iPlan CONSULT (Intl) LTD.
Innovative Spatial Use - Planning for the Future
P.O. Box 28634 - 00100 NAIROBI

ENVIRONMENTAL IMPACT ASSESSMENT PROJECT STUDY REPORT FOR THE PROPOSED SERVICED APARTMENTS, OFFICES AND RESTAURANT ON PLOT L.R. NO. NAIROBI/BLOCK 5/413 (ORIGINAL 1870/III/189) ALONG KARUNA ROAD, WESTLANDS SUB-COUNTY, NAIROBI COUNTY.

COORDINATES: 1°15'32.4"S 36°48'01.2"E

PROPONENT

KARUNA COURT LIMITED
P.O.BOX 32705-00600
NAIROBI

JANUARY 2025

CERTIFICATION

This Environmental and Social Impact Assessment study project report has been prepared by **iPlan Consult (Int'l) Limited (registered and licensed EIA /EA firm of Experts No. 7597)** in accordance with the Environmental Management and Coordination (Amendment) Act of 2005 and the Environmental (Impact Assessment) and Audit regulations 2003. We the undersigned, certify that the particulars in this report are correct and true to the best of our knowledge.

EIA/EA FIRM OF EXPERTS

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Signature……Date……..……

OBADIAH O. KARINGA (NEMA ASS. EXPERT REG. NO 11407)

PROPONENT

For and on behalf of KARUNA COURT LIMITED
P.O.BOX 32705-00600
NAIROBI

Name……

Position……...

Signature……Date……..……

EIA Team Members

The following team participated in the ESIA assessment and preparation of this report

Name	Position	NEMA Expert registration number
Shadrack K. Mbuta	ESIA/EA Lead expert/ Team Leader	6315
Obadiah Ondieki Karinga	ESIA/EA Ass expert	11407
Lorine Akinyi	EIA/EA Ass Expert/Sociologist	13041

PROJECT DATA SHEET

Project Data Sheet	Details
Project Name	Proposed Serviced Apartments, Offices, and Restaurant
Location	Plot L.R. No. Nairobi/Block 5/413, Karuna Road, Westlands Sub-County, Nairobi
Coordinates	1°15'32.4"S 36°48'01.2"E
Proponent	Karuna Court Limited
Consultant	iPlan Consult (Int'l) Limited
Project Scope	- 382 residential units - 346 parking spaces - Basement (1-4 floors) for parking - Ground floor: Management office, restaurant, convenience shop, and parking - 1st - 27th floors: Serviced apartments
Estimated Project Cost	Kes. **828, 532, 225.00**
Project Justification	- Growing demand for mixed-use spaces in Nairobi - Enhancing urban living and business opportunities - Promoting sustainable development
Environmental Considerations	- Waste management through recycling and controlled disposal -Noise and dust mitigation measures -Water conservation and drainage system implementation
Public Consultation	- Conducted interviews, public meetings, and surveys with stakeholders to integrate community concerns

TABLE OF CONTENT

ACRONYMS AND ABBREVIATIONS

EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EP	Electrophysiology
EMMP	Environmental Management and Monitoring Plan
EPR	Extended Producer Responsibility
ESMP	Environmental and Social Management Plan
IFC	International Finance Corporation
HR	Human Resources
KNBS	Kenya National Bureau of Statistics
KPLC	Kenya Power and Lighting Company
KURA	Kenya Urban Roads Authority
KRC	Kenya Railways Corporation
LMP	Labour Management Plan
LPG	Liquefied Petroleum Gas
MoD	Ministry of Defence
NCOs	Non Commissioned Officers
NCWSC	Nairobi City Water and Sewerage Company
NEMA	National Environment Management Authority
NO_2	Nitrogen Dioxide
PM	Particulate Matter
SDS	Safety Data Sheets
SNCOs	Senior Noncommissioned Officers
SO_2	Sulphur Dioxide
TORs	Terms of Reference
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

This Environmental Impact Assessment (EIA) report evaluates the proposed development of serviced apartments, office spaces, and a restaurant on Plot L.R. No. Nairobi/Block5/413 along Karuna Road in Wetlands Sub-County, Nairobi County.

The project aims to address the growing demand for high-quality developments while ensuring compliance with environmental regulations and sustainable development principles. The assessment focuses on identifying potential environmental and socio-economic impacts and recommending mitigation measures to minimize adverse effects while maximizing benefits.

The report covers key aspects such as project justification, baseline environmental conditions, legal and institutional frameworks, potential impacts, and mitigation measures.

It also explores project alternatives, including the "No Project" option, and outlines the Environmental and Social Management Plan (ESMP) for sustainable implementation. Public consultation was conducted to gather stakeholder feedback, ensuring community concerns are incorporated into the project planning.

The report concludes that, with the implementation of appropriate mitigation strategies and compliance with regulatory frameworks, the proposed development is viable and will contribute positively to the local economy and urban landscape.

CHAPTER ONE: INTRODUCTION

1.1 Project Background

This Environmental Impact Assessment (EIA) Project Study Report has been developed for a proposed development comprising serviced apartments, office spaces, and a restaurant on Plot L.R. No. Nairobi/Block5/413 (formerly 1870/III/189) along Karuna Road in Wetlands Sub-County, Nairobi County. The project aims to meet the increasing demand for integrated residential and commercial spaces in this prime urban area. Positioned in one of Nairobi's rapidly growing districts, the development is expected to enhance real estate value, generate employment opportunities, and support the hospitality and business sectors. Additionally, it aligns with Nairobi County's urban planning framework and contributes to sustainable city growth.

An Environmental Impact Assessment is crucial to assess the potential environmental and socio-economic effects of the project. The study will evaluate factors such as zoning compliance, air and noise pollution from construction activities, water management, energy efficiency, and biodiversity impact. Additionally, it will review traffic flow, waste management, and public concerns to ensure responsible implementation. Through comprehensive stakeholder engagement, the study will incorporate insights from the local community, businesses, and regulatory authorities to promote environmental sustainability and social responsibility while optimizing the project's economic benefits.

1.2 Justification of the proposed project

The proposed development of serviced apartments, office spaces, and a restaurant on Plot L.R. No. Nairobi/Block5/413 is justified by the growing demand for high-quality mixed-use spaces in Nairobi's Westlands area. With rapid urbanization and increased commercial activity, there is a need for developments that integrate residential and business spaces to enhance convenience and economic growth. The project will address housing shortages, provide modern workspaces, and improve the hospitality sector, contributing to the overall vibrancy of the urban landscape.

Furthermore, the project aligns with national and county government urban development policies that promote sustainable and efficient land use. By incorporating eco-friendly building designs, waste management strategies, and efficient energy use, the development will minimize environmental impact while maximizing economic benefits. The project will also create employment opportunities during and after construction, fostering local economic development and supporting businesses in the surrounding area.

1.3 Project Objectives

The primary objective of the proposed development is to create a modern, integrated facility that enhances urban living and commercial opportunities in Westlands, Nairobi. This project aims to provide high-quality serviced apartments, office spaces, and a restaurant, catering to the increasing demand for convenient and well-planned urban developments.

Additionally, the project seeks to promote sustainable development through the adoption of environmentally friendly construction practices, energy-efficient systems, and proper waste management strategies. By implementing green building principles, the project will minimize its environmental footprint while ensuring long-term economic viability.

The development also aims to contribute to the local economy by generating employment opportunities both during the construction phase and post-completion. The project will enhance the surrounding infrastructure, improve service accessibility, and support businesses within the area.

1.4 ESIA Objectives

The main objective of carrying out this ESIA was to ensure compliance with the provisions of Environmental Management and Co-ordination Act, Cap 387 namely The Environmental (Impact and Audit) Regulations 2003 and subsequent revisions. The provisions states that an ESIA study shall be undertaken for major development activities which are likely to have adverse environmental impacts.

The process is guided by a number of objectives:

- To identify potential environmental impacts of proposed project,

- To assess the significance of these impacts,
- To assess the relative importance of the impacts of alternative plans, designs and sites,
- To propose mitigation measures for the significant negative impacts of the project on the environment,
- To generate desktop baseline data for monitoring and evaluation of how well the mitigation measures are being implemented during the project cycle;
- To present results of the ESIA in an acceptable way to the client

1.5 Terms of Reference (ToRs) For the ESIA

The Terms of Reference (ToRs) for this report are in accordance with NEMAs' Environmental (Impact Assessment and Audit) regulations, 2003 under the Environmental Management and Co-ordination Act of 1999. The terms of reference for this report were submitted to NEMA and were approved with a ToR number **NEMA/TOR/5/2/841**

The general Terms of Reference (ToRs) for this report covers the following:

- Description of the proposed project components and activities in each phase including pre-construction, construction, operation and decommission phases. The project description should include location, project design, the technology, procedures and processes, materials to be used, project cost, products, by-products, and waste generated;
- Description of policy, legal, and institutional framework that are relevant to the environmental management and the proposed project;
- Gathering baseline information/existing environmental data and any other relevant information related to the project area including physical, biological and socio - economic conditions;
- Provide a description of the proposed activities throughout the entire implementation process of the project with a special focus on potential impacts to the surrounding environment and facilities;
- Develop an Environmental and Social Management and Monitoring Plan and cost estimates for the proposed project;
- Provide health and safety mitigation measures and management plan
- Produce an ESIA report that contains among other issues potential negative and positive impacts and recommendation of appropriate mitigation measures to minimize or prevent adverse impacts as per the ESIA/EA regulations of 2003 and subsequent revisions.

1.6 Methodology of the ESIA study

In undertaking the ESIA, the consultant employed a participatory approach that entailed a range of methods:

1.6.1 Desktop Review

This involved desk studies and review of all relevant available documents on the project activities and components from the client. The team also reviewed all the available and relevant national and international legal environmental documents, standards and guidelines. In addition, national and county level (planning) documents (such as Vision 2030, the Second Medium Term Plan, County Integrated Development Plan) among others relevant to the project.

1.6.2 Field Study

A major element of the study is primary research - both qualitative and quantitative among relevant stakeholders. The environmental assessment team conducted reconnaissance and field visits to the proposed project site to obtain further data and consult the stakeholders. This established the nature of the surroundings which included existing infrastructure, economic and social set up of the local communities whose normal daily activities will be and/or likely to be affected by` the implementation of the proposed project.

Similarly, the use of questionnaires, photography and observations were employed to collect data and information.

1.6.3Data Analysis

The data collected was analysed and compiled to prepare the various sections of the ESIA report and draw recommendations mitigation measures and monitoring plans.

1.6.4Reporting

The main output of this assessment is the ESIA report that has been prepared and compiled in compliance to the Environmental Impact Assessment regulations 2003 requirements.

1.7 Project cost

The project cost is estimated to be KES **828, 532, 225.00**

CHAPTER TWO: PROJECT DESCRIPTION

2.1 Project Location

The proposed project is located on Plot L.R. No. Nairobi/Block5/413 (Original 1870/III/189) Along Karuna Road, Westlands Sub-County, Nairobi County on coordinates 1°15'32.4"S 36°48'01.2"E

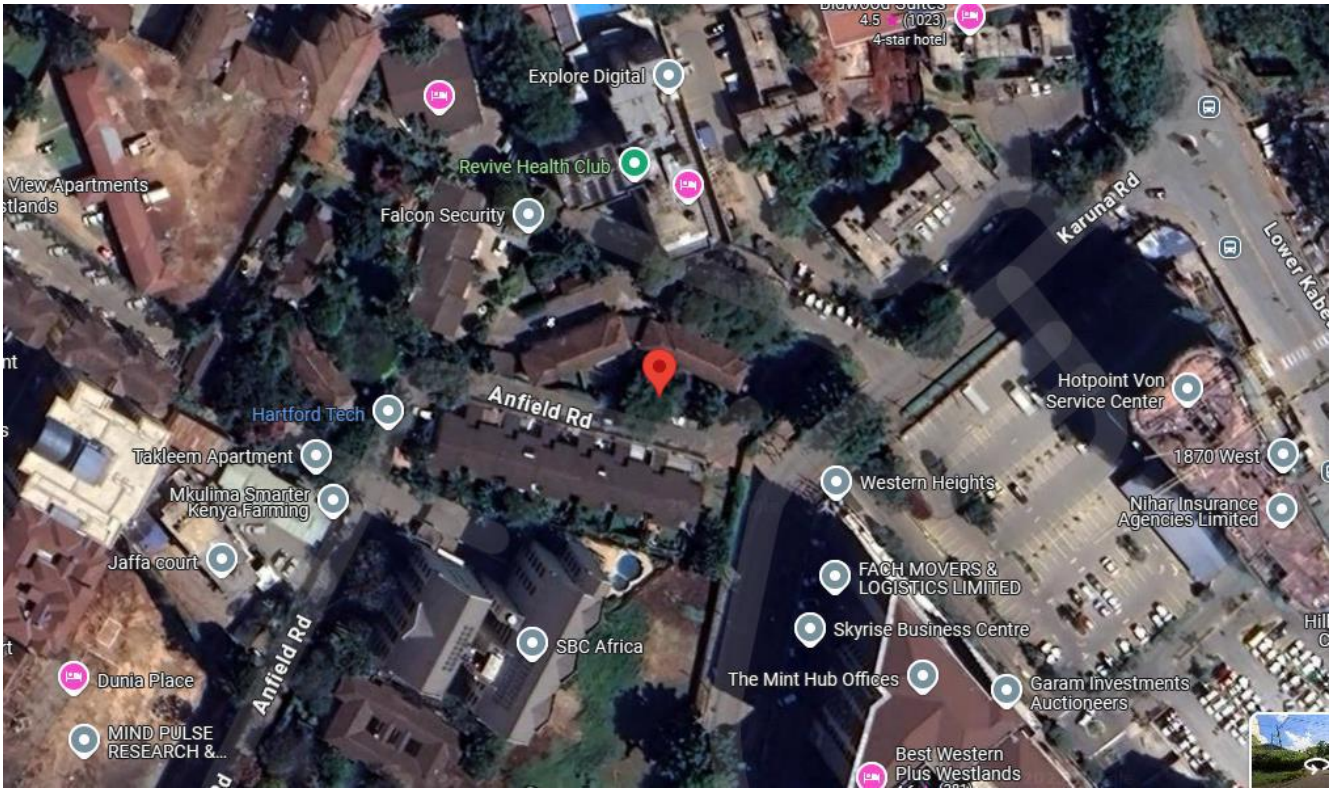


Plate: Location of the project site

Source: google

2.2 Project Scope

The proposed development will have basement one to four, ground floor and first to twenty-seventh floor. Basement one to four will be used for parking, ground floor will have management office, a restaurant convenience shop and parking space. 1st to 27th floor will comprise of one, two and three bedroomed Serviced Apartments units. The total parking space will be three hundred forty-six with three hundred and eighty-two units with associated amenities.

2.3 Construction activities and inputs

All the construction inputs shall be obtained from licensed dealers. The following are required for successful implementation of construction activities:

- Construction tools and equipment including machinery mainly transportation vehicles will be used for the transportation of materials and in the execution of the proposed works.
- Water for construction purposes.
- A construction labor force

2.4 Project activities

Project input and activities

- The development of the proposed commercial/residential building will utilize but not be limited to the following inputs:
- Water will be abstracted from the distribution network of Nairobi City Water and Sewerage Company (NCWSC).
- Both skilled an non-skilled workers will be hired based on their experience and the ability to perform the various tasks.

Input during construction

The materials that shall be used- and which have already been used as the construction process has already began -include machine cut stones, building sand, aggregates, hand timber for making structural formwork, and interior design, and floor tiles. Others include glass, concrete block for constructing selected internal and external pavements, precast units for drains, PVC pipes for sewer and water reticulation, roofing sheets and water tanks.

Inputs during operation

During the operation of the facility various items will be used in the residential houses.

2.5 Products, by-products and wastes

Wastes

For sound management of solid wastes during construction and occupation of the facility, the following will be considered:

- Source of solid waste
- Its composition

- The potential to reduce and recycle solid waste components

Air emissions

Relative air emission is expected during the construction process as dust from construction activities and construction machinery will be emitted. However, this will not be a major problem if mitigation measures are put in place to keep dust at minimal levels. The employees at the site should also be provided with gas masks to protect them from dust emissions.

2.6 Waste management

The principle objective of a waste management program is to minimize the pollution of the environment as well as to utilize the waste as a resource. This goal should be achieved in a way that is environmentally and financially sustainable.

Solid waste management

The technologies for the management of solid waste will incorporate the collection and segregation of the waste at source, transportation of the waste to the place of processing and treatment and final disposal.

The main waste management techniques that shall be used to manage waste include, re-use, recycling, giving out organic matter for feeding and composting, disposal at approved dumpsites

Effluent management

Wastewater from the kitchens, toilets, washbasins and showers shall be managed through connection to the Nairobi City Water and Sewerage system.

CHAPTER THREE: BASELINE ENVIRONMENTAL INFORMATION

3.1 Administrative Location

The proposed site is located in Westlands Sub County in Nairobi County.

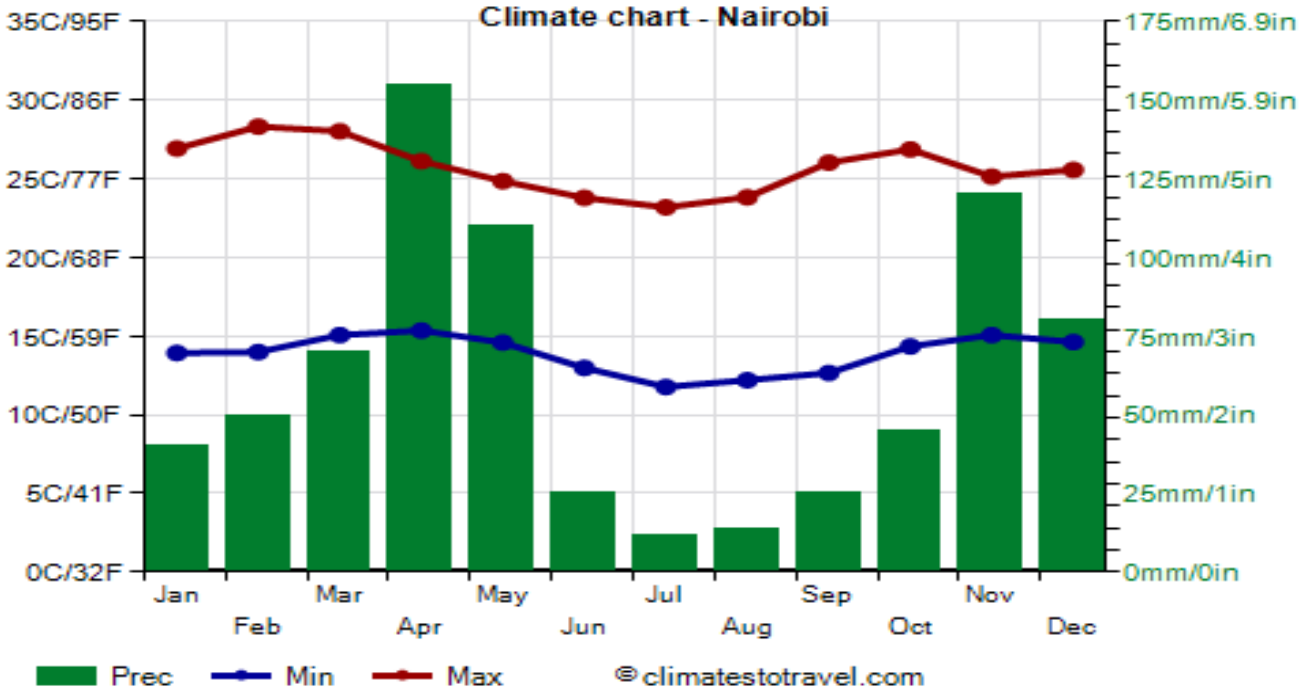
3.2 Demography

According to the KNBS 2019 census, the population of Nairobi stood at 4,397,073 inhabitants who live within 696 km2 (269 sq mi).

3.3 Climate and Temperature

Westlands experiences climatic conditions similar to those of Nairobi county with a fairly cool climate resulting from its high altitude. Mean daily temperature ranges from a low of 10^0C to a high of 29^0C. On average, temperature is almost constant at about 20^0c, throughout the year, with a mean monthly relative humidity between 36 and 55 percent.

Nairobi has a bi-modal rainfall pattern characterized by two rainy seasons: a long rainy season between March and May, with a mean rainfall of 899 millimetres (mm) and a short rainy season between October and December, with a mean rainfall of 638 mm. The mean annual rainfall is 786.5 mm (Nairobi County Integrated Development Plan, 2018).



Graph: Graph showing the climate of Nairobi

Source: climatetotravel.com

3.4 Physical and Topographic Features

Topography

The terrain in the eastern side of the County is gently rolling but divided by steep valleys towards the City boundaries. To the north, there is the Karura Forest which is characterized by steep sided valleys. Geologically, Nairobi City County is close to the Eastern border of the East African Rift Valley and is on a large depression filled with volcanic rocks and sediments Cainozoic times, which lie on basement complex rocks. The volcanic rocks (phonolites) have gentle slopes flowing eastwards from the rift Valley. The Major aquifers in the area are usually beneath the confining and deeply seated Upper Athi series.

3.4.2 Flora and fauna

The project site is mainly covered by grass and few trees along the boundaries. Majority of Westlands area is built there is however a good cover of planted vegetation and the area looks generally green. There are three forests in Nairobi County namely Ngong Forest, Karura Forest and the Nairobi Arboretum. The three forests have a total coverage of 23.19 Km^2. The areas surrounding the proposed site exhibit a built environment with minimal fauna. However, some birds and insects may inhabit in the vegetation in the area. The presence of small wild animals as well as reptiles is also highly likely.

3.4.3 Water resources

The main rivers in Nairobi County are Nairobi River, Ngong River and Kabuthi River. These rivers are highly polluted as open sewers and industrial waste is directed towards them. Nairobi dam, which is along the Ngong River, and Jamhuri dam are the main water reservoirs in the County.

Nairobi River has Thigirie, Getathuru, Ruaka and Karura tributaries while Mathare River has no major tributaries. Majority of the rivers in Nairobi are generally polluted and un-clean. The source of water from the site will be NCCWSC supplemented by water vendors within Westlands.

3.4.4 Geology & Soils

Nairobi City is mainly underlain by pyroclastic volcanic rocks that were deposited during the formation of the East African Rift Valley. Some of the volcanic rocks were deposited in aqueous conditions over a long period of time and are therefore intercalated with lacustrine sediments. River valleys and other depressions that existed

during the periods of intermittent inactivity were filled with alluvium and clays. The topography and surface geology of the city are largely the result of the Cenozoic volcanic processes (Saggerson, 1991).

A geotechnical survey is recommended with the view to assessing the suitability of the soil before construction began. A number of trial pits were dug and soil samples were collected and taken to the laboratory. The trial pitting produced mainly Reddish Brown Lateritic Murram with traces of either red soil or weathered tuff rock to an average depth of 1.6 meters with lateritic boulders being encountered in trial pit 6 at a depth of 1.4 meters. The structural Engineer should read the trial pit logs and laboratory results to make sound decisions during construction.

3.5 Infrastructural facilities

Electricity

The project area gets the bulk of its energy supply from the Kenya Power and Lighting Company (KPLC) and Karuna court is already connected to the national grid.

Water Supply and sewerage services

The project site is connected to the Nairobi City Water and Sewerage Company (NCWSC) water pipeline. This is the water that is used in the at the site, by the contractor and in the construction activities. The site is also connected to NCWSC sewer network.

Transport Network

Nairobi city has witnessed an expansion in its transportation infrastructure. The road network continues to be expanded, the commuter rail transport system has been refurbished and plans are underway to introduce the bus rapid transit (BRT) system.

Roads

The current road network in Nairobi County and its environs is fast expanding under the Vision 2030 – Expansion of Roads Programme aimed at enhancing domestic and regional trade through upgrading of the national and county roads network. The project area is mainly accessed through Karuna Road.

3.6 Land use

Westlands Sub-County is one of Nairobi's major commercial and residential hubs, characterized by a mix of land uses that support business, residential, institutional, and recreational activities. The area has evolved into a high-density urban zone, with significant commercial developments, including office buildings, shopping malls, hotels, and serviced apartments. The demand for mixed-use developments has been rising due to the need for integrated work-live environments, making Westlands a prime location for such projects.

The land use pattern in Westlands incorporates both high-end residential neighborhoods and commercial districts, with zoning regulations allowing for controlled urban growth. Major road networks, such as Waiyaki Way and Lower Kabete Road, facilitate easy accessibility, supporting commercial activities. The presence of key infrastructure, including modern roads, water supply, and electricity networks, makes the area suitable for sustainable urban development.

Plate: Similar developments within the area

Source: site visit

CHAPTER FOUR: LEGAL AND ADMINISTRATIVE FRAMEWORK

4.1 General

This chapter presents a discussion of the various national policies, rules and regulations that are applicable to the implementation, operation and decommissioning phases of the proposed project. A review of the various policies, rules, regulations is intended to guide the proponent in carrying out project activities in adherence to the applicable law governing the housing sector.

4.2 Legal Framework

The proponent, project implementing agencies and state lead agencies have a legal duty and responsibility to ensure that the various national statutes and regulations are strictly adhered to, to safeguard the environment, public health and safety. Table 4.1 gives a brief discussion of the key national and sectoral laws that have direct relevance to the proposed project.

Table: Relevant Legal Framework

Legislation / Act/Policy	Requirements	Relevance to the proposed project
The Constitution of Kenya, 2010	Article 42 of chapter four, *The Bill of Rights*, confers to every person the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations Part 1 of chapter 5 dwells on land, outlining the principles informing land policy, and natural resources. It provides a clear outline of the state's obligation with respect to the environment.	In conformity with the Constitution of Kenya, every activity undertaken within shall adhere to the right of every individual to a clean and healthy environment. The proposed project utilizes sensitive components of the physical and natural environment hence need for a clearly spelt out environmental management plan to curb probable adverse effects to the environment.
Vision 2030 Kenya	The Vision 2030 Medium Term Plan 2018-2022 states that the Kenya Government aims at Investment in security in terms of improving welfare and housing for National Police Service and other agencies.	The construction of the apartments and associated amenities will contribute to the achievement of the vision to provide adequate housing.

Environmental Management and Coordination Act, 1999 (EMCA)	The Environmental Management and Coordination Act 1999 was amended in 2015 and provides for the establishment of an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto. Section 58(1) of the Act states requires any person being a proponent of a project shall, before carrying out, executing, or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the second schedule to this Act submit an Environmental Impact Assessment Project report"	This report has been prepared pursuant to section 58 (1) of this Act. The proponent is expected to comply with Part II on General principles by ensuring that environmental conservation and protection are given the priority throughout project's life span. Other sections that the proponent should comply with include Part VII Section 71 (1) on water quality Standards, Section 78 on air quality standards, Section 86 on standards for waste, and Section 101 on standards for noise.
Environmental Impact Assessment andAudit regulations 2003.	The EIA and Audit Regulations 2003 and the EIA and Audit (Amendment) Regulation 2016. These regulations stipulate how an ESIA study report should be done. They highlight stages to be followed, information to be made available, role of every stakeholder and rules to observe during the whole ESIA process	The proponent shall undertake the assessment in full compliance to the regulations

The Physical and Land Use Planning Act, 2019	In consideration to relevant national and county policies; Section 56 of the Act gives County Governments the power within their jurisdiction to: (a) prohibit or control the use and development of land and buildings in the interests of proper and orderly development of its area; Section 57 & 58 requires a person to apply for a development permit from the respective county executive committee member before carrying out any development within a county. The Act under section 59(1) requires a person applying for development permission to ensure that any documents, plans and particulars submitted in the application have been prepared by the relevant qualified, registered and licensed professionals.	The proponent should adhere to the provisions of this Act and any regulations thereof for the proper and orderly development of the area. The proponent should apply for the relevant development permits and pay requisite permit fees as required by the Act before commencement of the development.
The Water Act 2016	The Act declares that every person in Kenya has the right to clean and safe water in adequate quantities and at reasonable standards of sanitation.	The proponent shall ensure that no waste, effluent or offensive matter is allowed near or into the boreholes or to the rivers in the neighborhood. A permit shall be obtained for any water abstraction for

	Pollution of water resources is prohibited in Part VIII, section 143 of the Act. Any rubbish, dirt, refuse, effluent or any other offensive matter shall not be allowed near or in water resources. Section 18 of this Act sub-section 3 mandates the water Resources Management Authority to demand from any person or institution, specified information, documents, samples or materials on water resources. The act states that a permit is required for the discharge of a pollutant into any water resource.	use in the project in accordance to the provisions of this Act. All records of water abstraction should be kept and water quality tests undertaken to ascertain the safety of water drawn for use.
Sustainable Waste Management Act 2022	Section 12. (1) of the Act requires all public and private sector entities to segregate non-hazardous waste into organic and non-organic fractions. (2) The segregated to be placed in properly labeled and colour coded receptacles, (3) All waste service providers shall collect, handle and transport segregated waste as provided for under this A ct. (4) Hazardous waste will be handled and managed as prescribed by the EMCA Act, 1999 and any other relevant written law. 13. (1) Every producer shall bear extended producer responsibility obligations to reduce	The contractor and the proponent shall comply to all the requirements of the Act and ensure that waste properly managed including the extended producer responsibility for the wastes arising out of the products they manufacture.

	pollution and environmental impacts of the products they introduce into the Kenyan market and waste arising therefrom. Section 19(1) stipulates that any private entity shall prepare a three year waste management plan and submit an annual monitoring report to the Authority	
The Environmental Management and Coordination (Air Quality) Regulations 2014	Part II of the regulations stipulates that no person shall emit any liquid, solid, or gaseous substance or cause emission of priority air pollutants to exceed ambient air quality limits prescribed in the First Schedule. Part VIII regulation 32 prohibits any person from operating construction equipment or handling construction material to allow emission of particulate matter during the demolition of structures, buildings, or parts of buildings in such a manner as to adversely affect the limits set out in the First schedule Regulation 34 further prohibits any person not to cause or allow stockpiling or other storage of material in a manner likely to cause ambient air quality levels to be interfered with.	It's the duty of the proponent and the contractor to ensure that the Air Quality regulations are strictly adhered to during construction, operation and decommissioning phases of the project. The contractor should ensure that dust, vehicle exhaust fumes, generator exhaust shall not exceed the standard limits.

Occupational Safety and Health Act (OSHA), 2007 Cap 514 Laws of Kenya	The Act makes provision for the health, safety and welfare of persons employed in factories and other places of work. The Act provides that all measures should be taken to ensure safety, health and welfare of all the stakeholders in the work place.	The provisions of this Act apply to the various stages of the project's full life cycle. It's therefore important that the contractor and the proponent thoroughly read, understand and apply the provisions of this Act. The contractor should formulate safety rules which all employees must comply with. An emergency response plan, warning signs, machinery safety provisions and construction safety provisions must be in place to avoid or minimize injuries at the work place.
Environmental Management and Co-ordination (Water Quality) Regulations, 2016	These Regulations apply to drinking water, water used for industrial purposes, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife, and water used for any other purposes. The Regulations provide for prevention of water pollution. They require every person to refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution.	The proponent must undertake strict preventive measures to avoid water pollution that may arise from oil spills/leakages, chemical spills and soil erosion due to improper management of soils during rainy seasons. These may lead to contamination of ground and surface water bodies. Water quality monitoring and analysis requirements of these regulations shall strictly be complied with.

The Work Injury Compensation Benefit Act 2007	Part III of the act stipulates the right to compensation to employees who get injured, diseased or die at the work place. All accidents should be reported by the employer to the relevant authorities. Occupational diseases are defined and compensation criteria described under the Act. The Act includes compulsory insurance for employees. Part VII gives details on medical aid to injured or diseased workers.	All workers contracted during the project implementation phase are entitled to medical and life insurance as required by the act. Accidents occurring at the work place should be reported to the Directorate of Occupational Health as the Act stipulates. Appropriate medical aid should be given to those injured at site at prescribed medical facilities.
The Penal Code Cap 63	Chapter XVII on "Nuisances and offences against health and convenience" contained in the Penal Code strictly prohibits the release of foul air into the environment which affects the health of the persons.	The proponent should comply with the provisions of the Code prohibiting fouling of air (section 192 by ensuring that operation of the proposed facility does not lead to releases of pollutants into the local atmosphere.
The Public Health Act Cap 242 Laws of Kenya	The Act makes it the duty of every local authority (in the capacity of "health" authority) to take all lawful, necessary and reasonably practicable measures to safeguard and promote public health.	The proponent and the contractor should comply with this Act by implementing the various provisions of Part IV on Prevention and Suppression of infectious diseases. The proponent should also put in place measures to mitigate all forms of nuisance in compliance with Part IX Sections 115 and 118 of the Act. In this regard, noise level, water quality and, air

		quality should be maintained at stipulated standards during construction and operation processes of the project. Solid waste arising from project related activities should be managed in compliance with provisions of this Act.
National Construction Authority (NCA) Regulations 2014	Part II – Contractor must be registered by NCA and with the Association of contractors, employ qualified persons. Part IV- All construction works or projects whether in private or public must be registered with NCA as soon as the tender for construction is awarded Part V – all construction workers and site supervisors must be accredited and certified under the NCA Regulations 2014	It is the duty of the proponent to ensure that the contractor is registered by the authority and that all the skilled construction workers and site supervisors are registered, certified and accredited by NCA. All the provisions of the regulations must be followed to ensure the safety and the quality of construction work
Noise and Excessive Vibration Pollution (Control) Regulations of 2009.	Under Part II, section 3 on 'General prohibitions', the Regulations provide that no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. Any person who contravenes the provisions of this Regulation commits an offence.	The proponent should comply with these regulations by ensuring that noise levels both during construction and operation phases of the project do not exceed those stipulated in the First Schedule of the regulations. Where the levels are exceeded, mitigation measures shall be employed.

Environmental Management and Co-ordination (Waste Management) Regulations	These Regulations apply to all categories of waste including solid waste, industrial waste, hazardous waste, pesticides and toxic substances, biomedical wastes and radioactive substances Part II of the Regulations require any person whose activities generate waste to collect, segregate and dispose or cause to be disposed of such waste in the manner provided for under the Regulations.	A wide range of wastes will be produced during construction, operation and decommissioning phase of the project. The proponent should comply with this regulation by obeying stipulations of the general provisions of the regulations including responsibility of waste generators and segregation of waste by generator. The Proponent and contractor should engage licensed solid waste to dispose of solid waste generated at the premises both during construction and operation phases in compliance with provisions of this regulation.
The Energy Act 2019	Under section 148 of the act, a person who wishes to carry out electrical installation work must be licensed as an electrical contractor by the Authority (The Energy and Petroleum Regulatory Authority). Section 149 further prescribes the requirements of persons who wish to be certified as electrical installation workers. Section 153 and 154 requires that the amount of electrical energy supplied to the consumer shall be ascertained by the use	The proponent should engage contractors and electricians that are qualified and duly certified by the authority for all electrical work within the housing developement. The contractor should ensure that electrical energy supplied is metered as required by the act. Alternative renewable energy sources should be explored and adopted as an alternative to electric energy.

	of approved meters by Kenya Bureau of Standards (KBS). Part IV Section 75 provides for the development and use of renewable energy technologies, including charcoal, fuelwood, solar, wind, tidal waves, hydropower, biogas and municipal waste etc.	
EMCA (Plastics Bags Control and Management) Regulations, 2018	These regulations are to ensure a clean and healthy environment through prevention of pollution caused by plastic bags and promotion of alternative biodegradable packaging materials. No person shall manufacture, import, export, use or offer for sale plastic carrier or flat bags.	The proponent shall be required to make an application for permission to manufacture, import or use the said bags.
Occupiers' Liability Act Cap 34	Under Section 3 of the Act, an occupier of premises owes the common duty of care to all his visitors, except in certain restrictions, modifications or exclusion to a visitor by agreement. The common duty of care is defined, as the duty to take care as in all circumstances of the case is reasonable to see that the visitor will be reasonably safe in using the premises.	The proponent and contractor should put in place measures to ensure that safety of workers and visitors to the facility are guaranteed both during construction and operation phases of the project.

4.3 Regulatory Framework

National Environment Management Authority, NEMA

NEMA is the regulatory body charged with management and coordination of environmental issues. The object and purpose for which the Authority was established is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment.

Regulatory function

- Co-ordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plans, programmes and projects.
- Identify projects and programmes or types of projects and programmes, plans and policies for which environmental audit or environmental monitoring must be conducted under this Act;
- Monitor and assess activities, including activities being carried out by relevant lead agencies, in order to ensure that the environment is not degraded by such activities.

CHAPTER FIVE: ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

5.1 Introduction

This chapter presents the assessment of social, economic and environmental issues likely to arise as a result of implementation of the proposed project. For each issue, the analysis is based on its nature, the predicted impact, extent, duration, intensity and probability, and the values affected. Mitigation options are discussed for each potential and significant negative impact identified.

5.2 Impact identification

A. Sources of impacts

The impacts associated with the proposed project will emanate from project inputs, activities and outputs. They are as discussed below:

i. Project inputs

The project inputs that shall be potential sources of impacts include:

- Aggregate materials taken from the local sources including crushed rocks, stones gravel, steel and cement.
- Skilled and unskilled workforce exerting indirect demand for energy, water supply, sanitation, health services etc.
- Heavy machinery including excavators, earth moving equipment, cranes etc used in the project construction process.

ii. Project activities

a) Construction

- Site clearance and demolition
- Removal of vegetation cover
- Establishment of associated work and support infrastructure including construction camps, accessories etc.
- Obtaining raw materials e.g. water abstraction, quarrying etc
- Transportation of raw materials, machinery and labour to the site
- Excavation and backfilling

- Spillage (oil and fuel)

c) Operation activities
- Wastes generated from the hosing facility (organic, e-wastes)
- Transportation of goods and people
- General repair and maintenance operations
- Discharge effluents

iii. Project outputs

The project outputs expected to lead to negative impacts include the following:

a) Construction wastes
- Eroded soil
- Surface runoff
- Refuse and sewerage wastes from construction camps
- Oil spills

b) Waste during operations
- Vehicle emissions
  - ✓ NOx
  - ✓ Hydrocarbons
  - ✓ Carbon dioxide
  - ✓ Carbon monoxide
  - ✓ Particulate (Diesel and dust)
- Hazardous wastes

B. Receptors of impacts

The anticipated negative impacts will be received by both the physical and human environments as below:

i) Human environment
- Settlements within the project site and its vicinity
- Sensitivity of the local population particularly with regard to:
  - ➢ Public health consequences (during construction)
  - ➢ Increased noise levels (during construction)
  - ➢ Hazardous wastes (during operation)

ii) Natural environment

- Sites supporting terrestrial and aquatic flora
- Soil structure, stability and susceptibility to erosion

5.3 Environmental Impacts and mitigation measures

Determination of key impacts was based on the views of interested and affected parties; legislation requirements and knowledge and understanding of the project team and environmental assessment practitioners. The impacts are classified in terms of the phase of the development in which they are likely to occur, namely the construction phase, the operational phase and the decommissioning phase (where applicable). Impact significance before and after mitigation measures was considered. Even though some impacts are perceived to be of high severity, with appropriate mitigation measures, the probability of these impacts occurring might be low and therefore the significance of the impact is reduced.

Impacts of obtaining construction materials

i. Impact description

The project will require sand, ballast and quarries (for rock). Since substantial quantities of these materials will be required for construction of the facilities, the availability and sustainability of such resources at the extraction sites will be negatively affected. Quarries or any borrow pits created shall be closed so as to minimize impacts on land users and avoid the creation of safety or health hazards (e.g. steep slopes, malarial ponds). Sand mining from rivers is associated with habitat destruction due to changes in channel morphology.

ii. Mitigation measures

(a) Borrow pits and quarries

- Maximize the re-use of excavated materials in the works, as fill.
- Selection of quarries and borrow pits sites should be done carefully so as to minimize impacts on existing land uses.
- Strip all available topsoil from borrow pits and quarries and store it safely for use in site restoration.
- Close all borrow pits and quarries in accordance with an approved plan to maximize their long-term biological productivity and minimize health and safety hazards.
- Carry out EIA for quarry site if new quarries are to be opened for purposes of this project

(b) Socially responsible procurement

- Include a provision in the tender documents that where goods and services are of equal quality, those sourced from an organization implementing a certified Environmental Management System and/or Corporate Social Responsibility approach will be preferred.

Generation of Wastes

i. Impact description

❖ ***Construction Phase wastes***

Solid wastes that will occur in the construction phase of the facility include;

- Domestic Solid Waste
- Excavation Waste
- Packaging Waste
- Waste Oils
- Hazardous Waste - Fuel, machinery equipment filters and wastes, chemical wastes, chemical waste or oil contaminated wastes, wasted machine parts, etc., contaminated excavation material.
- Batteries and Accumulators
- Worn out Tires

❖ ***Operation phase wastes***

Waste generation from the housing facilites is of paramount significance and should be managed according to industry standards. Among the wastes to be generated include;

- **General Waste** – Administrative offices, housekeeping, kitchen, storage facilities, sanitary waste, garages
- **Packaging Waste** – Reused recycled waste (such as paper, cardboard, paperboard, plastic, glass, metal. etc.) from all administrative offices, kitchen, warehouse, workshop

Waste segregation should be undertaken to ensure that mixing of wastes is avoided since this can compromise on waste management.

ii. Mitigation Measures

I) Construction phase

- Materials from excavation of the ground and foundation works should be reused for earthworks and landscaping. Excess soils to be disposed of at approved sites

- Domestic Solid wastes generated should be handled and disposed offsite by licensed waste handlers and according to EMCA Solid Waste Management Regulations 2006
- Institute procurement measures that recognize opportunities to return usable materials such as containers
- Waste batteries and tires should be collected for recycling by NEMA licensed waste handlers

II) Operation Phase

- Effective waste management practices that involves 3Rs (reduce, re-use, recycle) should be put in place during the construction and operation phase.
- Colour coded bins should be placed at strategic locations within the site for solid waste collection to facilitate separation and sorting
- Solid wastes generated should be handled and disposed offsite by licensed waste handlers and according to national laws governing waste management

5.3.3 Surface and ground water quality

i. Impact Description:

Surface and ground water quality may be impacted negatively by project activities both during construction and operation phase. These may occur through spillages from refuelling of construction vehicles, soil erosion and siltation, storm water contamination and sewer leakages into the environment. The water quality impacts due to leakage or seepage may affect wells or boreholes in the vicinity of the project site, local aquifers, surface water drainages and the downstream environment.

ii. Mitigation measures

(1) Construction Phase

Specific mitigation measures include:

- Install oil and grease interceptors at car wash areas.
- Employ standard best practices in fuel refueling, storage and handling to prevent the risk of spillages.
- All such materials, fuels and chemicals must be stored in a specific and secured area to prevent pollution from spillages and leakages. The basic NEMA regulations of hazardous waste management must be applied fully.
- Construction vehicles and machines must be maintained properly (including preventive maintenance) to ensure that oil spillages are kept at a minimum.

- Provide bins for construction workers at appropriate positions for disposal of litter. These bins can be colour coded to ensure minimal waste of recyclable resources.
- Sensitise and create awareness for all workers in regard to sound waste management practices.
- The location of stockpiled or excavated soil material must be done in such a way as to prevent siltation of drainage systems. The excavated and stockpiled soil material must be stored and bermed on higher lying areas of the site and not in any storm water channel or steep gradients.
- Stabilize storm water discharge points through robust designs to avoid soil erosion.

(II) Operational Phase

(i) Proper siting of waste disposal or fuel storage areas away from storm water impacts.
(ii) Monitoring and testing of quality of water from boreholes and nearby water sources.
(iii) Routine monitoring of sewer pipe networks and manhole covers for leakages and overflows for immediate repair
(iv) Avoid discharging disinfectants and cleaning agents into waste water treatment plant as it can alter the biological environment

Storm water and flooding impacts

i. Impact Description:

The construction of buildings will increase the impervious surface areas hence increasing the amount of storm water generated at site. The project site is gently sloped and flooding may occur during heavy rains. Eroded soils may cause clogging of drainage channels and increased storm water may cause flooding at the project site if not well managed.

ii. Mitigation measures

(1) Construction Phase

(i) Construction activities should preferably take place during the drier season to prevent soil erosion and siltation to surface water features. This, however, also comes with dust.
(ii) The excavated and stockpiled soil material must be stored and bermed on gently lying areas of the site and not in any storm water channel or steep gradients.

(iii) Discharge points of all storm water channels, where flow of water is concentrated should be well and firmly stabilized.
(iv) Surface water drainage of contaminated areas containing oil and petrol should be channelled towards a sump which will separate these chemicals and oils.

(2) Operational Phase

(i) Exposed soil should be re-vegetated or covered to prevent soil erosion.
(ii) Efficient and effective storm water management structures should be built to ensure storm water doesn't flood in the site
(iii) Regular unclogging of the drainage facilities should be undertaken

5.3.5 Biodiversity Impact

i. Impact Description

The proposed project site has been in use as residential with single dwelling buildings. The site does not have any indigenous trees or wild animals. There exist a few planted trees, bushes and grass covered sections which could be home to a few insects and rodents.

ii. Mitigation measures

(1) Construction Phase

(i) Replant cleared areas with appropriate vegetation such grass to arrest soil erosion.
(ii) Landscape exposed and vulnerable sites between buildings

Air Pollution

i. Impact Description

The expected air pollutants from the proposed Project will include dust, particulate matter and gaseous emissions. Dust and particulate matter will be generated from the excavations, earth moving and materials delivery, sand, cement, gravel, murram, etc. Smoke, hydrocarbons and nitrogenous gases will be emitted from machinery exhausts. These will be expected to increase slightly and will be localized.

ii. Mitigation measures

(1) Construction Phase

(i) Impose speed limits (10 km/h in all areas within the site boundaries).

(ii) Regular water sprays on access roads, stockpiles and cleared to minimize dust pollution.
(iii) No open air burning of refuse wastes on the premises or surroundings. Refuse wastes should be removed by an official contractor and dumped at an approved site in compliance with local laws regulations.
(iv) Proper rehabilitation of disturbed areas is required in order to minimize bare patches.
(v) Vehicles to be used during the construction phase well serviced and maintained to prevent or minimize release of excessive fumes.
(vi) Covering of trucks and vehicles transporting materials to prevent dust or particles from flying off the vehicles.
(vii) For the workers who must be at the dusty locations, they should be provided with personal protective equipment (PPEs).

(2) Mitigation measures: Operational phase

(i) Periodic measurement of stack emissions from back-up power generators to ensure they do not exceed the recommended emission limits.
(ii) Organic wastes should not be burned on the premises or surroundings.

Noise Impact

i. Impact Description

Noise generation will be due to construction activities, excavation equipment, concrete mixers and the transportation of equipment, materials and people. During the operation period noise will be generated from back-up generators and vehicles transporting goods, foodstuffs, visitors. With the proper mitigation measures the noise impact is not expected to be significant.

ii. Mitigation measures

(1) Construction Phase

(i) Fit silencers on equipment and machinery that are expected to generate a lot of noise.
(ii) Provide workers expected to work in noisy areas with ear muffs and enforce their use by worker through stringent supervision.
(iii) There should be no unnecessary horning of the involved machinery and vehicles.
(iv) Schedule road traffic movements to normal working hours (08H00 –17H00).
(v) All equipment and vehicles on the site should be properly serviced and maintained to reduce noise.

(vi) Work stations expected to generate a lot of noise should be shielded for instance with corrugated iron sheet.

(2) Operational Phase

(i) Proper maintenance and servicing of equipment and machinery used during the operation phase.

(ii) Use of warning signs for speed limits, hooting and levying of engines

5.3.8 Traffic Impact

i. Impact Description

Vehicles shall be used to transport construction material and equipment to site. It is expected that this will have a small impact on the traffic situation at the site and adjacent areas. However, there shall be plans to ensure that no vehicle obstructs other road users at the entrance to the site from the Karuna Road.

ii. Mitigation measures

(1) Construction Phase

i) Adequate and appropriate road signs should be erected to warn road users of the construction activities.

ii) Sensitize drivers on safe driving and working practices

iii) Avoid transporting materials during periods of peak traffic activity

iv) Traffic should be controlled especially during material delivery mostly when large trucks are turning into the site

(II) Operational Phase

i) Construct a service lane to accommodate vehicles wait for security check to the site

Site Security

i. Impact Description

Increased number of workforce during construction provides opportunity for criminals to infiltrate the site hence causing potential security risks.

ii. Mitigation measures

(1) Construction and operational Phases

(i) Proper access control should be enforced to ensure that no unauthorised persons enter the site and all vehicles entering site shall be thoroughly checked.

(ii) The construction sites should be properly fenced and guarded with controlled exit and entry points
(iii) Employees should be properly vetted and supervised to weed out any criminal agents within the work force

Visual Impact

(i) Impact Description

Major and minor earthworks will take place to ensure site preparation; which will entail the removal of trees, soil cover and the subsequent exposure of the soil. Material stockpiles, material sheds and construction equipment will be present on site, which could give the site a disordered feel. During the operation period the site will be completely modified and will consist of a multi storey building. Therefore, the landscape will be permanently and irreversibly altered. Upon the completion of the construction work the site will be cleaned and disturbed areas landscaped.

ii. Mitigation measures

(I) Construction Phase

- Keep the construction sites neat, clean and organised in order to portray a tidy appearance.
- Rehabilitate or vegetate disturbed areas as soon as practically possible after construction. This should be done to restrict long stages of exposed soil and possible erosion that will result in indirect landscape and visual impacts.

Increased Water Demand

i. Impact Description

There will be an increased water demand due to increased construction activities. Water will be used for drinking, in the washrooms for workers and staff, dust suppression and in the construction activities. The increased water-use may affect water supply in the area if alternative sources of water are not sought.

ii. Mitigation measures

(1) Construction Phase

- The proponent shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water use.
- Fix any water leaks from damaged pipes and faulty taps

(II) Operation phase

- Install water conserving automatic taps and toilets.
- Ensure that any water leaks through damaged pipes and faulty taps shall be fixed promptly by qualified staff.
- Consider rain water harvesting to have alternative water supply

Increased demand on Energy

i. Impact Description

There will be increased energy demand during the construction phase of the project that will be met by via electricity distribution network of the KPLC. Stand by power generators will be used in case of electric outages. Some construction machines and equipment will use fuel to run. On completion, the project shall consume large amount of electricity for lighting due to the high number electric appliances required. This will include cooling system for short life products. Liquefied Petroleum Gas (LPG) will be used mainly for cooking by the households and staff kitchens.

ii. Mitigation measures

(1) Construction and Operation Phase

- Employ the use of energy saving bulbs at the premises;
- Install security lights with sensors to save on energy during the night
- Switch off all electrical equipment when not in use to save energy
- Install alternative energy sources such as solar power to assist in lighting and warming of bath water
- Monitor and keep records of energy use. Undertake yearly energy audits on all types of energy usage in the facility for better decision making on energy conservation

Social and Labour Issues

The proponent and the contractor will fulfill the requirements of IFC PS2: Labor and Working Conditions by adopting and implementing the requirements of the Kenya Employment Act 2007, the Occupational Health and Safety Act of 2007, the Building Code 2015 and the Work Injury Compensation Benefit Act 2007 and other legislation. The proponent and contractor shall have a Human Resource (HR) Policy and Labour Management Plan in place guided by the existing national laws.

Cultural Heritage

Cultural heritage refers to tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls. With this definition in mind, the site does not have any forms of cultural heritage and has been under use as a single dwelling.

CHAPTER SIX: PROJECT ALTERNATIVES

6.1 The proposed alternatives.

This section deals with various project development alternatives. The criteria for assessing these alternatives is based on project location, design, construction materials, socio-economic considerations and proposed best available technologies.

6.2 No Development Alternative

The 'No development" alternative describes a situation in which the proponent does not undertake the proposed development. This option would mean that the status quo remains and the Karuna court personnel will continue to live in overcrowded and poor quality houses lowering their motivation and performance. It also means loss of financial commitments already made in design and planning of the project and loss of jobs.

6.3 Relocation Option

The other option available for the project implementation is for the proponent to relocate the project to an alternative site. However, the cost of acquiring land at a location strategic to the project will be considered prohibitive and time consuming. The existing site is considered suitable given that the impacts from the proposed project are low and the projects fits well within the existing land-uses.

6.4 Alternative to technology

Energy use

Energy will be required for lighting, cooking, and hot water showering and operating electronic gadgets in the apartments and offices. The energy mainly will be obtained from the national grid. Reliance on the national grid is not sustainable in the long term because of power rationing and outages in the country. Alternative energy sources such solar power should be considered to provide energy to power security lights and heating hot water for showers. Since solar power is not reliable, the proponent should consider installing a hybrid system that uses electricity, generator and solar power.

Solid waste management options

The proponent should plan to implement its own integrated solid waste management system in which an elaborate solid waste management chain, from generation, storage, collection, recovery and disposal are all properly coordinated. This will

prevent various health and environmental challenges that arise from poor management of solid wastes.

Water source options

The main source of water at the site is the piped water from the Nairobi City Water and Sewerage Company (NCWSC) water distribution network. To avoid water shortages during construction period, the proponent and the contractor should have alternative water sources to ensure seamless flow of construction work. The water source options available include sinking a borehole or buying water from vendors. At the moment, buying water from water vendors is the best alternative in-case the supply from NCWSC is interrupted in comparison to sinking a borehole which can take time and interrupt construction activities.

6.5 Preferred Development Option

All the alternative options analyzed have implications but maintaining the construction of proposed housing units at the current location is considered as the more viable option due to the following reasons:

- There is already adequate land for the project and a lot of money that has been committed to the project will be saved as opposed to looking for another site.
- The proposed project is of low impact and is compatible with the neighboring land-uses

CHAPTER SEVEN: PUBLIC CONSULTATION

7.1 Introduction

Public participation and involvement is an important aspect in the design, planning and implementation of any development project. Public participation tries to inform and consult the public to ensure that due consideration is given to public values, concerns and preferences when decisions are made. It encompasses the public actively sharing in the decisions that government and other agencies make in their search for solutions to issues of public interest. Effective public participation requires the availability of adequate information in public inputs.

7.2 Public participation in the proposed Project

Public consultations in this project was done with the following aims:

(i) To inform the local people, leaders and the beneficiary/project affected communities about the proposed project and its objectives

(ii) To seek views, concerns and opinions of people in the project area concerning the proposed project

(iii) To establish if the local people foresee any positive or negative environmental impact which may arise as a result of implementation of the proposed project and if so, how they would wish these perceived impacts to be addressed.

7.3 Methodology

Public participation was mainly achieved through direct interviews, questionnaire administration and a public meeting. The following is a detailed discussion of public consultation methodology used by the EIA team

Direct Interviews

This involved interviewing key stakeholders in order to gather information on the design and layout of the project, baseline information on the project area and also to assist in analysis of existing and anticipated impacts of project activities to the community and institutions within the project catchment area. Among those consulted through this method include the Project proponent, Contractor representatives including Site agent, Environment, Health and Safety Officer, Site Mechanical Engineer and the foreman.

Questionnaire administration

Questionnaires were prepared and administered mainly to the members of the public neighboring the project site. The aim was to inform them and seek their views on the proposed construction.

Public meeting

Stakeholders and interested parties were invited to the meeting through invitation letters and a public notice inviting stakeholders and interested was placed at the site.

A public participation was conducted on 28th February, 2025.

Plate: public participation meeting held on 28th February, 2025.

CHAPTER EIGHT: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.0 Introduction

The key outcome of the Environmental and Social Impact Assessment (ESIA) process for the proposed construction is the Environmental and Social Management Plan (ESMP). In real meaning, the ESMP is a mechanism to meet the recommended environmental and social mitigation measures. This ESMP is an instrument that will allow the proponent, Contractor, visitors and other key stakeholders to integrate environmental and social components into the project during implementation, operation and decommissioning phases.

The ESIA is a complex document containing a series of recommendations related to mitigation measures, monitoring and management. A key role of the ESMP is to put them all in a single framework showing mitigation measures, responsibilities, and timelines for implementation. It also highlights the various commitments that must be made at various levels, from the senior management level of the proponent to the levels of all parties involved in the implementation of the project.

8.1 Climate Change and Variability

The proposed development of serviced apartments, offices, and a restaurant on Plot L.R. No. Nairobi Block 5/413 (Original 1870/III/189) along Karuna Road, Westlands Sub-County, Nairobi, is situated in an area likely to be affected by the changing climate and variability. Nairobi, located in the central highlands of Kenya, experiences a subtropical highland climate characterized by moderate temperatures ranging from 14°C to 26°C and two main rainy seasons. However, climate change is causing significant shifts in temperature, precipitation patterns, and the frequency of extreme weather events. Projections for the region suggest that temperatures will rise by up to 2°C by 2050, with a potential increase of 4°C by the end of the century. Rainfall is expected to become more variable, with both prolonged dry periods and intense rainfall events, leading to a higher risk of flooding and droughts. Furthermore, the city is anticipated to experience more extreme weather events, such as heatwaves and heavy storms, which could exacerbate the challenges faced by urban infrastructure.

The potential impacts of these climate changes on the proposed development are multifaceted. The increased rainfall intensity could result in localized flooding, especially if drainage systems are not designed to handle higher volumes of water. The urban heat island effect could also be amplified, raising temperatures in and around the buildings, which would negatively affect the comfort of occupants and increase energy demands for cooling. Additionally, the likelihood of water scarcity, due to

shifting rainfall patterns, may pose challenges for the development's water supply, particularly for the serviced apartments and restaurant, which typically have high water usage. The project could also face higher energy consumption due to increased demand for cooling systems during warmer periods, which could impact both operational costs and the local energy grid. Lastly, extreme rainfall events could increase the risk of soil erosion and potential damage to the development's infrastructure, particularly in the foundation areas.

To address these climate-related risks, several mitigation measures should be incorporated into the project's design. The development should include effective storm water drainage systems, rainwater harvesting systems, and permeable pavements to manage runoff and minimize flood risks. Energy-efficient building materials and passive design strategies, such as natural ventilation and shading, will help reduce the heat island effect and lower energy demands. Water conservation measures, such as low-flow fixtures and rainwater harvesting, should be implemented to ensure sustainable water use, especially during dry periods. Additionally, the landscape design should focus on drought-resistant plants and the creation of green spaces that can act as heat buffers and reduce water consumption. The buildings should be designed to withstand extreme weather conditions, with reinforced foundations and resilient structures to protect against potential flooding, storms, or soil erosion. Furthermore, the orientation of the buildings should be optimized to maximize natural light and minimize heat gain, while solar energy solutions could be incorporated to supplement power needs, especially for the office and restaurant areas.

The proposed development in Westlands is expected to face various challenges due to the impacts of climate change, including rising temperatures, changing rainfall patterns, and more frequent extreme weather events. However, by integrating climate-resilient design strategies, the development can reduce these risks and enhance the sustainability and comfort of its occupants. By considering these factors, the client and the consultant have implemented these factors in the design phase, the project can be better equipped to withstand the uncertainties of a changing climate and ensure long-term environmental and economic benefits.

8.2 Scope and Objectives of the ESMP

This Environmental and Social Management Plan focuses on mitigating the impacts identified during the environmental and social assessment. This plan is meant to establish measures and procedures to control the analyzed impacts and monitor their progress. It will achieve the following in the long run:

(i) Provide the National Environment Management Authority (NEMA) with a tool to make it easy to evaluate the objectives at different phases of the project, taking into account the Kenyan environmental legislation;
(ii) Provide clear and mandatory instructions to the proponent, contractor users and other key stakeholders with regard to their environmental and social responsibilities in all phases of project.
(iii) Ensure continuous compliance of the proponent, contractor and other key stakeholders with Kenyan legislation and policies regarding the environment;
(iv) Assure the regulators and interested and affected parties the satisfaction of their demands in relation to environmental and social performance.

8.3 Applicable Legislation

The pieces of legislation applicable to the ESMP are described in Chapter four of this project report. International normative instruments concerning the environment, as well as international best practices have also been considered.

8.4 Responsibilities in Environmental and Social Management

Karuna Court Management and the contractor are the main entities responsible for implementing this ESMP. In the interest of environmental protection, health and safety of workers and the public, and in their own interest, the proponent should include in their contractual arrangements with contractors, clauses relating to environmental protection -and, specifically, compliance with the ESMP - that will safeguard the right to require the contractor's compliance with environmental requirements and social action in case of breach.

Responsibility of Karuna Court Management

The proponent (Karuna court) will ensure that all project operations are conducted in accordance with their internal environmental policies and in accordance with the ESMP. The proponent in partnership with the contractor and other key stakeholders will ensure that the ESMP and other requirements related to health, safety and environment are implemented in full. The proponent should strive to manage operations in a manner to protect the environment and health and safety of employees, contractors, consumers and the general public. To achieve this objective, the proponent will:

(i) Obtain Authorizations/Approvals/Licenses required for project implementation;
(ii) Request the contractor to operate on the basis of valid Authorizations/approvals/ licenses for the activities to be implemented;

(iii) Ensure that the EMP is an integral part of the contract document with the Contractor and that the contractor will be responsible for its implementation;
(iv) Establish institutional linkages with relevant parties in the project implementation as needed, or designate a representative for that purpose;
(v) Ensure that the various project activities comply with the mitigation measures proposed in the Environmental Management and Monitoring Program (ESMP);
(vi) Ensure that there are contingency plans and resources for employees health and contingency plans to respond to accidents at work (Emergency Response Plan);
(vii) Make regular inspections to all the different activities with regard to social aspects, health, safety and environment and check for any non-conformity with the EMP attributable to the Contractor and identify the steps taken for its correction;
(viii) Produce reports that allow to monitor and evaluate the performance of operations following the measures and objectives of the ESIA and ESMP in relation to health, safety and environmental protection;
(ix) Conduct an initial induction for construction activities with contractors before the commencement of operations;
(x) Monitor the performance of their own teams, or designate a representative to that effect;
(xi) Approve work procedures established for each phase of the project and ensure that the various proposed activities are implemented in accordance with them;
(xii) Establish and implement a complaints management procedure that allows treatment/appropriate response to them;
(xiii) Create awareness among workers about environment, health and safety issues; and
(xiv) Ensure that any corrective activities recommended by the audits or inspections (performed internally or externally) are implemented within the time pre-set.

If the activities of this project are awarded to contractors or subcontractors to act on behalf of the proponent, the responsibilities indicated here as of the proponent's move to these companies. From an environmental point of view, the primary responsibility over the continued operations, belong to the proponent. It is recommended therefore that where there are jobs awarded to contractors, be appointed a Clerk of Work/Supervisor, which will verify its performance.

Responsibility of the Contractor

All Contractors should identify individuals responsible for overall management of the environment, social management, safety and health management during all operations. The Contractor shall be responsible for relevant training of its staff, which

must be able to complete the project activities in an efficient and appropriate manner in accordance with the contractual requirements of the proponent to the agreed work. Among many tasks, the contractor shall:

(i) Prepare its own EMP as well as a health and safety plan within 30 days of signing of the contract. The EMP implementation plan must be approved by the proponent prior to the initiation of construction works;

(ii) Submit to the proponent the work procedures/methods or equivalent documents for approval;
(iii) Operate on the basis of valid Licenses/Approvals/Authorizations for the activities to be implemented;
(iv) Employ techniques, practices and construction methods to ensure compliance with the ESMP;
(v) Prevent or minimize the occurrence of accidents which might cause damage to the environment and be able to respond positively to an accident if it occurs;
(vi) Meet the working procedures and environmental requirements and health and safety established by contract with the Proponent; ensure compliance with them by sub-contractors who might be hired by him;
(vii) Minimize environmental damage, waste control, avoid pollution, prevent loss or damage on natural resources and minimize the effects on the users and occupants of surrounding lands and the public;
(viii) Provide Personal Protective Equipment (PPE) to workers which is appropriate to the tasks to be performed and ensure that it is used;
(ix) Implement all corrective activities agreed in audit (internal or performed by other agencies) or inspections, within the pre- established deadline;
(x) Manage the complaints process on the elements that fall within its jurisdiction, or refer complaints to the Proponent, so that they can receive treatment/appropriate response;
(xi) Prepare a Rehabilitation Plan which shall include preliminary designs on the temporary and permanent landscaping plan during both the construction and post-construction and maintenance period (where applicable).

Responsibilities of Regulatory Agencies

Regulatory Agencies directly involved in this project include the National Environment Management Authority (NEMA), County Labour Officers, KPLC, Nairobi Water and Sewerage Company among others. NEMA is the institution that plays a greater role in the process since it is responsible for taking decision on the ESIA process and

responsible for regulating the environmental performance of projects in Kenya. They are also responsible for verification, inspection and audit, before, during and after the implementation of projects (in accordance with EMCA 1999). NEMA is also a governmental agency with expertise in waste management with regard to: the issuance and dissemination of the mandatory rules on the procedures to be followed for waste management.

The other institutions listed above play a subsidiary role in specific issues of the ESIA process and its implementation. For instance, KPLC and Nairobi Water and Sewerage Company shall be responsible for power and water connection to the site.

(i) Comply with and enforce existing laws and the requirements of environmental agencies and other relevant bodies involved;

(ii) Ensure that the Environmental Management Plan is fulfilled according to the stipulated standards;

(iii) Identify and evaluate periodically the effects and results on the basis of established environmental standards and propose, where necessary, changes, additions or new actions and activities, considering also the progress of services and their capacity to contractual deadlines and resources allocated.

8.5 Extended Producer Responsibility (EPR)

Section 13(1) of the Sustainable Waste Management Act 2022 stipulates that every producer shall bear extended producer responsibility obligations to reduce pollution and environmental impacts of the products they introduce into the Kenyan market and waste arising therefrom. It states further that the extended producer responsibility obligations can be fulfilled either individually or collectively in a compliance scheme. These provisions apply to the proponent, contractor and suppliers for the wastes that arise from their operations. Measures must be put in place for re-use, recycling and proper disposal. Where required, a take back scheme shall be put in place to collect waste products produced by the various parties to this project either individually or collectively.

8.6 Construction Phase Environmental Management Plan

The EMP for the construction phase mainly focuses on impacts that are likely to affect the environment, the health and safety of the public as well as the workers during the planning and construction process. Mitigation measures are then proposed to minimize the anticipated impacts. Issues covered by the construction EMP include; Occupational safety and health, air pollution, surface and ground water

contamination, noise pollution and traffic impact among others. These are presented in Table 8.1

Table: Environmental Management Plan for the construction phase

Environmental issues	Action required	Implementation Time frame	Responsible party	Estimated Cost (Kshs)
Impacts of obtaining construction materials	• If new quarries are done by contractor to obtain rock aggregates, they should be closed and filled up for future use and to minimize health and safety hazards • Re-use excavated soil from the works as fill and for landscaping.	At completion of material extraction At construction completion	Contractor Contractor	300,000
Traffic Management	• Sensitize drivers on safe driving and working practices	Weekly	Contractor's EHS officer	No costs
	• Avoid transporting materials during periods of peak traffic activity (6.30-8.30am) & after 5.00pm	Daily	Contractor	No costs
	• Use of traffic Marshalls to direct and control vehicles at the entrance from main road to the construction site.	Daily	Contractor	Part of contractor's labour costs
	• Erect appropriate signage at construction site to guide drivers and heavy equipment operators	During construction phase	Contractor	200,000

Waste Management	• The contractor should develop a solid waste management plan for the site	Construction phase	Contractor aided by EHS Consultant	Part of project costs
	• Reduce or re-use wastes to minimize generation of waste	During construction phase	Contractor's EHS officer	No costs
	• Wastes that cannot be re-used or recycled should be disposed at Nairobi City Council designated dumping sites	Daily/Weekly	Contractor's EHS officer	1,000,000
Waste Management	• Hazardous wastes, used batteries and tires should be collected for disposal or recycling by NEMA licensed waste handlers	Throughout the construction phase	Contractor's EHS officer	100,000
	• All wastes leaving the site should be recorded and tracking documents issued in line with NEMA Waste management Regulations	Daily through the construction phase	Contractor's EHS officer	No costs
	• Give priority to material suppliers who provide opportunities to return usable materials such as empty containers according to the Extended Producer Responsibility (EPR) requirements	During construction phase	Contractor's Construction Manager	No costs

	• Provide colour coded solid waste collection bins for waste collection from workers and site offices	During construction phase	Contractor	100,000

Soil erosion and storm water management	• Re-plant exposed project sites with appropriate vegetation covers	At start & completion of construction activities	Construction manager, Contractor's EHS officer	To be determined by the contractor
	• Excavated materials and stockpiled soils should be covered or kept at appropriate sites to prevent wind erosion	During construction	Construction manager, Contractor's EHS officer	100,000
	• Undertake appropriate soil erosion control measures to manage siltation and clogging of drains during construction phase	Throughout the construction phase	Contractor, Contractor's EHS officer	To be determined by the contractor
	• Discharge points of all storm water channels, where flow of water is concentrated should be firmly stabilized.	Throughout the construction phase	Site civil engineer, Contractor's EHS officer	Part of construction costs
	• Storm water should be diverted away from the steep gradients as well as temporary stockpiled soil and/ or waste.	Throughout the construction phase	Site civil engineer, Contractor's EHS officer	Part of construction costs

Surface and underground water pollution	• Store materials, fuels and chemicals in a specific and secured area to prevent pollution from spillages and leakages.	Throughout the construction phase	Contractor	Part of constructio n costs
	• Provide Oil spill containment kits and cleanup equipment	Throughout the construction phase	Contractor	100,000
	• Train drivers and workers on oil and fuel spill control	At start of construction work	Contractor 's EHS officer,	No costs
	• Waste oil should be taken for recycling by a NEMA licensed waste handler.	Construction period	Contractor 's EHS officer	100,000
	• Provide adequate toilets at the construction site for use by workers	Throughout the construction phase	Contractor	Part of the constructi on costs

Air pollution	• Sprinkle water on dusty work areas to minimize dust generation. • Ensure all workers are provided with personal protective gears • Enforce low speed limits for construction vehicles and spray water on dusty roads • Cover sand and loose aggregate materials during transportation to site • Regular servicing and maintenance of machines and vehicles to reduce emission of harmful fumes to the atmosphere	During construction period	Project manager, Contractor' EHS officer	Part of construction costs
Noise Pollution	• Device appropriate noise mitigation measures e.g. use of acoustic barriers around noisy equipment • Provide personal protective (PPEs) equipment to workers working in noisy areas • Track drivers to avoid hooting and revving of engines where unnecessary • All equipment and vehicles on the site should be properly serviced and maintained to reduce noise.	During construction Period	Project Manager, EHS officers	Part of construction costs

Site Security	• The contractor, workers and suppliers should strictly follow security rules and procedures put in place by Management • Conduct thorough vetting for all workers to avoid criminal elements infiltrating the site • Proper screening and manning of entry points to the site • Conduct random and regular security patrols around the construction site	Construction period	Contractor's security guards	Management to use their own security team
Increased water demand	• Conduct daily inspections to ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water use. • Fix any water leaks from damaged pipes and faulty taps • Utilize water from other alternative sources e.g. from existing borehole or water harvested from rain	Construction period	proponent, Contractor	Part of construction costs

Increased energy demand	• Employ the use of energy saving bulbs at the site; • Install security lights with sensors to save on energy during the night • Switch off all electrical equipment when not in use to save energy • Install alternative energy sources such as solar power • Monitor and keep records of energy use for better decision making	Construction period	Contractor	Part of construction costs
Socio – economic impacts	• Give priority to locals when hiring workers for the project during construction • Ensure gender balance in employment as far as possible. • Provide business opportunities for local suppliers and service providers • Implement HIV/AIDS and STD awareness and prevention programme for workers and local residents targeting risk groups	During construction	Contractor	Not applicable

	• Constitute a Grievance Redress Mechanism to handle social conflicts related to the project			

8.7 Operation phase Environmental Management Plan

Operation phase EMP proposes measures that should be undertaken to minimize adverse impacts that are likely to result from operation activities of the project. The following issues have been identified and mitigation measures proposed as shown in the Table below.

Table: Operational phase Environmental Management plan

Environmental issues	Action required	Responsible party	Estimated Cost (Kshs)	Time frame
Noise and vibrations pollution control	• Proper maintenance and servicing of equipment and machinery used during the operation phase. • Use of warning signs for speed limits, no hooting and levying of engines	Contractor,	To be determined by Management	Operational phase

Waste Management	• Develop a waste management plan and adhere to EMCA solid waste management regulations 2006 • Waste should be sorted and segregated at source for easy of management • Provide adequate infrastructure for waste collection and transfer points before disposal (bins, holding containers etc.) • Contract a NEMA licensed solid waste handler to collect, transport and dispose waste from the residential houses • Effective waste management practices that involves 3Rs (reduce, re-use, recycle) should be put in place during the construction and operation phase. • Establish a take back scheme for all wastes emanating from proponent manufacturing in line with EPR	management	To be determined by Management	Operation phase

Environmental issues	Action required	Responsible party	Estimated Cost (Kshs)	Time frame
Water and soil pollution	• Install oil and grease interceptors at car wash areas • Regular checks and maintenance of oil interceptors and grit traps • Employ standard best practices in fuel refueling, storage and handling to prevent the risk of spillages. • Oil spill containment and cleanup equipment should be kept at the contractor's yard with a small kit in every project vehicle • All drain pipes passing under building, driveway or parking should be of heavy duty PVC pipe tube encased in 150mm concrete surround	Management	To be determined	Regularly
Storm water management	• Conduct regular checks and unclog or de-silt blocked drainage channels within the site	Management	To be determined as need arises	Operation phase

Environmental issues	Action required	Responsible party	Estimated Cost (Kshs)	Time frame
Increased water demand	• Install water conserving automatic taps and toilets. • Fix any water leaks from damaged pipes and faulty taps • Install water conserving automatic taps and efficient toilets flushes. • Consider alternative water sources such as rain water harvesting	Management	To be determined	Operation phase
Increased energy demand	• Employ the use of energy saving bulbs at the premises; • Install security lights with sensors to save on energy during the night • Switch off all electrical equipment when not in use to save energy	Management	To be determined by management	Operation phase

8.8 Environmental, Health and Safety Monitoring

Environmental, Health and Safety monitoring and audits are essential in Project's life span as they are conducted to establish if project implementation has complied with set environmental management standards for Kenya as spelt out in EMCA 1999 and the Environmental (Impact Assessment) and Audit Regulations 2003. In this Project, environmental monitoring and audit will be conducted to ensure that identified potential negative impacts are mitigated during the project's implementation, operation and decommissioning periods. The key objectives of monitoring are:

(i) To ensure that the ESMP and OSH plans are implemented;
(ii) To evaluate the effectiveness of the mitigation measures;
(iii) To verify predicted impacts;
(iv)To provide feedback to licensing authorities.

Environmental concerns, that will be monitored and audited during the project's construction and operation period include: water quality, air Pollution, occupational health and safety issues (including worker accidents and hazards), soil erosion, Socio-cultural changes; and socio-economic benefits.

Project parameters to be monitored

The EMCA 1999 require the project proponent to prepare and undertake a monitoring plan and regular auditing. Monitoring is needed to check if and to what extent the impacts are mitigated, benefits enhanced and new problems addressed. Table 8.3 present the various project parameters to be monitored.

Table: Monitoring plan

Monitoring Parameters	Responsibility	Monitoring Location(s)	Time/Frequency	Indicators
Condition of machinery and equipment	Contractor	At work stations	Weekly	Service, maintenance, repair or replacement records of faulty machines
Training on safety and health	Contractor	At work stations	At onset of construction and operation	Records of first aid, fire management training
Accidents, incidents, injuries etc.	Contractor	At work stations	Daily	Mitigation/prevention measures in place, PPEs, Records of incidents or accidents, Medical records, Training , First Aid kits; Fire extinguishers
Dust emissions	Contractor	At work stations	Daily - construction	Health safety measures in place
Noise emissions	Contractor	At work stations	During construction	Noise level measurement and monitoring records, Noise reduction strategies in place

Monitoring Parameters	Responsibility	Monitoring Location(s)	Time/Frequency	Indicators
Sanitation and welfare facilities	Contractor,	Workers camps, construction sites and site offices	Weekly	Presence of sanitation & welfare facilities
Oil spills and leakages	Contractor	Workers camps and construction sites	Daily	Records of daily inspections
Solid Wastes	Contractor	Workers camps, construction sites	Daily/weekly	Inspection and waste disposal records
Traffic management	Contractor	At construction sites	Daily	Records of driver and vehicle activities

CHAPTER NINE: OCCUPATIONAL HEALTH & SAFETY AND MANAGEMENT PLAN

9.1 Project Employee Responsibilities

Responsibility of Project Manager

In Charge of the development, communication and supervision of the safety program and employee awareness. The project manager must enforce and set the tone for all safety related issues during and prior to the planning of each project phase. They must provide leadership and show commitment to a safe and healthy environment. Responsibilities shall include reviewing inspection reports, safety-meeting reports and addressing health and safety issues on the site.

Responsibility of Site Engineer/Agent

The site engineer must ensure that safety procedures are applied in an effective manner and that all employees are conforming to established rules and regulations. Duties include establishing a pre-job assessment prior to the start of the project, ensuring site foremen comply with safety regulations, conducting safety orientations for all new employees, reviewing all incident & corrective action reports, pre-task plans and enforcing disciplinary action when necessary. The site agent will also work with the site safety representative overseeing regular site inspections, developing a site-specific emergency plan and implementing weekly toolbox topics with subcontractors

Responsibility of health and Safety officer

The Health and Safety Officer will act as the designated safety manager and will inspect the site weekly, conducting safety inspections. Responsibilities include providing education and training opportunities to all employees, conducting safety audits, discussing & providing weekly tool box topics, developing an emergency action plan and procedures, reviewing all safety programs and safety data sheets (SDS), scheduling Pre-Task planning meetings & overseeing implementation, issuing violation notices, issuing corrective action reports.

9.2 Employee Orientation

There should be a comprehensive safety orientation for each employee that must be done within one week of any employee starting work on site.

9.3 Site inspections

a) Site Safety officer will conduct weekly site inspections, and review all safety documents

b) Contractors shall perform daily safety inspections of their work area and equipment per OSHA, 2007 requirements.

c) After inspecting a job site/work area, the site safety representative and superintendent will identify and evaluate all potential hazards

d) This site safety representative will also consider the skill and knowledge level demonstrated by exposed workers.

e) This site safety representative shall then take the following actions:

- Discuss all hazards with the necessary parties.
- Explain appropriate recommendations and precautions.
- Assist with any necessary training (i.e. provide appropriate Tool Box Talks), in accordance with the level of hazard.
- Issue corrective actions.

f) Records shall be maintained for all recommendations, precautions, and training for each hazard
identified.

9.4 Emergency Procedures, Investigation, and Reporting

- Contractors/employees shall report all work related injuries, illnesses, first aid cases, near misses, property damage, and environmental incidents such as a spill or release of hazardous materials, regardless of severity, immediately to the Project Manager and Safety Manager.
- The contractor shall investigate all incidents and forward copies of the incident report to the Project Manager within 4 hours of the incident. An incident report must be provided for: near misses, first aid, recordable injuries, third party property damage or personal injury, and builders risk claims.
- All incidents, accidents or death must be reported to the office of Directorate of Occupational Health and Safety and the Police.
- Follow-up information on personal injuries (doctor's reports, insurance or worker's compensation reports etc.), shall be forwarded to the Project Manager within a reasonable period.

9.5 Fire Prevention

(i) The contractor should devise a fire prevention program and sensitize all employees, suppliers and visitors. All employees should be trained on fire prevention and fire response.
(ii) All stocks of highly inflammable substances shall be kept either in a fire-resisting store or in a safe place outside any occupied building not preventing escape routes.
(iii) The contractor should inspect all cutting and welding equipment and ensure they are handled by well trained and competent personnel.
(iv) Provide and place fire extinguishers at a recommended location near the cutting, welding, or other hot work locations.
(v) Provide workers with appropriate PPE when handling work that might spark fire.
(vi) No person shall smoke, light or carry matches, lighters or other flame producing articles, or smoking materials, in any place in which explosive, highly flammable or highly combustible substances are stored or used
(vii) The contractor shall ensure that proper fire exits are provided and well-marked and visible to all staff

9.6 Hazard Communication Program

A Hazard Communication Program is to protect workers from injuries and illnesses associated with using hazardous chemicals in the workplace. To accomplish this, the program includes the following elements;

- Maintaining a list of hazardous chemicals (a chemical inventory),
- Making Safety Data Sheets (SDSs) accessible,
- Ensuring that chemical containers are properly labeled,
- Providing information, training, work practices, PPE and equipment capable of protecting employees.
- Potential hazard reduction measures such as exposure limits to the hazard(s).

9.7 Occupational Health and safety Mitigation measures

Personal Protective Equipment (PPE)

- All workers shall be provided by personal protective equipment prior to commencement of construction work. The PPEs shall be of good quality and suitable to the specific work requirements.
- The safety officer must ensure that the use of PPEs is adhered to at all times and worn in an appropriate manner
- All personal protective equipment must be inspected regularly as per OSHA, 2007 standards to ensure they are fit for use.

Safe use of plant and machinery

- All plant, machinery and equipment whether fixed or mobile for use either at the workplace or as a workplace, shall only be used for work which they are designed for and be operated by a competent person.
- The contractor to ensure that every part of an electric generator, motor and rotary converter, and every flywheel, prime mover shall be securely fenced.
- Only well-trained and competent personnel shall be allowed to operate machines and equipment.
- A spotter is required whenever a vehicle has a restricted view while operating on site.
- Properly set-up barricades or traffic control zones when operating equipment near residential or public roadways.
- Contractor/Sub-contractors is required to conduct daily inspections of all equipment.
- Traffic control marshals shall wear highly visible reflector jackets as required by OSHA 2007 standards.

Site Excavation precautions

- The competent person must inspect the excavation daily before work activities commences after a heavy rainfall, for failures of protective systems, equipment and adjacent structures.
- When working in a trench 4 feet or more in depth, proper sloping, shoring, or other cave in protection methods shall be utilized.
- Ladders shall be provided at least every 25 feet for access to trenches exceeding 4 feet in depth.
- Material and spoil piles shall be kept a minimum of 2 feet away from the edge of a trench.
- All open holes, trenches, and excavations shall be barricaded and clearly marked to alert the public and other workers in the area.
- Excavations and trenches may be confined spaces where air monitoring could be required.
- All vehicles hauling soil from site must pull into site and turn around to make loading easier and safer.

Crane & lifting machines Safety

- All crane and lifting machine operators shall be well trained and certified to operate such machinery.
- Cranes shall be thoroughly examined, at least once in every period of twelve months, or after any modifications or extensive repairs or within a shorter period, by approved and authorized personnel.
- No lifting machine shall be used in any workplace, for the first time in that workplace, unless it has been tested and all the parts and working gear of the machine are in good working condition
- There shall be plainly marked on every lifting machine the safe working load
- If any person is working on or near the wheel track of an overhead travelling crane where he would be liable to be struck by the crane, effective measures shall be taken to ensure that the crane does not approach within six metres of that place.
- Contractor must submit a copy of the crane plan (operation, swing radius, etc.) to site engineer or project officer prior to the start of the project.

Fall Protection

- Fall protection systems are required when workers are exposed to heights of 10 feet or more. The systems include:
  a) Guardrails
  b) Safety net system
  c) Personal fall arrest systems. All the fall protection systems must be inspected, constructed and installed per OSHA, 2007 requirements.
- Floors, passages, gangways, steps, stairs and ladders must be soundly constructed and properly maintained, and handrails must be provided for stairs
- When conducting roofing work, contractors are required to submit a pre-task analysis.
- All holes/ floor openings greater than 2 feet in depth or diameter are required to be properly covered or secured, and clearly marked
- Proper maintenance of fall protection systems shall be ensured.

Electrical safety

- Site electrical installations shall be undertaken by well trained and certified personnel
- The contractor shall ensure that all electrical machines, equipment and hand tools in a workplace are properly earthed and insulated.

- Ensure that all electrical motors, fittings, attachments and switches shall be spark proof in workplaces where flammable liquids, vapours, dusts and gases are likely to be present.
- Ensure that all electrical equipment and the related attachments are inspected in every period of six months by a competent person and a record of the inspection kept.
- The contractor or his staff shall take adequate measures to ensure that electrostatic charges do not build up where flammable substances are present.
- Portable generators must be provided with ground fault circuit interrupters.
- Temporary lighting must be protected with safety guards.

Scaffolding Safety and precautions

- The scaffolding system shall be erected and inspected by a competent person to ensure its stability and safety.
- The scaffold system must be built of structurally sound materials that meet industry standards
- Ensure proper maintenance of scaffold by removing debris, spills, or slippery substances to prevent accidents and carry any necessary repairs as soon as possible
- All workers shall be trained on safe use of equipment, understanding load capacities, identifying potential hazards, and emergency response.
- Training on erecting, altering, and dismantling scaffolding correctly per regulatory standards is also crucial
- Fall protection is of utmost importance when working with scaffolding, as falls account for a significant number of scaffolding-related accidents.
- The scaffold system must have a ladder provided for access. Climbing the bracing is not acceptable unless the system has a built-in ladder for that purpose.
- Evaluate weather conditions that might compromise the safe use of scaffolds such as rain, wind or heat and institute appropriate measures.

Ladder Safety

- Ladder to be used in the workplace shall be of good construction, sound material adequate strength and suitable for the purpose for which it is used and shall be properly maintained.
- Ladders should be securely fixed in a position to prevent it from slipping, swaying or falling, or when impracticable supported by a person at the base

- Ensure the ladder extends at least one metre above the place of landing or the highest rung to be reached by the feet of the person using the ladder in the absence of adequate handhold,
- Ensure there is sufficient space at each rung to provide adequate foothold
- Keep ladder bases clear from debris, hoses, wire, materials, etc.
- Use the "four and one" rule when positioning a ladder – one foot of base for every four feet of height.
- Workers shall not straddle or stand on the top two rungs of a ladder, and shall work facing the ladder.

Housekeeping

- Gather up and remove debris to keep the work site orderly.
- Plan for the adequate disposal of scrap, waste and surplus materials.
- Keep the work area and all equipment tidy. Designate areas for supplies or waste materials and provide containers.
- Keep stairways, passageways, ladders, scaffolds, ramps, and gangways free of material, supplies, and obstructions.
- Secure loose or light material that is stored on roofs or on open floors.
- Remove or bend over nails protruding from lumber.
- Keep hoses, power cords, welding leads, etc., from lying on heavily travelled walkways or areas.
- Ensure structural openings are covered or protected adequately (e.g., sumps, shafts, floor openings, trenches, excavations, ramps, etc.)
- Keep form or scrap lumber with protruding nails and all other debris away from the work areas, passageways, stairs, etc.

Window Installation and Roofing precautions

- When installing windows on the upper floors, the area below (ground level) must be properly barricaded.
- Employees are required to wear a personal fall arrest system when installing windows on the upper floors and during roofing
- If using any lifting devices (rough terrain, aerial), employees must wear a personal fall arrest system and have operator's license to use equipment.
- Employees are restricted from throwing material from roof. Contractor must set up a drop one, which requires a barricade and a spotter.
- Employees working on roofs must wear appropriate footwear that provides good traction.

- Working surfaces must be free of tripping hazards (tools, cords, etc.) and must be clean to prevent material from falling below.
- Employees must have proper and safe access to roofing surface.
- Employees should refrain from working on the roof during bad weather conditions.

Workers' welfare and safety

- Provide adequate toilets and shower rooms for male and female workers as per the recommended ratios
- Keep all workplaces clean, provide handwashing stations with soap and portable drinking water for all employees
- Employees shall be provided with changing rooms and temporary lockable rooms to store their effects
- Train first aiders and provide fully stocked first aid kits for workers in case of emergencies/accidents
- Institute necessary measures for the prevention and treatment of communicable or contagious diseases.
- All workers must be insured against diseases, injuries or death

9.8 Grievance Redress Mechanism (GRM)

The proponent and contractor should develop a grievance redress mechanism for workers as well as for neighbours. The GRM ensures that conflicts or complaints are reported in time and resolved in a transparent, credible, fair, and effective manner. GRM also creates trust and cooperation from the community for the success of the project.

Table: Occupational Health and Safety Management Plan

OSH issues	Action required	Responsible party	Estimated Cost (Kshs)	Time frame
Occupational Health and Safety	• Develop a safety and health plan for guiding all workers on safety and health issues at the construction site	At start of construction phase	Contractor guided by EHS Consultant	Part of construction costs
	• Constitute a health and safety committee to manage health and safety issues at site	At start of construction phase	Contractor's EHS officer	No cost
	• Conduct daily Tool Box Talks with all workers on accident prevention and safe work procedures • Provide and display emergency telephone numbers within the site • Restrict and control unauthorized access into construction sites to prevent accidents and injuries	Daily/ throughout construction phase	Contractor's EHS officer	No cost

	• All machines and other moving parts of equipment must be enclosed to protect all workers from injuries	Throughout the construction phase	Contractor	To be determined by the contractor
	• Train some workers on first aid and fire control and management techniques • Avail well stocked First Aid Kits at the site and ensure its easily accessible in case of an emergency	Throughout the construction phase	Contractor	200,000
	• Provide personal safety gears (PPEs) and enforce adherence to their use at all times	Throughout the construction phase	Contractor	2,000,000
			Total in Kshs.	**2,200,000**

CHAPTER TEN: DECOMMISSIONING

10.1 Introduction

Decommissioning normally takes place both at the end of construction period and during the final phase of a project life-cycle. Environmental planning is therefore necessary before any decommissioning activities should be allowed to commence. The reason for this is because a project earmarked for decommissioning has in all likelihood been operational for some time, and as such, the environment within which it lies has stabilised in response to the presence of the associated infrastructure, activities and facilities. At the end of construction phase, decommissioning mainly targets temporary facilities associated with construction camps and site restorations. The decommissioning of one or all components of the proposed project will therefore have some effect on the environmental status quo of the project site, either in a positive or in a negative way.

10.2 Purpose and objectives of decommissioning

The purpose of decommissioning is the release of valuable assets such as machinery and sites for alternative and the restoration of environmental amenity. In all cases, the basic objective is to achieve an end-point that is sensible in technical, social and financial terms, that properly protects workers, the public and the environment and, in summary, complies with the basic principles of sustainable development. Stringent regulatory controls protect the public, the environment and workers from the hazards associated with decommissioning activities.

10.3 Decommissioning at the end of construction phase

The construction process at the proposed project site will involve a number of activities that may contribute to some changes at the site. Activities associated with site construction process and which may have some impact on the site include acquisition and transportation of construction materials, equipment, vehicles and personnel to the site. Construction process will involve excavation and piling of soil which may negatively affect the local environmental conditions.

Decommissioning and site restoration activities

The decommissioning exercise will involve dismantling of site facilities; backfilling all disturbed areas and transportation of materials out of site for disposal or re- use in similar future projects.

Demolition and disposal of materials from the construction site

The contractor shall undertake demolition activities at the end of construction period. Materials from the site will basically include excavated soils, scrap metal, iron sheets, concrete blocks, debris and metal pipes among others. These materials can be reused, exchanged, recycled and donated to other organizations. Scrap materials, can often be reused or refurbished. Various items should be accumulated separately to facilitate recycling. The table below gives a summary of mitigation measures proposed for decommissioning during construction stage.

Mitigation measures for dust emissions, excessive noise, waste generation and occupational health and safety have been discussed in the construction environmental management plan and are applicable to decommissioning phase.

Table: Decommissioning at the end of construction phase

Activity/ Issues	Recommended mitigation measures
Spoil disposal	• Maximize the re-use of all excavated materials in the works
	• Dispose of spoil only at designated sites and by approved methods; methods must consider topsoil conservation and quality, long-term soil stability, erosion and floodwaters.
Waste Management and Pollution	• Design and implement formal site waste management plan.
	• Apply best practice and standard operating procedures (SOPs) to minimize risk of spills
	• Collect, sort and store all pieces of metals scattered within the site in a special area pending disposal to scrap metal dealers
Dust nuisance	• Identify dust-sensitive locations on all unpaved roads and access tracks leading to the site and establish and enforce maximum vehicle speeds of 10km/h through these roads. • Spray water to surfaces planned for demolition to minimize dust emissions
Hazards to workers	• Workers should be properly supervised to avoid injuries and accidents during demolition. • All the provisions of the Occupational, Health and Safety Act 2007 shall be applied.
	• Sensitize workers on handling hazardous substances and working in hazardous areas.

10.4 Decommissioning at the end of project life cycle

If for some reasons decommissioning for the project is required or at the end of the project life cycle, the proponent management shall draw a detailed decommissioning master plan. Such plan should address all environmental and socio-economic impacts associated with decommissioning. An EIA report for decommissioning shall then be prepared and submitted to NEMA. A license shall then be issued stipulating the terms and conditions to be followed during decommissioning.

CHAPTER ELEVEN: CONCLUSION AND RECOMMENDATIONS

11.1 Conclusion

The proposed development of serviced apartments, office spaces, and a restaurant on Plot L.R. No. Nairobi/Block 5/413 in Westlands, Nairobi, is a well-planned project aimed at addressing the growing demand for mixed-use urban spaces. The project aligns with national and county development policies, ensuring efficient land use while incorporating sustainable construction practices. Through proper waste management, air and noise pollution control, and efficient water use, the project aims to minimize its environmental footprint. Additionally, the incorporation of storm water drainage systems and energy-efficient technologies will enhance environmental sustainability, making the development both economically and ecologically viable.

Public consultation and environmental assessments have ensured that the project integrates stakeholder concerns and adheres to legal requirements such as the Environmental Management and Coordination Act (EMCA). With the implementation of the proposed mitigation measures, the project is expected to positively contribute to the local economy by creating employment, enhancing real estate value, and improving urban infrastructure. Proper monitoring and compliance with environmental regulations will be crucial in ensuring that the project remains sustainable throughout its lifecycle.

11.2 Recommendations

- The proponent and contractor shall ensure that worker's occupational health and safety standards are maintained through capacity building, proper training and provision of protective clothing.
- The contractor should strictly comply to the design plans and specifications as well as to the quality of building materials proposed for the construction of the housing project.
- The contractor and the proponent should ensure that there's regular monitoring program of environmental and occupational health and safety issues in order to safeguard the health safety of the environment and workers on site.
- The contractor shall comply to all relevant environmental, occupational health and safety and labour laws and building codes

REFERENCES

1. Munishinge Mohan1993: Environmental Economics and Sustainable development. The World Bank washing DC

2. Ojany F. F and Ogendo R B 1985: Kenya. A study of physical and human geography. Longman, Kenya.

3. GOK 2016: Water Act 2016. Kenya Gazette supplements no. 164 (Acts No 43) Nairobi, 2016

4. GOK 2019: Energy Act 2019. Kenya Gazette supplements no. 29 (Acts No. 1) Nairobi, 2019

5. James Win penny 1994: Managing Water as an Economic Resource- Rout ledge, London

6. GOK 1986: Sessional Paper No. 1 of 1986 on development prospects and policies, Government Printers

7. GOK 1999: Sessional Paper No 6 of 1999 on Environmental and Development.

8. GOK 1999: Environmental Management and Coordination Act (EMCA) 1999.

9. Good land, R., Mercier, J.R., and Shimwayi M (EdS) 1995. Environmental Assessment in Africa. World Bank Commitment.

10. Kenya National Bureau of Statistics (2019). The 2019 Kenya Population and Housing Census. Counting our people for the implementation of Vision 2030. Volume II: Population Distribution by Administrative Units. Government Printer, Nairobi.

11. E.P. Saggerson (1991:98). Geology of the Nairobi Area. Mines & Geological Dept., Nairobi

12. Nairobi City County (2018). Nairobi County Intergrated Development Plan (CIDP) 2018-2022

13. Canadian Centre for Occupational Health and Safety https://www.ccohs.ca/oshanswers/hsprograms/housekeeping/cklstcon.html