous fumes and noise resulting from friction of rubbing metal bodies.
- Heavy construction activities should be limited (or avoided) during the rainy season to minimize the chances of soil degradation (soil erosion).
- Maintenance activities must be carried out in service bay to reduce chances of oils or grease or other maintenance materials, from coming into contact with environment (water or soil).
- Workers should be provided with complete personal protective equipment (PPE) and safety gear. They should have working boots, complete overalls, helmets, gloves,

earmuffs, nose masks, goggles etc. A fully equipped first aid kit must be provided within the site.

- The contractor must have workmen's compensation cover; the contractor is required to comply with workmen's compensation Act as well as other relevant ordinance, regulations and Union Agreement
- The contractor must provide adequate security during the construction period and especially during the night when there are no construction activities.
- The Proponent is advised to ensure the contractor does adhere to the architectural plans and proper backfilling and landscaping be done so as to rehabilitate the environment and improve its aesthetic value.

Further recommendations for the prevention and mitigation of adverse impacts are as identified by the study shall be mitigated as outlined in the EMP. Finally, having gone through the EIA process for the proposed project to its conclusion, we hereby recommend approval of this report and subsequently issuances of the EIA license to the proponent to enable him commence implementation of the project.

REFERENCES

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APPENDECES

- Architectural Design & Drawings
- Title Deed
- Questionnaires
- Copy of EIA practicing license