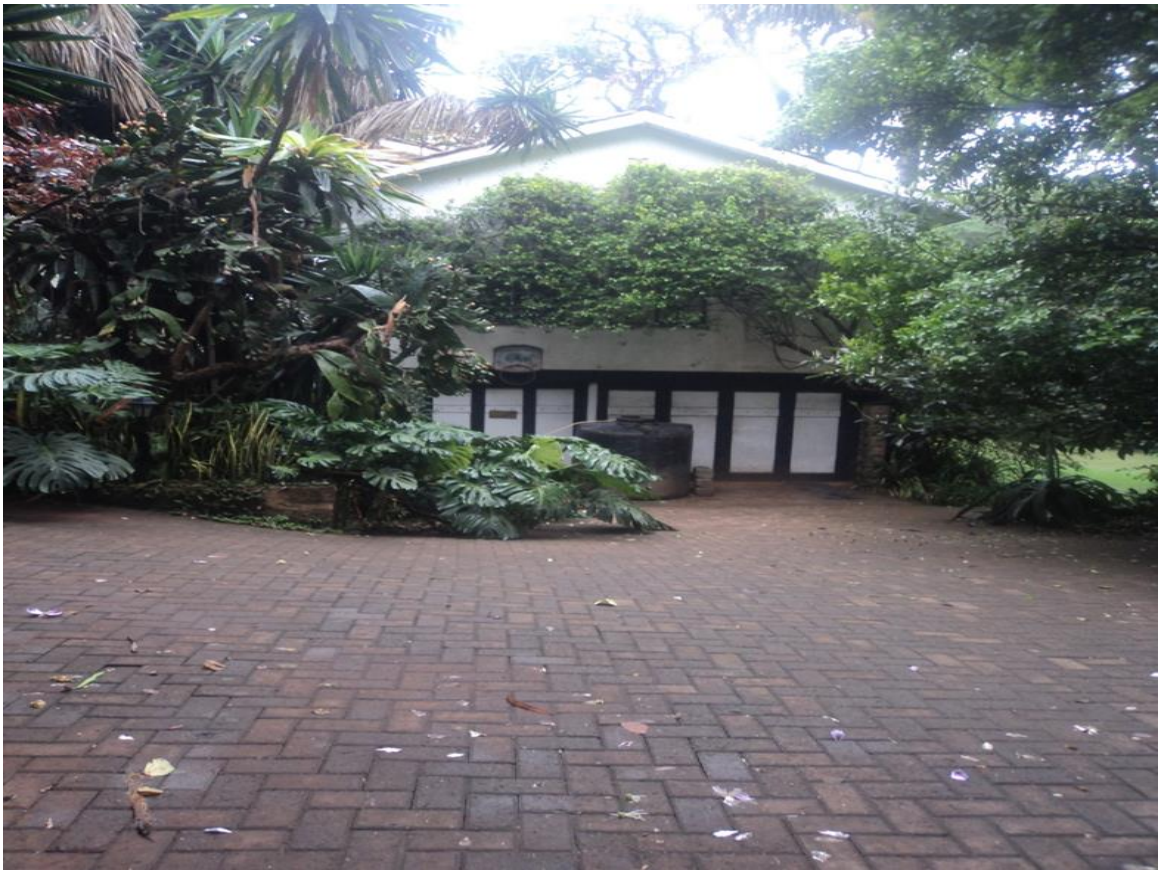
ENVIRONMENTAL IMPACT ASSESSMENT

STUDY REPORT

FOR

PROPOSED RETAIL AND OFFICES ON PLOT L.R. NO. 209/4907 ALONG RIVERSIDE DRIVE IN RIVERSIDE AREA OF NAIROBI CITY COUNTY.



This Environmental Impact Assessment (EIA) Study Report is submitted to the National Environment Management Authority (NEMA) in conformity with the requirements of the Environmental Management and Coordination Act, Cap 387 and the Environmental (Impact Assessment and Audit) Regulations, 2003

Project Proponent:

Tillmann Wolfgang Proske,

P.O. Box 56038 – 00200,

Nairobi.

The following expert(s) conducted the assessment and prepared this Report

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Signed: …… Date: ……

Name: ……

Designation: ……

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ACRONYMS

AP	Affected Persons
CCTV	Closed-circuit Television
CPP	Consultations and Public Participation
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
ERC	Electricity Regulatory Commission
Ha	Hectares
KPLC	Kenya Power and Lighting Company
L. R. No.	Land Reference Number
NCA	Nairobi Construction Authority
NCC	Nairobi City County
NCWSCo	Nairobi City Water & Sewerage Company
NEAP	National Environment Action Plan
NEMA	National Environmental Management Authority
NET	National Environmental Tribunal
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
SDG	Sustainable Development Goals
TOR	Terms of Reference
°C	Degrees Celsius

EXECUTIVE SUMMARY

Introduction

The need to pursue sustainable development guided by environmental, social, cultural and ethical considerations has been accorded high priority worldwide. Due to numerous environmental challenges, resulting from unsustainable implementation of development programs and projects, the Kenyan government harmonized environmental laws under the Environmental Management and Coordination Act (EMCA), Cap 387, for the purposes of coordinating environmental management efforts in a bid to conserve the environment for the current and future generations. It is in pursuit of this piece of legislation that the project proponent, *Tillmann Wolfgang Proske*, commissioned the environmental experts to carry out the EIA for the proposed retail and offices development and prepare an EIA study. The proposed project entails the **construction of two blocks of twelve floors comprising retail and office spaces** located along Riverside Gardens in Riverside Area of Westlands Sub County of Nairobi City County.

Scope

The study covered the physical extent of the project site and its immediate environs, documenting the baseline data, legal and regulatory frame work relevant to the project, analysis of the project alternatives, assess the environmental impacts and develop feasible mitigation measures for negative impacts including designing Environmental Management and Monitoring Plan (EMP) for the project.

The objective of the project

The objectives of the proposed development are:

i. To construct **15,227m^2 retail and office spaces** in riverside area.
ii. To put the current land into more productive and economic use while conserving the environment.
iii. To meet the economic desires of the proponent.

The objectives of undertaking the EIA were to:

i. To identify potential environmental impacts of proposed project and assess the significance of these impacts.
ii. To assess the relative importance of the various project alternatives.

iii. To propose mitigation measures for the significant negative impacts of the project on the environment.

iv. To seek the views and concerns of all the Project Affected Persons (PAPs) in regards to the proposed project.

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

vi. To develop comprehensive Environmental Management Plan (EMP) for the project cycle with mechanisms for monitoring and evaluating the compliance and environmental performance which shall include the cost of mitigation measures and the time frame of implementing the measures.

vii. To present the results of the EIA in such a way that they can guide informed decision making.

Methodology

The methodology of this study included: mobilization and planning, desk review of documents, field visits to the project area to collect baseline data; project data synthesis; public consultation and participation. A number of stakeholders were consulted for their inputs to the study through public meeting (baraza), key informant interviews and completion of qualitative questionnaires.

Environmental Impacts and Mitigation Measures

The potential negative environmental impacts of the proposed project and possible mitigation measures are summarized below:

Possible Impact	**Mitigation Measures**
Traffic congestion	▪ Employ traffic marshals to control traffic in and out of site ▪ Ferry building materials during off-peak hours ▪ Provide traffic control signs at the site/entrance to notify motorists and general public about the development ▪ Enforce speed limits for construction vehicles especially along the roads leading to the site ▪ Ensure that the vehicles comply with axle load limits ▪ Provide an entry and exit point for motorized traffic to ease movement
Increased water demand	▪ Sink a borehole to supplement the existing source of water. ▪ The contractor shall use water bowsers and tankers from external sources.

	▪ Encourage re-use of water where possible during construction and operation phase.
Storm water drainage	▪ Leveling of the site to reduce pooling of water ▪ Semi permeable materials shall be used for construction of pavements. ▪ Landscaping on the open areas shall be done to promote efficient management of storm water runoff.
Air Pollution	▪ Screening of the construction site to contain and arrest construction-related dust. ▪ Dust suppression with water-sprays during the construction phase on dusty areas. ▪ Exposed stockpiles of e.g. sand, shall be covered and watered daily. ▪ Regular and prompt maintenance of construction machinery and equipment to minimize generation of hazardous gases.
Noise and Excessive Vibrations	▪ Construction works shall be carried out between 0800hrs to 1800 hrs. ▪ Provide and enforce use Personal Protective Equipment (PPEs) e.g. earmuffs and helmets during construction. ▪ Monitor Noise and Excessive Vibrations levels especially during excavation as per the regulations
Increased solid waste	▪ Proper disposal of construction waste in the contractor's yard (off the site). ▪ Segregation of waste at the source ▪ Provision of waste management rooms as collection points within the site ▪ Engage the services of NEMA registered waste collector to dispose the waste at designated areas ▪ Use of an integrated solid waste management system; through a hierarchy of options: source reduction, recycling, composting and reuse.
Increased liquid waste	▪ Conduct routine inspection and monitoring of the internal sewer system to identify leakages and blockages. ▪ All waste pipes shall have rodding eyes accessible from outside for inspection, cleaning and repair. ▪ As provided for by the Building Code, sanitary facilities shall be provided on site to be used by construction workers ▪ Proper decommissioning of the sanitary facilities after construction

Conclusion and Recommendations

The project will provide quality office spaces and retail facilities in the area, create employment opportunities and increase the national and county governments' tax revenues. However, major concerns should be focused towards minimizing the occurrence of impacts that would degrade the general environment. To greatly work in synchrony with the environment and stakeholders in order to ensure its sustainability, the proponent shall proceed with careful consideration of the prescribed mitigation measures through close follow-up and implementation of the recommended Environmental Management and Monitoring Plans.

It is hereby recommended that the project be granted the required EIA license so as to implement the project.

CHAPTER ONE: INTRODUCTION

1.1 General Overview

In the recent decade, Nairobi has experienced a boom in urban development curtailed by the construction of numerous infrastructure projects encompassing residential and housing projects, commercial and industrial establishments, recreational facilities, and other amenities. These have all been in support or service to the growing population in the city and also economic development in both macro and micro scales. In light of these prevailing circumstances, the Proponent *Tillmann Wolfgang Proske* has **proposed to construct retail and office spaces** comprising of 15,227 m^2 retail and office spaces, 314 parking bays and other auxiliary facilities on plot LR No. 209/4907 located along Riverside Drive on latitude 1°16'8.04''S and longitude 36°47'21.38''E in Riverside area of Westlands Sub County, Nairobi City County.

1.2 Objectives of the EIA

Environmental Impact Assessment (EIA) is a process having the ultimate objective of providing decision makers with an indication of the likely environmental consequences of a proposed activity. The main objectives of this EIA therefore include the following:

i. To identify and evaluate the significant environmental impacts of the project.
ii. To identify and analyze the various alternatives on the project.
iii. To propose mitigation measures for the significant negative impacts of the project on the environment.
iv. To generate baseline data for monitoring and evaluating impacts, including mitigation measures during the project cycle.
v. To seek the views and concerns of all the affected persons with regards to the proposed project and incorporate them in decision making.
vi. To highlight environment issues with a view to guiding policy makers, planners, stake holders and government agencies to make environmentally and economically sustainable decisions.
vii. Prepare a practicable and effective Environmental Management and Monitoring Plan (EMMP) compliant with the Environmental Management and Coordination Act, CAP 387.

1.3 Terms of Reference (TOR)

The following are the Terms of Reference as developed after a scoping exercise was carried out for the proposed project in order to identify the significant factors to be considered while carrying out the project. During the exercise, terms of reference (TOR) were developed and submitted to the authority on 26th October 2018 in line with section 11 of the EIA Regulations and approved *(Attached is the TOR approval letter).*

These included:

i. Carrying out assessment and description of site/location, objectives, scope, nature of the proposed project,
ii. Carrying out analysis of the proposed project activities during the proposed project cycle; construction, operation and decommissioning phases,
iii. Establishing the suitability of the proposed project in the proposed location,
iv. Reviewing and establishing all relevant baseline information (Physical, Biological, Social Cultural and Economic) and identify any information gaps,
v. Description and analysis of policy, legal and institutional framework including but not limited to policies, laws, regulations and guidelines which have a direct bearing on the proposed project and will also serve as benchmarks for monitoring and evaluation, and future environmental audits,
vi. Do an in-depth description of the proposed project and associated works together with the requirements for carrying out the works,
vii. Analyze the efficacy of the designs, technology, procedures and processes to be used, in the implementation of the works,
viii. Carry out Consultation and Public Participation (CPP): Identify key stakeholders and Project Affected Persons (PAPs); hold a public meeting and collect written evidence, that is, minutes, questionnaires and photographs,
ix. Identify and analyze proposed project alternatives including but not limited to no project option, proposed project option, alternative design and alternative materials and technologies,
x. Identify, predict and carry out in-depth analysis of all actual potential and significant impacts on flora, fauna, soils, air, water, the social, cultural and community settings

including the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated to be generated by the proposed project, both positive and negative throughout the project cycle and recommend sufficient feasible mitigation measures for all the potential negative impacts identified,

xi. Analyze materials to be used in the construction and implementation of the project and wastes to be generated proposing alternative/appropriate options/technologies,

xii. Analyze occupational health and safety issues associated with the proposed project,

xiii. Develop an Environmental Management and Monitoring Plan (EMP) proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures,

1.4 Methodology

The methodology used for preparation of this EIA report is stated in the steps below:

i. Screening of the project, a process that identified the project as being a **high risk project** requiring an EIA study under schedule 2 of the EMCA, CAP 387, since it is a development that exceeds ten thousand square metres.

ii. A scoping exercise that identified the key issues to be addressed in the assessment.

iii. Documentary review on the nature of the proposed activities, policy and legal framework, environmental setting of the area and other available relevant data/information,

iv. Public participation and discussions with the local community, proponent and the project team regarding the proposed project,

v. Physical evaluation of the project site and the surrounding areas using a pre-prepared checklist with specific focus on environmental and human safety issues that are likely to be affected,

vi. Reviewing the proposed project designs and implementation plan/schedules with a view to suggesting suitable alternatives,

vii. Developing an EMP outline with responsibilities, schedules, monitorable indicators and time frames among other aspects,

viii. A comprehensive report including issues as listed in the Environmental (Impact Assessment) Regulations 2003.

The data used for developing the EIA can be categorized into two, primary and secondary data, as tabulated below;

Table 1

Type of data	***Source of data***
Secondary data	Published books, official government documents and statutes, plans, reports and documentation from members of the project team.
Primary data	Formal/informal interviews, field observations, pictures, questionnaires, views from resident attendees during the public meeting and inputs from the project team

1.5 Justification of the project

1.5.1 Adjacent Land use analysis

High economic growth and increased population in Nairobi has led to rapid increase in demand for office spaces. Riverside area is known to be home to a number of institutions, commercial and mixed use developments that require working spaces for their staff members. The needs of these people can only be taken care of through the construction of facilities, such as the proposed project.

Notable similar developments in the area include the Embassy of Chile, Ugandan Embassy and Allianz Plaza. Therefore, the proposed development will be in conformity with the current land uses.

1.6.2 Size of the plot

At 0.3452 hectares, the plot is large enough to accommodate the proposed development while adhering to the planning standards and policies provided by the County Government.

1.6.3 Neighborhood Development Trend

The neighborhood is currently undergoing urban transformation, with the previous residential land being replaced by mixed use developments such as apartments, commercial and institutions. The proposed development will therefore be in conformity with this trend which will ensure better utilization of the land giving it more and higher quality and urban character as well as increase its profitability.

1.6.4 Socio-Economic Benefits

There will be numerous benefits attributed to the proposed development. Some of the benefits will include provision of retail and modern office spaces, direct and indirect employment opportunities, market for goods and services throughout the project cycle, increased national and county governments tax revenues, enhanced overall competitiveness of this area hence more development and growth, increased property value, increased income for the proponent and increased security in the area.

CHAPTER TWO: PROJECT DESCRIPTION, DESIGN AND IMPLEMENTATION

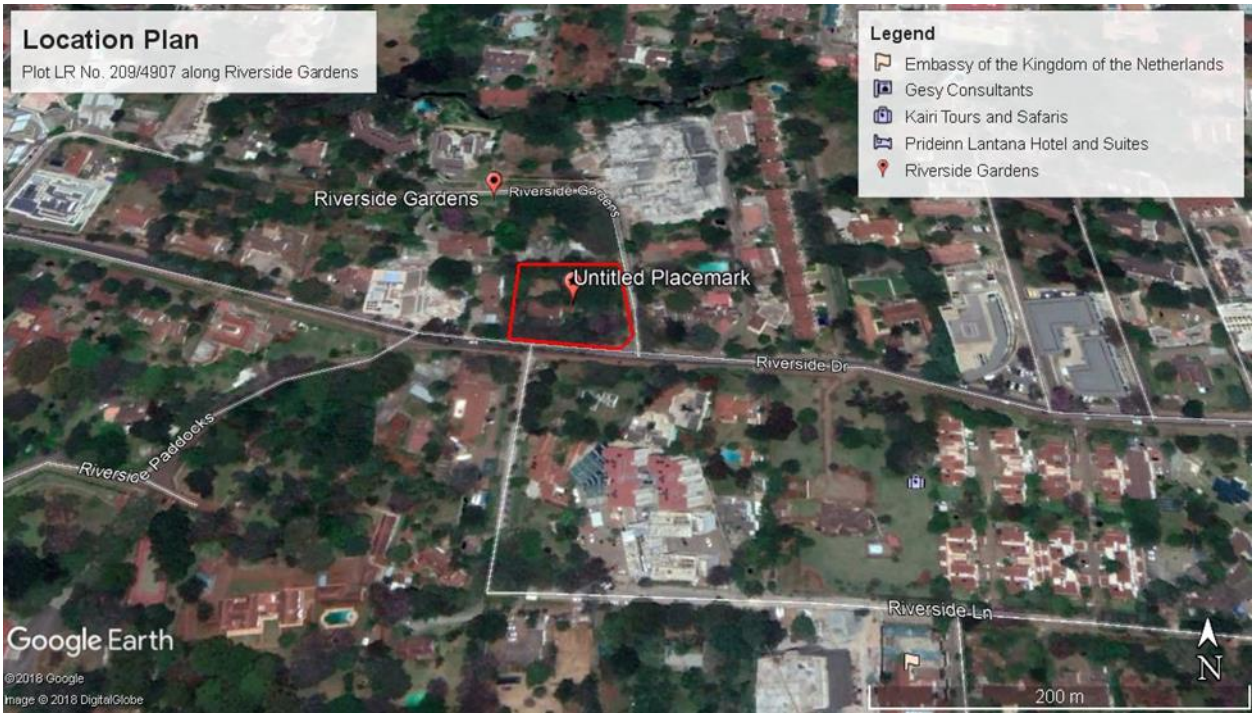
2.1 Nature of the Project

The proponent, *Tilmann Wolfgang Proske,* is proposing to construct two blocks of twelve floors on LR No. 209/4907 comprising of 15,227 m^2 retail and office spaces, 314 parking bays and other auxiliary facilities. The existing house on the site will be demolished to pave way for the proposed project. The proposed development aims at providing quality retail and office spaces and increase the utility of the land in the area.

2.2 Project Location and Size

The proposed project site is located **along Riverside Gardens off Riverside Drive** approximately 200m from the Embassy of Chile**,** on latitude 1°16'8.04''S and longitude 36°47'21.38''E in Riverside Area of Westlands Sub County, Nairobi City County. The parcel of land to be developed measures approximately **0.3452Ha** *(Attached is copy of the ownership documents).*

Plate 1: Site Location



Source: Google Earth, 2018

2.3 Land Tenure, Use, Ownership and Management

The parcel of land on which the subject development is proposed is held on leasehold interest for 99 years from 04/11/1953. The certificate of title is drawn under The Registration of Titles Ordinance (Chapter 160) as Plot L.R. No. 209/4907 and the current registered proprietor is *Tillman Wolfgang Proske* (Post Office Box Number 56038 – 00200 Nairobi) who is hereby seeking the EIA License for the proposed project *(See attached the ownership document).*

According to the Nairobi City Development Ordinances and Zones Guidelines, the area is in Zone 4 which allows Commercial/Residential (High-rise Flats). The proponent applied for a change of use from residential to offices and provision stores, and the approval has been granted by the County Government *(Attached is the change of use approval).*

Therefore, the proposed project is in line with the zoning ordinances of the area.

2.4 Project Description

The project proponent proposes to construct two retail and office blocks on the aforementioned land comprising of 15,227 m^2 retail and office spaces, 314 parking bays and other auxiliary facilities as described below:

i. **Basement 1** comprising of 41 retail parking bays, 4 service rooms, 2 stores and a service yard
ii. **Basement 2** comprising of 56 office parking bays, generator room and electrical services, 5 service rooms and security room
iii. **Basement 3** comprising of 72 office parking bays and service room
iv. **Basement 4** comprising of 72 office parking bays and service room
v. **Basement 5** comprising of 73 office parking bays, pump room, water tank and service room
vi. **Ground floor level** comprising of coffee shop, retail area, 2 stores and 23 retail parking bays
vii. **1st floor level** comprising of facilities area and coffee area
viii. **2nd floor level** comprising of office spaces
ix. **3rd floor level** comprising of office spaces
x. **Typical 4th and 5th floor levels** comprising of office spaces
xi. **Typical 6th and 9th floor levels** comprising of 10 office suites
xii. **10th floor level** comprising of office spaces and a terrace

xiii. **11th floor level** comprising of office spaces

xiv. **12th floor level** comprising of office spaces and a covered walkway

Other salient features include 2 staircases, 4 lift lobbies, passage lift, goods hoist, washrooms and gardens. More fine details, specifications and features of the proposed project can be obtained from the drawings (*Attached are architectural drawings*).

2.5 Construction Inputs

The project inputs will include the following:

i. The materials that shall be used will include stones, cement, sand, crushed rock (gravel/ballast), ceramic fixtures, reinforcement bars, wood/timber, glass, painting materials, plastic, electrical and mechanical fixtures. All these materials shall be obtained from licensed dealers who have complied with the environmental management guidelines and policies and approved by Kenya Bureau of Standards (KBS).

ii. Several machines shall be used which will include earth moving equipment (excavators, loaders, wheel loading shovels and backhoe), material handling equipment (cranes and hoists), construction equipment (concrete mixers and vibrators) and Engineering vehicles (trailers, tippers and dumpers).

iii. The project will require a labour force of both skilled and non-skilled workers. The skilled personnel will include the project consultants (architects, engineers, quantity surveyors and environmental experts) and the contractor with a team of foreman, masons, plasterers, carpenters, plumbers, welders, electricians, glaziers, painters and casual labourers.

iv. Other construction inputs will include water and electricity from the main grid or provided by generators

2.6 Construction Activities

2.6.1 Pre-construction Phase

i. Seeking of the appropriate approvals from the relevant authorities such as change of land user, demolition, hoarding and excavation permits.

ii. Preparation of the preliminary architectural designs for the proposed project and submission to the County Government for approval.

iii. Conducting a preliminary geotechnical exploration investigation for the project.

iv. Appraisal of baseline conditions to determine supply and demand for required infrastructural services.

v. Conducting an EIA and submission of the Study Report to NEMA for licensing.

2.6.2 Construction phase

i. Demolition

The existing house shall then be demolished to pave way for the proposed development. Application for demolition permits shall be presented to the relevant authorities such as NCC before commencing the demolition exercise. A registered private contractor shall be engaged to carry out the demolition. The exercise shall be limited to day time only and all personnel working on the project shall be provided with PPEs such as helmets and dust masks. The demolition debris shall be disposed of to designated areas by a registered NEMA waste handler.

ii. Sourcing and Transportation of Building Materials

Building materials will be transported to the project site from their extraction, manufacture, or storage sites using trucks. The building materials to be used in construction of the project will be sourced from Nairobi and neighboring areas. Greater emphasis will be laid on procurement of building materials from within the local area, which will make both economic and environmental sense as it will reduce negative impacts of transportation of the materials to the project site through reduced distance of travel by the materials transport vehicles.

iii. Clearance of Vegetation

The site is characterized by vegetation cover which includes grass, shrubs, hedges and trees. The vegetation will be cleared through cutting down of trees, grass, bushes, hedges, under growth, grub up roots and remove tree stumps to pave way for the proposed development. However, the proponent will ensure that the trees along the edge of the property shall be preserved. The proponent shall also ensure as many indigenous trees as possible are used for re-vegetation as well as obtaining the necessary prerequisite permits and licenses before clearing the vegetation.

iv. Storage of Materials

Building materials will be stored on site. Bulky materials such as building stones, ballast, sand and steel will be carefully piled on site. To avoid piling large quantities of materials on site, the proponent will order bulky materials such as sand, gravel and stones to the site in accordance to the demand at any particular time. Materials such as cement, paints and glasses among others

will be stored in temporary storage structures, which will be constructed within the project site for this purpose.

v. Excavation and Foundation Works

Excavation will be carried out to prepare the site for construction of foundations, basements, pavements and drainage systems. This will involve the use of heavy earthmoving machinery such as excavators, tractors and bulldozers.

vi. Masonry, Concrete Work and Related Activities

The construction of the foundations, building walls, floors, pavements, drainage systems and parking area among other components of the project will involve a lot of masonry work and related activities. General masonry and related activities will include construction of foundations, superstructure construction, concrete mixing, stone shaping, plastering and erection of building walls and curing of fresh concrete surfaces. These activities are known to be labor intensive and will be supplemented by machinery such as concrete mixers.

vii. Structural Steel Works

The building will be reinforced with structural steel for structural stability. Structural steel works will involve steel cutting, welding and fixing.

viii. Electrical and Mechanical Works

Electrical and mechanical works shall be done by qualified technicians under the supervision of the Project Engineer and shall follow the set standards. During construction activities will include installation of electrical fixtures, devices and appliances including electrical cables, lighting apparatus, sockets etc. In addition, there will be other activities involving the use of electricity such as welding and metal cutting.

The mechanical works will include and not limited to the following:

i. Plumbing and drainage
ii. Service ducts accessible from all floor levels
iii. Soil vent pipes (SVP) provided on doors and windows
iv. Storm drains pipes
v. Inspection chamber covers and framing
vi. Underground foul and waste drain pipes

vii. Landscaping

To improve the aesthetic value or visual quality of the site once construction ceases, the proponent will carry out landscaping. This will include establishment of lush grass lawns and planters on balconies and decks and will involve replenishment of the topsoil. It is noteworthy that the proponent will use plant species that are available locally preferably indigenous ones for landscaping.

2.6.3 Project's Operational Phase

i. Office spaces

Some of the activities that will be carried out include filing of documents, communication through emails, installation of office machines and equipment, meeting areas/boardrooms and consultancy services.

ii. Retail Shops

Some activities will include social interaction and entertainment in the coffee shops and meetings in small groups. The retail spaces will bring services closer to people living in the neighborhood as well as the occupants of the new development.

iii. General Cleaning

This will involve regular washing and cleaning of the retail and office spaces, common areas, pavements and other public areas.

iv. General Repairs and Maintenance

The retail and office spaces and auxiliary facilities will be repaired and maintained regularly during the operational phase of the project. Such activities will include repair of building walls and floors, repairs and maintenance of electrical gadgets and equipment, repairs of leaking water pipes, repairs of refrigeration equipment, painting, maintenance of flower gardens and grass lawns, and replacement of worn out materials among others.

2.6.4 Description of the Project's Decommissioning Activities

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

i. Dismantling of all equipment including electrical and mechanical installations
ii. Remove all underground facilities from the site
iii. The site should be well landscaped by flattening the mounds of soil
iv. Planting vegetation which may include indigenous trees and flowers
v. Fence and signpost unsafe areas until natural stabilization occurs
vi. Backfill surface openings

2.7 Construction Products, By Products and Wastes

2.7.1 Products

The final product will be **15,227m^2 retail and office spaces, 314 parking bays** and other auxiliary facilities.

2.7.2 By-Products

The by-products will be disposed-off as follows:

i. The soil generated during excavation will be reused (if applicable) elsewhere in the project. Unusable soil will be transported for disposal at designated dumping sites by NEMA licensed waste handlers.
ii. Large pieces of timber/wood generated during the construction phase will be transported back to the contractor's yard for reuse in future while the small pieces of timber/wood will be disposed-off for use as fuel for cooking and heating.
iii. Empty cans and drums will be used to store water during construction. The damaged ones will be disposed-off to registered scrap metal and plastic waste dealers.
iv. Excess sand, ballast and stock piles shall be stored properly since they would come in handy in for future construction activities such as renovations. Upon completion of the project, these will be moved by the contractor to a suitable yard.

2.7.3 Wastes

The solid waste generated during construction will include construction and demolition debris, sanitary waste, excavated soil and rocks. The other wastes that are likely to be generated during operation are solid waste such as paper, plastics, cans, glasses, metallic pieces, organic waste and E-wastes.

The liquid waste generated throughout the project cycle will be conveyed to the Waste Water Treatment Plant (WWTP) before being channeled towards the trunk sewer system. The treatment of the liquid waste at the site reduces the waste load channeled to the trunk sewer system and

hence alleviates the risk of overloading the trunk sewer system. These wastes will be disposed by the proponent in accordance with the standards and documented procedures stipulated in the EMCA Waste Management Regulations of 2006.

2.8 Project Budget and Duration

The proposed project is estimated to cost **one billion three hundred thirty million Kenyan shillings** (KShs 1, 330, 000, 000). The project implementation works is estimated to take 2 years to completion.

CHAPTER THREE: BASELINE INFORMATION

3.1 PHYSICAL ENVIRONMENT

3.1.1 Climate

The area just like many parts in Nairobi experiences a fairly cool climate resulting from its high altitude. Temperature ranges from a low of 10°C to a high of 29°C. It has a bi-modal rainfall pattern. The long rains season fall between March and May with a mean rainfall of 899 millimeters (mm) while the short rains season fall between October and December with a mean rainfall of 638 mm. The mean annual rainfall is 786.5 mm (Nairobi County Integrated Development Plan, 2014).

3.1.2 Topography

The site lies at an altitude of about 1700m above sea-level and is sloping towards the northern part of the property. It drains its storm water in the open drains constructed within the compound that eventually lead to the public drains along Riverside gardens.

3.1.3 Geology and Soils

The soil type in the project area is primarily red volcanic in nature which is well drained and easy to work on during construction. The excavated soils shall be reused onsite or transported to a designated place for reuse in other projects

3.1.4 Water Resources and Wetlands

There is no river or stream bordering the property. The closest water source is Nairobi River which is about 250 m away from the site.

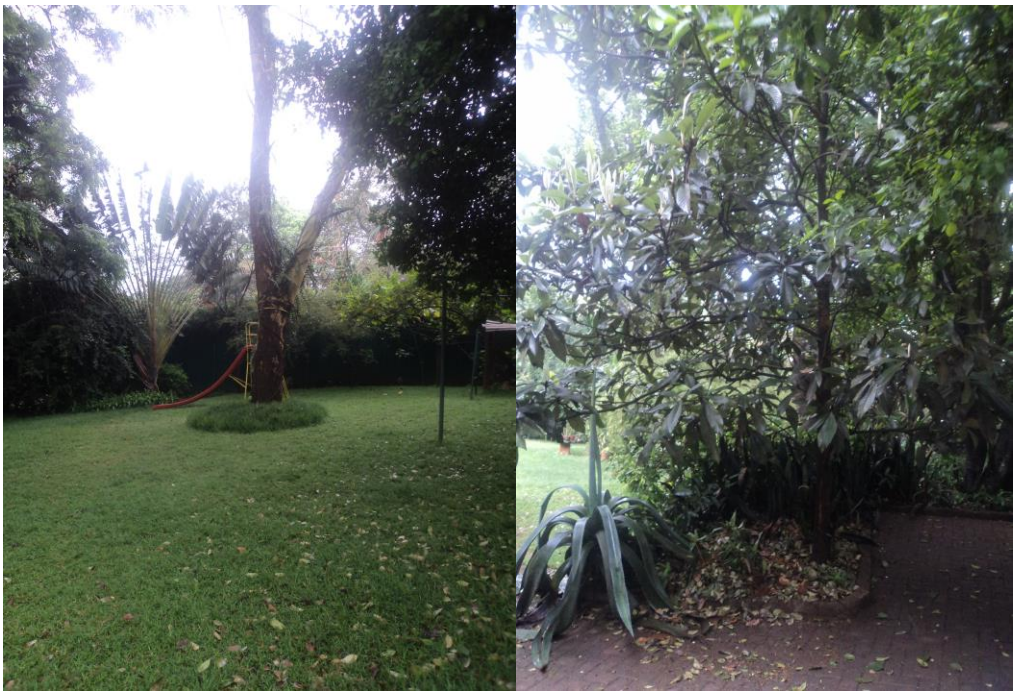
3.2 BIOLOGICAL ENVIRONMENT

This section describes key biological elements, including the identification and distribution of dominant, rare and the unique flora and faunal species within the proposed project site and other potentially affected areas.

3.2.1 Flora

The site is generally characterized by grass, thickets and trees within and along the plot boundaries. The trees will be cut to pave way for the proposed development and measures will be taken to replant, observing the necessary relevant policies. The developer will seek tree cutting permit from relevant authorities before carrying out the exercise.

Plate 2; Vegetation cover within the site



Source: Field Survey 29/10/2018

3.2.2 Fauna

The project site is situated within a commercial/residential zone where human activities have altered the natural habitat for animals over the years. The property is characterized by few bird species. None of the faunal species observed are rare or endangered.

3.3 SOCIO-ECONOMIC ENVIRONMENT

3.3.1 Land Use

The neighborhood is generally characterized by a mix of different uses. Initially, Riverside was a residential area with a mixture of middle and low density housing. Although most of the developments have been low density residential areas, the trend appears to be changing with developers constructing multiple story buildings for commercial and residential purposes. These developments include office blocks such as Office Park Riverside, commercial buildings such Chase Bank Headquarters and Apartment blocks such as the upcoming duplex apartments along Riverside Gardens. The project will therefore be in character with other developments in the area.

Plate 3: Upcoming development in the neighborhood

Source; Field Survey 29/10/2018

3.3.2 Educational Institutions

The area also has seen an increasing number of other developments, such as educational facilities, institutions, religious institutions and the general commerce sector. This is due to the increased demand arising from the incoming population.

The educational facilities found in the area include; Consolata School, University of Nairobi - Chiromo Campus, Strathmore School and St. Austin's Academy, just to mention a few.

3.3.3 Commercial Activities

These activities are mainly concentrated along the Riverside drive and some of these include banking and insurance companies (Chase Bank and East Africa Insurance Company), corporate offices and suites such as the Chile Embassy and Australian High Commission Residence, supermarkets and shops. The area is also ideal for recreation activities and leisure due to the presence of plazas and malls such as the ABC place.

3.3.4 Security

Security in the area is provided by the nearby Muthangari and Kileleshwa Police Stations which are located approximately 3 kilometers from the site. There are security lights along Riverside Drive and Riverside gardens to enhance security in the area. However, the proponent will beef

up security by employing guards 24 hours and installation of CCTV cameras at strategic points within the new premises.

3.3.5 Religious Institutions

Religious institutions in the neighbourhood include such as Parklands Baptist Church, St. Jude Catholic Church, Consolata Shrine and mosques such as Masjid Ibrahim Kileleshwa Mosque and Westlands Mosque.

3.3.6 Health facilities

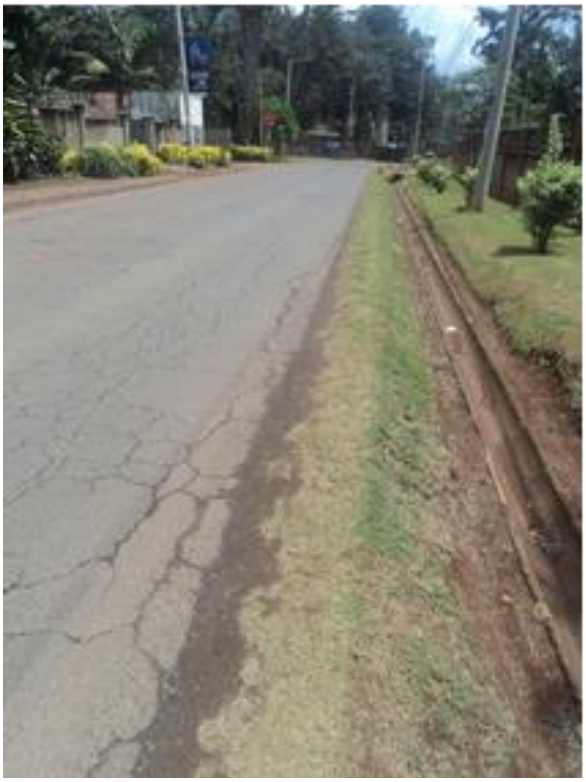
The health facilities located closest to the project site are AIC Kijabe Hospital Nairobi Clinic, Mater Misericordia Hospital Westlands and Bliss Medical Centre Westlands.

3.4 INFRASTRUCTURE

3.4.1 Roads and accessibility

The proposed project‘s site is located in an area served with good road network such as riverside gardens which feeds to riverside drive. The accessibility of the site will be instrumental during project implementation process and occupation phase

Plate 4: Access Road to site (Riverside Drive)



Source: Field Survey 29/10/2018

3.4.2 Water supply

The general area is served with water supplied by Nairobi City Water and Sewerage Company (NCWSCo). The developer intends to connect to the new development to the main water supplier as well. In addition, a borehole will be sunk on the site to supply water and supplement the existing source. During construction the proponent will make arrangements with water bowsers to provide water.

3.4.3 Sewer System

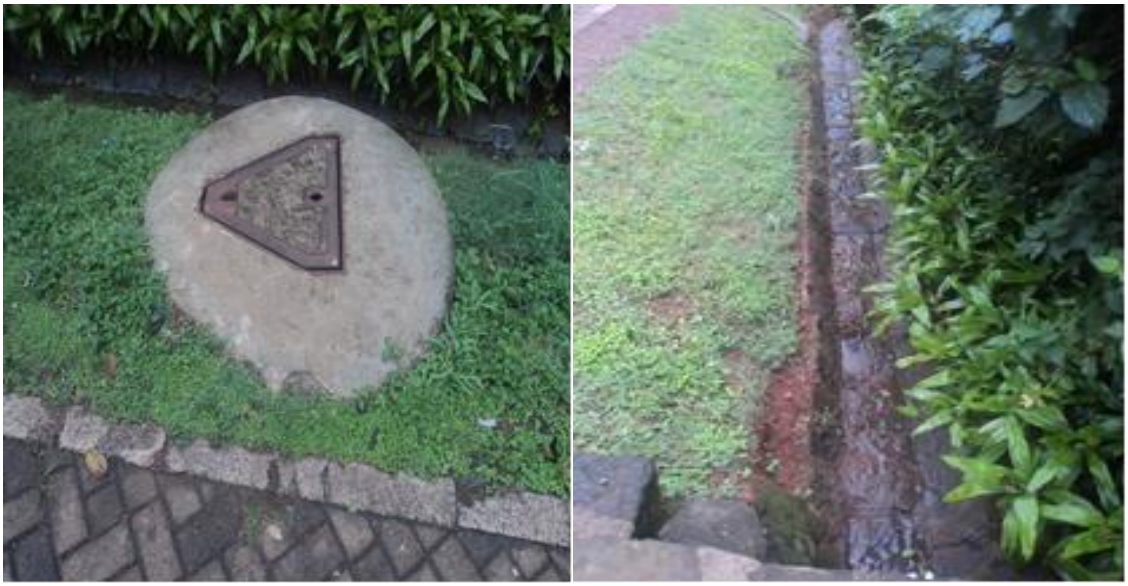
The area is served with public sewerage system of NCWSCo. The proponent therefore intends to connect to the trunk sewer for sewerage disposal. The internal sewer system of the proposed project will be suitably designed to collect all effluent/waste water from the development. All sanitary installations, fixtures and fittings will be done to the entire satisfaction of County government Public Health Office and Ministry of Health.

3.4.4 Storm water Drainage

Increased surface run-off is anticipated from roof catchments of building structure; drive way and parking. In connection to this, the volume of water reaching the drain system will greatly reduce by installing rain water harvesting facilities in the development

The surface water/run-off will mainly be directed to the open drains constructed within the compound that will eventually drain to the public open drains.

Plate 5: Manhole and storm water drains serving the site



Source: Field survey 29/10/2018

3.4.5 Solid Waste Management

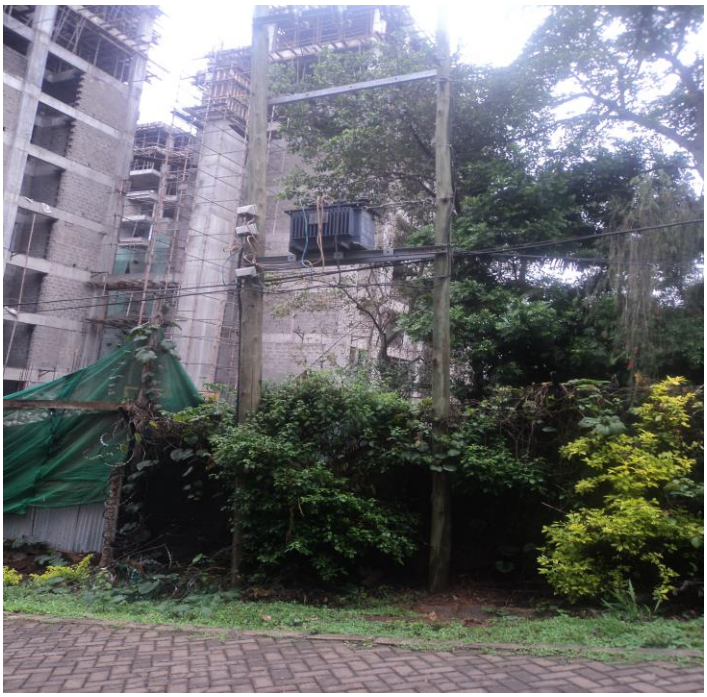
It is anticipated that a development of this nature produces a significant amount of solid wastes throughout its lifecycle .The wastes from the existing developments in the area are collected by a private waste handler twice every week and disposed of at a designated dumping site. The proponent shall device a waste management system that will focus on waste reduction, reuse and recycling in order to conserve the environment.

Dustbins will be provided for each floor and in common areas and protected from rain and animals. The solid wastes from the blocks shall then be assembled at the garbage collection point ready for disposal by a NEMA licensed waste disposal company.

3.4.6 Electricity

The site is already connected to electricity from the National grid. Upon completion of construction, the proponent will extend the connection to the new development upon acquiring relevant permits.

Plate 6: KPLC Transformer serving the site



Source: Field Survey 29/10/2018

3.4.7 Communication

The area is well covered by communication facilities such as Safaricom, Airtel, Telkom, among others. All these will facilitate communication during the project cycle.

CHAPTER FOUR: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

4.1 Introduction

EIA is an instrument for environmental management and development control. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound. It is a condition that all developers conduct EIAs on the development projects.

EIAs are carried out in order to identify potential positive and negative impacts associated with the proposed development with a view of taking advantage of the positive impacts and developing mitigation measures for the negative ones. The guidelines on EIAs are contained in section 58 to 67 of the Act. According to section 68 of the EMCA CAP 387, the authority shall be responsible for carrying out environmental audits on all activities that are likely to have a significant effect on the environment.

There are a number of policies, laws and regulations that govern the protection, conservation and exploitation of the natural resources coupled with provisions for environmental management. These national policies, laws and regulations cover infrastructure, water, agriculture, forestry and health just to mention a few. The national environment action plan documents cover policy directions regarding integration of environmental concerns including EIA into development planning process.

Some of the key national laws, policies and regulations that govern the management of environmental resources in the country are discussed herein.

4.2 Relevant National Policies

The following national policies are of relevance to the proposed project:

4.2.1 The National Environmental Action Plan (NEAP)

The NEAP was a deliberate policy effort to integrate environmental considerations into the country's economic and social development initiatives/plans. The integration process was to be achieved through a multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and conservation of natural resources are an integral part of societal decision making. As a result of its adoption and implementation, establishment of appropriate policies and legal guidelines as well as harmonization of the existing ones have been accomplished and/or are in the process of development. Under the NEAP process, EIAs were

introduced targeting the industrialists, business community and local authorities (now the county governments).

The project shall be implemented and operated based on these guidelines

4.2.2 National Policy on Water Resources Management and Development (1999)

While the National Policy on water resources management and development (1999) enhances a systematic development of water facilities in all sectors for promotion of the country's socio-economic progress, it also recognizes the by-products of this process as wastewater. It therefore calls for development of appropriate sanitation systems to protect people's health and water resources from institutional pollution. This implies that Industrial and business development activities should be accompanied by corresponding waste management systems to handle the waste water and other waste emanating there from. The same policy also requires that such projects undergo comprehensive EIAs that will provide suitable measures to be taken to ensure environmental resources and people's health in the immediate neighborhood and further downstream are not negatively impacted by the emissions.

4.2.3 Sustainable Development Goals (SDG's)

On September 25th 2015, countries adopted the United Nations Sustainable Development Goals (SDG's) aimed at contributing towards ending poverty, protecting the planet, and ensuring prosperity for all as part of a new sustainable development agenda. The SDG's have very significant implications for investment needs and the role of the public sector is fundamental and pivotal. At the same time the contribution of the private sector is indispensable.

The proponent has committed to the SDG's through the proposed development in the following ways:

Goal 8 – Decent work and economic growth

Targets achieved:

i. Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors by providing conducive working environments.
ii. Employment creation that will contribute to reducing the proportion of youth not in employment.
iii. Providing an environment that emphasizes on protection of labor rights and promotes safe and secure working environments for all workers

Goal 11 – Sustainable cities and communities

Targets achieved:

i. Enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

Goal 7 -Affordable and Clean Energy

Targets achieved:

i. Implementation of an energy management system shall contribute to increased energy efficiency.
ii. Installation of solar panels as a source of renewable energy.

4.3 Legal framework

4.3.1 The Constitution of Kenya 2010

The Constitution of Kenya is the supreme law of the Republic of Kenya and binds all persons and all State organs at all levels of government. It provides the broad framework regulating all existence and development aspects of interest to the people of Kenya, and along which all national and sectorial legislative documents are drawn. In relation to environment, Article 42 of Chapter 4, 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 through legislative measures, particularly those contemplated in Article 69, and to have obligations relating to the environment fulfilled under Article 70.

Chapter 5 of the new constitution provides the main pillars on which the 77 environmental statutes are hinged and covers "Land and Environment" and includes the aforementioned articles 69 and 70. Part 1 of the Chapter dwells on land, outlining the principles informing land policy, land classification as well as land use and property. Part 2 of the Chapter directs focus on the environment and natural resources. It provides for a clear outline of the state's obligation with respect to the environment. The Chapter seeks to eliminate processes & activities likely to endanger the environment.

There are further provisions on enforcement of environmental rights as well as establishment of legislation relating to the environment in accordance to the guidelines provided in this Chapter. In conformity with the Constitution of Kenya 2010, every activity or project undertaken within the Republic of Kenya must be in tandem with the state's vision for the national environment as well as adherence to the right of every individual to a clean and healthy environment. The

proposed development project is a development activity that will utilize sensitive components of the physical and natural resources hence need for a clearly spelt out environmental management plan to curb probable adverse effects to the environment.

The proponent will therefore adhere to the provisions of the Environmental Management and Monitoring Plan provided in this report to ensure the public and employee's right to a clean and safe environment is not infringed.

4.3.2 Environment Management and Coordination Act, EMCA, Cap 387.

In EMCA states in section 3 (1) and (2) that "Every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment and that the entitlement to a clean and healthy environment under subsection (1) includes the access by any person in Kenya to the various public elements or segments of the environment for recreational, educational, health, spiritual and cultural purposes.

Part VI Section 58 (2) of the Act states the proponent of any project specified in the Second Schedule shall undertake a full environmental impact assessment study and submit an EIA Study report to the Authority prior to being issued with the EIA license. Section 58 (5) states that EIA studies and reports required under the Act shall be conducted or prepared respectively by individual experts or a firm of experts authorized in that behalf by the Authority. The Authority shall maintain a register of all individual experts or firms of all experts duly authorized by it to conduct or prepare environmental impact assessment studies and reports respectively. The register shall be a public document and may be inspected at reasonable hours by any person on the payment of a prescribed fee. Subsection (7) further states that EIA shall be conducted in accordance with the EIA regulations, guidelines and procedures issued under this Act.

Section 59 (1) states that upon receipt of an EIA study report from any proponent under section 58(2), the Authority shall cause to be published in the Gazette, in at least two newspapers circulating in the area or proposed area of the project and over radio stating:

(a) a summary description of the project;
(b) the place where the project is to be carried out;
(c) the place where the environmental impact assessment study, evaluation or review report may be inspected; and

(d) a time limit of not exceeding ninety days for the submission of oral or written comments by any member of the public on the environmental impact assessment study, evaluation or review report.

Subsection (2) and (3) of 59 states that the Authority may, on application by any person extend the period stipulated in sub-paragraph (d) so as to afford reasonable opportunity for such person to submit oral or written comments on the EIA report and the Authority shall ensure that its website contains a summary of the report referred to in subsection (1).

The proponent has engaged the services of the environmental experts to conduct the EIA Study Report in line with the provisions of this Act. The environmental experts conducted the EIA in line with the regulations, guidelines and procedures issued under the Act.

4.3.3 The Environmental (Impact Assessment and Audit) Regulations, 2003

These regulations stipulate how an EIA study report should be prepared and specifies all the requirements that must be complied with. It highlights the stages to be followed, information to be made available, role of every stakeholder and rules to be observed during the EIA Study Report making process.

Section 4 (1) states that no proponent shall implement a project likely to have a negative environmental impact or for which an EIA is required under the Act or these Regulations unless an EIA has been concluded and approved in accordance with these Regulations.

Section 11 (1) states that an EIA study shall be conducted in accordance with terms of reference developed during the scoping exercise by the proponent and approved by the Authority. Section 13 (1) and (2) further states that proponent shall, on the approval of the terms of reference under regulation 11, submit to the Authority the names and qualifications of the impact assessment experts appointed to undertake the EIA study and authorized so to do in accordance with section 58 (5) of the Act and that every EIA study shall be carried out by a lead expert qualified in accordance with the criteria of listing of experts specified in the Fourth Schedule to these Regulations.

Section 17 (l) stipulates that during the process of conducting an EIA study under these Regulations, the proponent shall in consultation with the Authority, seek the views of persons who may be affected by the project.

Part IV of the regulations states how an EIA Study Report is conducted, contents and information required, submission, timelines and review process.

The proponent and consultant have undertaken this EIA Study report in line with all the provisions set out in these regulations. A public meeting, administration of questionnaires and interview were conducted to seek views of persons who may be affected by the project in line with these regulations.

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

The 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.

Part II Section 4 (1) states that "Every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act. Subsection (2) further states that "No person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit"

Part IV Section 24 states that "No person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive wastes, or other pollutants or permit any person to dump any such matter into water meant for fisheries, wildlife, recreational purposes or any other uses".

According to these regulations, "Every person shall refrain from any action which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act".

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

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

The regulations are contained in the Kenya Gazette No. 69, Legal Notice No. 121. Section 4 (1) states that "No person shall dispose of any waste on a public highway, street, road, recreational area or any other public place except in a designated waste receptacle".

Section 4 (1) and (2) states that "No person shall dispose any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle and that any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed of such waste in the manner provided for under these Regulations"

Section 6 (1) stipulates that "Any person who owns or controls a facility or premises which generates waste shall minimize the waste generated by adopting the following cleaner production principles:

i. improvement of production process through conserving raw materials and energy, eliminating the use of toxic raw materials within such time as may be prescribed by the Authority and reducing toxic emissions and wastes,
ii. monitoring the product cycle from beginning to end by identifying and eliminating potential negative impacts of the product, enabling the recovery and re-use of the product where possible and reclamation and recycling,
iii. incorporating environmental concerns in the design, process and disposal of a product.

Section 9 states that "Any person licensed to transport waste shall collect waste from the designated area of operations or storage areas and shall deliver such waste to the designated storage site, disposal site or plant"

The proponent shall engage the services of a licensed waste handler to collect, transport and dispose of wastes to the designated areas.

4.3.6 The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009

Section 3 (1) and (2) of the regulations states that no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment except as otherwise provided in the Regulations. In determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered:

- Time of the day;
- Proximity to residential area;
- Whether the noise is recurrent, intermittent or constant;
- The level and intensity of the noise;
- Whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and ,
- Whether the noise can be controlled without much effort or expense to the person making the noise.

These regulations also relate noise to its vibration effects and seek to ensure no harmful vibrations are caused by controlling the level of noise.

Part II Section 4 states that: except as otherwise provided in these Regulations, no person shall

a. Make or cause to be made excessive vibrations annoys, disturbs, injures or endangers the comfort, response, health or safety of others and the environment; or
b. Cause to be made excessive vibrations which exceed 0.5 centimeters per second beyond any source property boundary or 30 meters from any moving source.

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

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

The contractor shall ensure that all construction activities are carried out between 0800hrs and 1800hrs on weekdays to ensure that the neighbors are not disturbed. The contractor shall also ensure that all machineries are in good working condition to reduce noise.

4.3.7 The Environmental Management and Co-Ordination (Air Quality) Regulations, 2014

The objective of these Regulations is to provide for the prevention, control and abatement of air pollution to ensure clean and healthy ambient air. Section 5 states that no person shall act in a way that directly or indirectly causes, or is likely to cause immediate or subsequent air pollution; or emit any liquid, solid or gaseous substance or deposit any such substance in levels exceeding those set out in the first Schedule.

Further, clause 6 stipulates that no person shall cause or allow emission of the priority air pollutants prescribed in the second schedule to cause the ambient air quality limits prescribed in the first schedule to be exceeded.

Clause 25 (1) states that no person shall cause or allow the emission of visible air pollutants from a stationary or mobile vehicle in excess of the limits set out under the prescribed Standard.

Clause 33 states that no person operating construction equipment or handling construction material shall allow emission of particulate matter so as to adversely affect the limits set out in the First schedule.

Clause 35 states that no person shall cause or allow stockpiling or other storage of material in a manner likely to cause ambient air quality levels set out under the First Schedule to be exceeded.

Clause 38 stipulates that no person shall cause or allow emissions of priority air pollutants set out under the Second Schedule from disposal of medical waste, domestic waste, plastics, tyres, industrial waste or other waste by open burning.

The proponent shall comply with these regulations and implement all mitigation measures provided in the EMP to prevent air pollution during the project cycle

4.3.8 The Water Act, 2016

This Act of Parliament provides for the regulation, management and development of water resources, water and sewerage services.

Part II section 9 of this Act states that every person has a right to access water resources, whose administration is the function of the national government. Part III section 11 states the establishment of the Water Resources Authority (WRA) whose functions are stipulated in section 12 and include but not limited to receiving water permits applications for water abstraction, collection of water permit fees and water use charges.

Section 63 of the act states that every person in Kenya has the right to clean and safe water in adequate quantities and to reasonable standards of sanitation as stipulated in Article 43 of the Constitution.

Section 143 states that a person shall not, without authority conferred under this Act;

a) willfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or
b) throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.

The proponent shall ensure that all provisions stated in the act and under any regulations are observed and that the EMP is implemented.

4.3.9 Occupational Health and Safety Act, 2007

This is an act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. The key areas addressed by the Act include:

i. General duties including duties of occupiers, self-employed persons and employees. Enforcement of the act including powers of an occupational safety and health officer.
ii. Health General Provisions including cleanliness, ventilation, lighting and sanitary conveniences.
iii. Machinery safety including safe handling of transmission machinery, hand held and portable power tools, self-acting machines, hoists and lifts, chains, ropes & lifting tackle, cranes and other lifting machines, steam boilers, air receivers, refrigeration plants and compressed air receiver.
iv. Safety General Provisions including safe storage of dangerous liquids, fire safety, evacuation procedures, precautions with respect to explosives or inflammable dust or gas.
v. Chemical safety including the use of material safety data sheets, control of air pollution, noise and vibration, the handling, transportation and disposal of chemicals and other hazardous substances materials
vi. Welfare general provisions including supply of drinking water, washing facilities, and first aid.

The proponent shall ensure that safety measures are implemented in use of tools and machinery within site and that protection of the workers and general public with any form of interaction with the construction sites is given first priority.

4.3.10 The Physical Planning Act of 1996 CAP 286

This Act is aimed at enhancing and promoting the integrated physical development of socioeconomic activities. The act requires that any activity that constitutes development needs to be approved by the relevant local authority. It has made specific provisions in respect to the mandate of local authorities (now County Governments) in development control and planning

Part V - Control of development

30. (1) No person shall carry out development within the area of a local authority without a development permission granted by the local authority under section 33.

(2) Any person who contravenes subsection (1) shall be guilty of an offence and shall be liable to a fine not exceeding one hundred thousand shillings or to an imprisonment not exceeding five years or to both.

(3) Any dealing in connection with any development in respect of which an offence is committed under this section shall be null and void and such development shall be discontinued.

(4) Notwithstanding the provisions of subsection (2);

(a) The local authority concerned shall require the developer to restore the land on which such development has taken place to its original condition within a period of not more than ninety days;

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

31. Any person requiring development permission shall make an application in the form prescribed in the Fourth Schedule, to the clerk of the local authority responsible for the area in which the land concerned is situated. The application shall be accompanied by such plans and particulars as are necessary to indicate the purposes of the development, and in particular shall show the proposed use and density, and the land which the applicant intends to surrender for;

a. Purposes of principal and secondary means of access to any subdivisions within the area included in the application and to adjoining land;
b. Public purposes consequent upon the proposed development.

36. If in connection with a development application a local authority is of the opinion that proposals for industrial location, dumping sites, sewerage treatment, quarries or any other development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an environmental impact assessment report.

This Act provides for order in terms of development execution.

The proponent has received approval of the architectural designs from the county government and engaged the environmental experts to conduct the EIA study.

4.3.11 Public Health Act Cap 242

Part IX section 115 of the Act states that No person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.

Section 116 requires that the local authorities (county governments) take all lawful, necessary and reasonably practicable measures for maintaining its district (counties) at all times in clean and sanitary condition, and for preventing the occurrence therein of, or for remedying or causing to be remedied, any nuisance or condition liable to be injurious or dangerous to health, and to take proceedings at law against any person causing or responsible for the continuance of any such nuisance or condition.

Part XII Section 136 states that all collections of water, sewage, rubbish, refuse and fluids which permits or facilitate the breeding or multiplication of pests shall be termed nuisances and are liable to be dealt with in the manner provided by this Act. Section 138 states that no person shall within a township permit any premises or lands owned or occupied by him or over which he has control to become overgrown with bush or long grass of such a nature as, in the opinion of the medical officer of health, to be likely to harbour mosquitoes.

The proponent shall contract a licensed waste handler to collect all waste from the site to disposal at approved dumping site. Sewage from the site shall be treated on site before being discharged into the conventional sewer system.

4.3.12 County Government Act, 2012

The main purpose of the enactment of this Act was to give effect to Chapter Eleven of the Constitution; to provide for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Functions which were carried out by local governments were effectively transferred to the county governments. The Act gives county the responsibility of planning and co-coordinating all developments within their areas of jurisdiction. Part XI (sections 102-115) of the Act provides for planning principles and responsibilities of the county governments. The land use and building plans provided for in the Act are binding on all public entities and private citizens operating within the particular county. The proposed project is within the Nairobi City Government and thus there will be need of working in liaison with the County Government. The plans for the proposed project must be approved by the County Government

and the County government may also issue directives and authorizations on various aspects e.g. waste management and fire emergency preparedness among others.

The proponent shall work in liaison with County Government and in particular the Water, Energy, Forestry, Environment and Natural Resources Sector.

4.3.13 Energy Act, 2006

The Energy Act, 2006 was enacted on 2nd January 2007 establishes an Energy Regulatory Commission (ERC) mandated to perform all function that pertains to energy production, transmission, setting and enforcing of energy policies, Public education and enforcing energy conservation strategies, prescribing the energy licensing process and issuing of licenses that pertain to energy sector in Kenya. Section 30 of the Act provides the factors that shall be taken into consideration prior to issuance of license. It states the need and expression of an entity to conserve and protect the environment and natural resources in accordance to the EMCA 1999. Moreover, the Act gives provisions for the need to protect health and safety of users of energy by providing an enabling environment of operation that protects the health and safety of users of the service for which the license or permit is required and other members of the public affected by the undertaking.

4.3.14 National Construction Authority Act, 2011

The act is set to streamline, overhaul and regulate the construction industry in Kenya for sustainable development. The NCA establishes the authority and confers on its power to register contactors within the construction industry. The act requires all the contractors, both foreign and local contractors to be registered with the authority. The act also regulates the practices of foreign contractor by limiting their work to only tender work. The foreign contractors are licensed for only a specific period and once they certify they are in Kenya for that specific time. The foreign contractors must also produce a certificate of compliance. Furthermore they must lodge an affidavit with the NCA that once the project they have been licensed is over, they shall wind up their business. This prevents them from engaging in any other construction in the country.

4.3.15 Building Code, 2000

This gives general guidelines for the construction of buildings and attendant safety measures such as installation of firefighting appliances, fire escapes etc. It equally recognizes local authorities as lead planning agencies and thus requires every developer to submit building plans

to the relevant local authority for approval. The local authorities are in turn empowered to disapprove any plan submitted if it is not correctly drawn or does not provide sufficient information that complies with the relevant by-laws. Any developer who intends to erect a building, such as a retail and office block, must also give the concerned local authority a notice of inspection before the erection of the proposed structure.

After erecting the building, a notice of completion shall be issued to the local authority to facilitate final inspection/approval. No person shall therefore occupy a building whose certificate of completion has not been issued by the local authority. As a precaution against fire breakout, the by-law states that the walls of any premise shall be non-combustible throughout. Similarly, in every building which comprises more than one story, other than a small house, shall have fire resistance.

Section 214 indicates that, in any public building whose floor is more than 20 feet above the ground level, the council may recommend the provision of firefighting equipment that may include one or more of the following: hydrants, hose reels and fire appliances, external conations, portable fire appliances, water storage tanks, dry risers, sprinkler, drencher and water spray spring protector system.

4.3.16 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. It states "Any person who voluntarily vitiates the atmosphere in any place so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighborhood or passing along a public way is guilty of a misdemeanor"

Waste disposal and other project related activities shall be carried out in such a manner as to conform to the provisions of this code.

4.3.17 Land Registration Act, 2012

According to section 26 subsection (1) states that the certificate of title issued by the Registrar upon registration, or to a purchaser of land upon a transfer or transmission by the proprietor shall be taken by all courts as prima facie evidence that the person named as proprietor of the land is the absolute and indefeasible owner, subject to the encumbrances, easements, restrictions and conditions contained or endorsed in the certificate, and the title of that proprietor shall not be subject to challenge, except on the ground of fraud or misrepresentation to which the person is

proved to be a party; or where the certificate of title has been acquired illegally, unprocedurally or through a corrupt scheme. A certified copy of any registered instrument, signed by the Registrar and sealed with the Seal of the Registrar, shall be received in evidence in the same manner as the original.

Copy of land ownership documents is attached to this Report.

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

Section 5 of the Act outlines the Functions of the Commission, pursuant to Article 67(2) of the Constitution as follows 5(1): (a) to manage public land on behalf of the national and county governments; (b) to recommend a national land policy to the national government; (c) to advise the national government on a comprehensive programme for the registration of title in land throughout Kenya; (d) to conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities; (e) to initiate investigations, on its own initiative or on a complaint, into present or historical land injustices, and recommend appropriate redress; (f) to encourage the application of traditional dispute resolution mechanisms in land conflicts; (g) to assess tax on land and premiums on immovable property in any area designated by law; and (h) to monitor and have oversight responsibilities over land use planning throughout the country.

4.4 Institutional Framework

4.4.1 National Environmental Management Authority (NEMA)

The objective and purpose for which NEMA is established is to exercise general supervision and co-ordinate over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment. A Director General appointed by the president heads NEMA. The Authority is mandated to co-ordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plan, programmes and projects with a view to ensuring the proper management and rational utilization of the environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya and identify projects and programmes or types of projects and programmes, plans and policies for which environmental audit or environmental monitoring must be conducted under EMCA.

The EIA Study report is submitted to the authority for review and licensing. The proponent shall work in liaison with the authority in complying with the provisions of EMCA and any other subsidiary legislation under the Act.

4.4.2 National Environmental Tribunal (NET)

This tribunal guides the handling of cases related to environmental offences in the Republic of Kenya. If disputes to the proposed project arise, they are supposed to be presented here for hearing and legal direction.

CHAPTER FIVE: IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1 Anticipated Impacts

The anticipated impacts of the proposed project on the environmental elements which may be negative or positive are categorized into four major parameters. The **magnitude** is described as being major or minor, the **duration** may be short-term or long term, the **extent** is evaluated in terms of being specific (localized) or widespread, and the **reversibility** in terms of being reversible or irreversible. On the basis of information gathered during both the desktop and field study, the potential environmental impacts of the proposed project are as tabulated below:

Table 2: Impact analysis throughout the project cycle

Impact	**Impacts Analysis**		
	Construction	**Operation**	**Decommissioning**
Provision of retail and office		Major positive Long term Localized Irreversible	
Employment	Major positive, Short term, Widespread Reversible	Major positive, Long term, Widespread, Irreversible	Major positive Short term Localized Reversible
Revenue	Major positive Short term Widespread Reversible	Major positive Long term Widespread Reversible	Major positive Short term Widespread Reversible
Market for goods and services	Major positive Short term Widespread Reversible	Major positive Long term Widespread Reversible	
Solid Waste	Major negative Short term, Localised Irreversible,	Major negative Long term Localised Irreversible,	Major negative Short term Localised Irreversible
Liquid waste	Major negative Short term Localised Irreversible	Major negative Long term Widespread Irreversible	Major negative Short term Localised Irreversible
Traffic Density	Major negative Short term Widespread Irreversible	Major negative Long-term Widespread Irreversible	Major negative Short-term Widespread Reversible

Water demand	Major negative Short term Widespread Irreversible	Major negative Long-term Widespread Irreversible	Major negative Short term Widespread Irreversible
Energy demand	Major negative Short term Widespread Irreversible	Major negative Long term Widespread Irreversible	Major negative Short term Widespread Irreversible
Noise Pollution	Major negative Short, Term Reversible Localized	Minor negative Short term Localised Reversible	Major negative Short term Reversible Localize
Air Pollution	Major negative Short term Reversible Localized	Minor negative Short term Localised Reversible	Major negative Short term Reversible Localised
Storm water drainage	Major negative Short term Widespread Irreversible	Minor negative Short term Widespread Irreversible	Major negative Short term Widespread Irreversible
Soil erosion	Major negative Short term Widespread Irreversible	Minor negative Short term Localised Reversible	Major negative Short term Widespread Irreversible
Insecurity	Minor negative Short term Localized Reversible,	Minor negative Long term Localised Reversible	Minor negative Short term Localised Reversible
Occupation health and safety	Minor negative Short term, Localized Reversible	Minor negative Long term Localised Reversible	Minor negative Short term Localised Reversible
Oil pollution	Minor negative Short term Localized Irreversible	Minor negative Long term Localized Irreversible	Minor negative Short term Localized Irreversible

5.2 Positive impacts

Positive impacts that shall be associated with the implementation of the project include and are not limited to the following:

5.2.1 Provision of retail and office spaces

The unique design and technology used for this proposed development will provide high quality offices with a modern feel.

5.2.2 Provision of employment opportunities

The proposed project will create employment opportunities for both skilled and semi-skilled workers. During the construction phase, the project will employ a large workforce including; masons, plumbers, electricians among others, cooks among others. For the operation phase, the project will employ a work force that will include cleaners, security guards and caretakers among others.

5.2.3 Provision of market for goods and services

During the construction phase, the project will consume a lot of building materials sourced both locally and in other parts of the region. This will have a positive impact towards the economic status of the supplies and to the national economy through V.A.T rates for goods.

5.2.4 Increase in revenue to the government.

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

5.2.5 Economic investment

The proponent will receive returns on his investments

5.2.6 Gains in the local economy

The economy of the neighborhood will receive a boost especially during the construction phase due to the activities of the workers; buying food, drink and commodities.

5.2.7 Improved Security

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

5.2.8 Land Use Intensification

The development will result to a more economical use of the land without significant environmental degradation.

5.3 Negative Impacts

5.3.1 Soil Erosion

Due to the topographical nature of the project site, much of the land on which the proposed project is to be developed is sloppy, and bound to be affected by soil erosion especially when the site shall be cleared of its vegetation cover to pave way for the new developments and hence exposing the soil to weather elements.

The activities involved in the site preparation such as deep excavations in order to construct the basements may have a major negative and moderate impact on soil and geology of the project site. Heavy machinery will be traversing the site may lead to soil compaction and erosion of the soil.

Potential Mitigation measures

i. Control excavation works especially during rainy / wet conditions
ii. The stockpiling of construction materials shall be properly controlled and managed.
iii. Materials to be delivered on site in installments.
iv. Provide soil erosion control measures i.e. suppressing open surfaces with water or use of soil erosion control structures on soil-erosion prone areas within the site.
v. Avoid unnecessary excavations and other soil disturbances that can predispose it to the agents of erosion.
vi. Avoid unnecessary movement of soil materials from the site.
vii. Re-surface open areas on completion of the project and introduce appropriate vegetation.
viii. Leveling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil
ix. Building of physical barriers to prevent mass movement where necessary

5.3.2 Air Pollution

During the construction phase air quality is expected to decline as a result of an increase in levels of fugitive dust from excavation works, the stockpiled earth materials, dusty roads and concrete mixing. Tiny particulates are a public health hazard and may otherwise create considerable nuisances to the public. There may be air pollution due to combustion of fossil fuels expected from construction machinery and vehicles. This is expected to be a short-term, reversible impact lasting only for the duration of the construction activity.

Potential Mitigation measures

i. Provide personal protective equipment (PPE) such as gas masks, goggles etc. to the workers
ii. Stockpiles of fine materials (e.g. sand and ballast) should be wetted or covered with tarpaulin during windy conditions.
iii. Regular and prompt maintenance of construction machinery and equipment. This minimizes generation of hazardous gases.
iv. Access roads and exposed ground must be water sprayed at a frequency that effectively keeps down the dust.
v. Providing appropriate enclosure for the concrete mixer and use of dust nets or screens at high levels of the building
vi. Regular watering of all the exposed areas to prevent fugitive dust violations.
vii. Minimize exposed areas through the schedule of construction activities to enable dust control
viii. Use environmentally friendly fuels such as low Sulphur diesel
ix. Ensure no burning of waste on sites/non-designated areas
x. Restricting heights from which materials are to be dropped, as far as practicable to minimize the fugitive dust arising from unloading/loading.
xi. Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials will not leak from the vehicle.
xii. Monitor the air pollution levels regularly as per the Air Quality regulations

5.3.3 Noise and Excessive Vibrations

Construction activities of this nature are agents of noise pollution. The noise is inevitably expected to emanate from the demolition, vehicular activities, excavations and heavy equipment during construction and building works and this may create a nuisance for nearby occupants, particularly the immediate neighbors. Albeit annoying, this negative impact will be short-term (limited to the construction phase). Noise beyond some level is itself a nuisance and need to be avoided. Such noise emissions should be minimized as much as possible from the source point through appropriate measures.

A number of measures may be undertaken by the developer to reduce the impact of noise and excessive vibrations to the neighbors as well as the workers involved in the project. This is temporary, however, and the aim at this point is to make the exposure to noise to reasonable levels as much as possible until this construction is completed.

Potential Mitigation measures

i. Use of noise suppressors or silencers on noisy equipment or noise shields i.e. corrugated iron sheet structures.
ii. Construction works shall be carried out only during the specified time i.e. from say 0800hrs to 1800 hrs.
iii. Machineries shall be serviced regularly to reduce noise resulting from friction.
iv. Workers should be provided with suitable PPE such as earmuffs when operating noisy machinery and when in noisy environment.
v. Drivers delivering materials shall be advised to avoid unnecessary hooting of the trucks/vehicles
vi. Provision of a bill board at the construction site/gate notifying of the construction activity and timings.
vii. The contractor shall endeavor to use equipment installed with noise abatement devices as much as practicable
viii. Safe excavation shall be done using technologies that cause fewer vibrations so as to minimize the effect these excessive vibrations may have on buildings and trees nearby and in case of any inevitable damage to property, the proponent will ensure the affected parties are compensated.
ix. Regular monitoring of noise and vibration levels at the site as per the NEMA regulations.

5.3.4 Oil leaks and spills

It is important to note that oil/grease spills are prevalent in construction sites that make use of petroleum products for their vehicles and machines. Such products contain detrimental elements to the environment such as heavy metals (mercury, lead, and Sulphur among others). Though this may not be common at the site, it is wise to control and observe the little that could occur especially during maintenance of the involved machinery. During operational phase, oil spills might occur at the parking lots.

Potential Mitigation measures

i. All machinery shall be keenly inspected not to leak oils on the ground. This can be ensured through regular maintenance.
ii. Maintenance will be carried out in a well-designed and protected area and where oils/grease is completely restrained from reaching the ground. Such areas should be covered to avoid storm from carrying away spilled oils into the soil/water systems.
iii. All oils/grease and materials will be stored in a site's store, in the contractor's yard.
iv. Proper disposal of oil handling materials such as drums, oily clothes/papers/materials and cans.
v. All drainage facilities shall be fitted with adequate functional oil water separators and silt traps.

5.3.5 Solid Waste

A significant amount of solid waste will be generated in the construction phase through the clearing of vegetation and construction activities which will generate related solid wastes including cement bags, stones, wood, broken glasses, containers, rods of metal, sharp objects (nails) etc. The proponent should take the initiative of segregation of wastes at source to enable recycling and removal of the unrecyclable solid wastes.

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

Potential Mitigation measures

i. Efficient use of building material to reduce waste and recycling where possible
ii. Engage the services of registered waste handlers to transport waste to designated disposal sites

iii. Use of an integrated solid waste management system; through a hierarchy of options: source reduction, recycling, composting and reuse, will facilitate waste handling during occupation phase.
iv. Segregation of waste at the source by providing clearly marked dustbins
v. Provision of the waste management rooms as collection point before disposal
vi. To manage waste in line with the Environmental management and coordination (Waste Management) Regulations, 2006.

5.3.6 Liquid Waste

During construction stage it is expected that wastewater shall arise from the proposed activities which shall be sprinkled on the working areas to reduce dust generation by the construction machinery while contaminated waste water shall be channeled into the sewer line to prevent water and soil pollution.

Lack of or inadequate provision of toilets for use by workers can lead to ad hoc defecation in secluded areas or structures on the site, thus creating unsanitary conditions and sources of fly infestation. This can threaten the health of neighbors and workers themselves. Indiscriminate sewage disposal can also result to contamination of underground water resources.

Wastewater during operational stage if not properly managed can cause contamination of water resources, land and also air pollution. Thus all waste water shall be treated at the waste water treatment plant before being channeled to the sewer line.

Potential Mitigation measures

i. Channel all liquid waste to the trunk sewer system after treating it at the water treatment plant to reduce the waste water load deposited in the sewer line.
ii. The design of the internal sewerage system shall consider the estimate discharges from individual sources and the cumulative discharge of the entire project i.e. it will have the capacity to consistently handle the loads even during peak volumes.
iii. All drain pipes passing under building, driveway or parking should be of heavy duty PVC pipe tube encased in concrete surround. All manholes on drive ways and parking areas shall have heavy-duty covers set and double sealed airtight; as approved by specialists.
iv. Sanitary facilities will be kept clean always, through regular washing/cleaning.
v. Frequent monitoring of the internal drainage system.
vi. Blockages and damages shall be fixed expeditiously.

vii. Provision of adequate and appropriate sanitary facilities for the workers during construction phase

viii. Ensure regular maintenance of foul water drainage works at the premises to prevent clogging and fore-stall breakdowns

ix. Proper decommissioning of the sanitary facilities shall be carried out once construction is complete

5.3.7 Storm water drainage

The clearance of site vegetation cover and excavation works will lead to increased soil erosion at the project site and release of sediments into the drainage systems. The building roofs and pavements may lead to increased volume and velocity of storm water or run-off flowing across the area covered by the buildings. This can lead to increased amounts of storm water entering the drainage systems, resulting in overflow and damage to such systems.

Potential Mitigation measures

i. Rain water harvesting gutters and storage tanks will be installed to reduce the amount of rainfall reaching the surface.

ii. Semi permeable materials will be used for construction of pavements.

iii. After completion of construction, the proponent shall embark on comprehensive landscaping.

iv. Drainage channels shall be covered; say with gratings, to avoid occurrence of accidents and entry of dirt.

v. Construct gently sloping drains to convey water at non-erosive speed.

5.3.8 Increased Water demand

A considerable amount of fresh water will be required during the construction works, especially for cement mixing, curing and for wetting of the site to control dust and for use by the workers (washing, drinking etc). This may place some amount of strain on water supply and may exacerbate current shortage of water supply in Nairobi.

Potential Mitigation measures

i. The contractor will use water bowsers and tankers to bring in water for construction activities i.e. during periods of high water demand (i.e. during slab formation). Water fetching shall however be subject to authorization by the local water authority.

ii. Install water conserving taps that turn-off automatically when water is not in use.

iii. Encourage water reuse/recycling during construction and occupation phases.

iv. Roof catchments of the building will be provided with rainwater harvesting systems (gutters, down pipes and water storage facilities) to enhance collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc

v. Provide notices and information signs to sensitize on means and needs to conserve water resource i.e. 'Keep/Leave the Tap Closed', etc. This will awaken the civic consciousness of the workers and occupants with regard to water usage and management

vi. A borehole shall be sunk in the site to provide an alternative source of water.

vii. Use water efficient appliances and fixtures for plumbing products and white goods

5.3.9 Public Health

During construction, there will be increased dust, air and noise pollution. These are considered harmful to human health. The occupants and workforce involved will be subjected to these environmental hazards putting them at high risk.

Waste material such as pieces of glass and nails left lying on the ground may cause injuries/ accidents to the workers. Food for the construction workforce is usually provided by mobile individuals most of which operates without licenses. This can compromise health of the workers especially if such foodstuffs are prepared in unhygienic conditions.

Potential Mitigation measures

i. Depending on the occupational safety and health hazards anticipated while performing assigned job tasks, workers will require using properly fitting PPE to avoid injuries and illness. These include working boots, overalls, helmets, goggles, earmuffs, masks, gloves etc

ii. A First Aid Kit shall be provided within the site and during construction phase. This should be fully equipped at all times and should be managed by qualified persons.

iii. Adapt a suitable emergence response plans to manage occurrence of anticipated hazards during construction phase.

iv. Safety awareness may be gained through regular safety meetings, safety training or personal interest in safety and health.

v. The contractor shall have workmen's compensation cover. It will comply with Work Injury and Benefits Act, as well as other ordinances, Regulations and union Agreements.

vi. Sanitary facilities should be provided; and maintain Standard cleanliness of the facilities.

vii. Local individuals preparing food for the workers at the site should be controlled, monitored and evaluated to ensure that food is hygienically prepared.

viii. Workers should always be sensitized on social issues such as drugs, alcohol, diseases such as HIV/AIDS and STIs etc.

ix. Ensure provision of safe drinking water for the workers on site.

5.3.10 Insecurity

Insecurity may arise during the construction phase since intruders may try to steal the building materials deposited on the site. This especially happens in cases where there is no fence.

Potential Mitigation measures

i. The project site will be enclosed using a perimeter wall to beef-up security.
ii. There will be a guard house at the gate. Security guards will be expected to monitor the gate of the facility to keep away the intruders and to control movement within the site.
iii. Contractor shall provide adequate security during the construction period when there are no works on the site.
iv. The guards stationed at the gates will document movements in and out of the site/ property.
v. Installation of CCTV cameras at strategic points for monitoring and enhancing the security of the property during operation phase.

5.4.2.3 Fire

The operations that lead to fire outbreaks include poor handling of electricity systems, faulty electrical equipment, carelessness etc. These should be avoided both during construction and operation phases of the project through proper training and sensitizations.

Potential Mitigation measures

i. Hire competent and properly authorized electrical contractor to do the wiring and other electrical works.
ii. Provide adequate number of appropriate firefighting equipment
iii. Organize for inspection and maintenance of fire equipment at least once in a period of six months
iv. Conduct regular firefighting drills within the site.
v. Post ‘No smoking signs’ where flammable materials will be stored

vi. Develop and post at the site, fire emergency and evacuation procedures
vii. Train staff on the use of the available firefighting equipment
viii. At least one person trained on handling firefighting techniques should be available through-out the construction phase of the project.
ix. Maintain on site telephone contacts for fire brigade, G4S fire brigade and St. Johns ambulance service provider

5.3.11 Increased energy demand

There will be increased use of energy during the construction stage (fuel for running machinery and other equipment) and during operation phase (electricity used by the occupants of the project). Energy conservation is thus fundamental.

Energy conservation involves optimum use of petroleum products (diesel and gasoline), electrical appliances (equipment), lighting systems and other electric machinery as used for different purposes. It also includes use of renewable energy sources.

Potential Mitigation measures

i. Turn off machinery and equipment when not in use.
ii. Put off all lights immediately when not in use or are not needed.
iii. Use energy conserving lighting system.
iv. Make use of alternative source of energy such as solar power. Solar panels proposed in the project shall be fully utilized and timely repaired in case of damage.
v. The large glass facades will provide natural lighting during the day and in turn preserve the amount of energy used for lighting
vi. There shall be a generator on standby to provide power during power outages.

5.3.12 Traffic Density

There will be increase in traffic along the access road (Riverside Drive) especially during construction phase since trucks will be accessing the site to deliver construction materials and taking away construction wastes. This phase of the development may have a negative impact on the present road network in the study area. During the operation phase of the project, a major negative impact on the road network in the area will also be experienced as the volume of traffic associated with the project activities will be significantly increased.

Potential Mitigation measures

i. Employ traffic marshals to control traffic along the adjacent roads and in and out of the site.

ii. It is important that warning/ informative signs be erected at the site. The signs shall be positioned in a way to be easily viewed by the public and mostly motorists.

iii. An entry and exit points shall be provided separately for the retail and the offices to ease traffic during implementation of the project. The entry point is situated along Riverside Drive and the exit along riverside gardens to ease traffic flow.

CHAPTER SIX: ENVIRONMENTAL HEALTH AND SAFETY

6.1 Introduction

According to the European Union construction is the sector most at risk of accidents, with more than 1300 fatalities in construction accidents every year. Worldwide, construction workers are three times more likely to be killed and twice as likely to be injured as workers in other occupations. It is therefore essential that the proponent and contractor ensure the safety and well-being of the workers, the passersby and any other person who may be directly or indirectly associated with the project.

The main hazards and risks of accidents in the construction site can be categorized and described in the following way:

i. risks of slips, trips and falls
ii. risks related to instability
iii. risks related to traffic
iv. risks related to construction machinery
v. risks related to electricity
vi. risks related to gas
vii. fire and explosion risks

After identification of these major risks and the stages when they are likely to occur, efforts should then be focused on how to alleviate these dangers before they happen.

6.2 Principles of EHS

The principles of environmental health and safety involve three main actions:

i. **Risk identification and assessment** - This shall involve identifying the various hazards and risk at the site that have the potential to occur, all the people who may be at risk such as employees, cleaners, visitors, contractors, the public, etc. as well as determine whether a control program is required for a particular hazard.
ii. **Risk communication** – Risk communication refers to the exchange of real-time information, advice and opinions between workers and people facing threats to their health, economic or social well-being. The ultimate purpose of risk communication is to enable people at risk to take informed decisions to protect themselves and their loved ones. Risk communication uses many communications techniques ranging from media

and social media communications, mass communications and community engagement. It requires a sound understanding of people's perceptions, concerns and beliefs as well as their knowledge and practices.

iii. **Risk management** – This involves actions implementing risk evaluation decisions, monitoring, re-evaluation and prioritizing, and compliance with legal requirements that safeguard health and safety at construction sites The OHS personnel shall be required to determine if existing control measures are adequate or if more should be done.

6.3 Construction Safety, Emergency Procedures and Action Plan

The following recommendations to ensure the health and safety of the workers and general public shall be taken into consideration:

1. Create a culture of safety within construction by planning, creating and supporting ongoing OHS awareness campaigns that promote the importance of workplace occupational health and safety with industry stakeholders as well as consumers.
2. Increase safety knowledge in the construction site by promoting awareness of the top construction sector hazards (trips and falls from heights, motor vehicle incidents, struck by objects, machinery) and how to control these hazards through new and improved information channels
3. Support the role of the supervisor in creating and maintaining a culture that fosters worker participation in identifying and mitigating workplace hazards.
4. Create a strategy for continuous health and safety learning for the construction workers e.g. by conducting regular training sessions and drills on how to handle emergencies and accidents at site.
5. Identify, review and enhance health and safety content of apprenticeship training standards to keep abreast with any new methods that are effective in promoting site safety.
6. Provide suitable and well maintained Personal Protective Equipment (PPEs) to all the workers and visitors and ensure they are utilized at all times and in the right manner. These include safety boots, helmets, gas masks, gloves and googles.
7. Place visible and readable signs to control the movement of vehicles and notify motorists and pedestrians around the, and workers in the site.

8. Enclose or isolate hazardous parts of machines or sites within the construction site to minimize exposure.
9. Prepare and maintain emergency response equipment such as fire extinguishers and first aid kits in readiness for use when need be.
10. Encourage reporting of safety incidents as soon as they occur at the site, so as to enable a quick action to alleviate the extent of the damage.
11. Comply with the provision of the Occupational Safety and Health Act, (OSHA), 2007

6.4 Grievance Redress System

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

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

CHAPTER SEVEN: CONSULTATION AND PUBLIC PARTICIPATION

7.1 Introduction

This chapter describes the process of the public consultation followed to identify the key issues and impacts of the proposed project. Views from the local occupants, stakeholders, surrounding institutions and development partners who in one way or another would be affected or rather interested in the proposed project were sought through administering of questionnaires, interviews and public meeting as stipulated in the Environment Management and Coordination Act, 1999.

The Consultation and Public Participation (CPP) process is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by EMCA 1999 section 58, on EIA for the purpose of achieving the fundamental principles of sustainable development. Section 17 (1) of the Environmental (Impact Assessment and Audit) Regulations 2003, states that during the process of conducting an environmental impact assessment study under these Regulations, the proponent shall in consultation with the Authority, *seek the views of persons who may be affected by the project.*

7.2 Objectives of the Consultation and Public Participation (CPP)

The objective of the consultation and public participation was to:

i. Disseminate and inform the stakeholders about the project with special reference to its key components and location.
ii. Gather comments, suggestions and concerns of the interested and affected parties.
iii. Incorporate the information collected in the EIA study.

7.3 Methodology used in the CPP

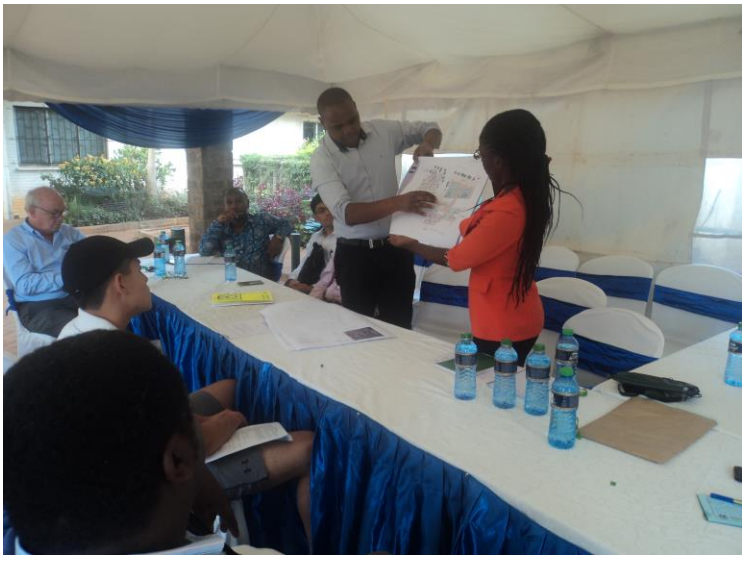
The exercise was conducted on the 2nd November to 12th November 2018. In accordance with the EIA Regulations 2003 section 17 (2) c, appropriate notice was circulated to the affected parties/communities on 2nd November, 2018 one week prior to the public meeting *(attached is the notice and delivery sheet signed by the AP).*

The exercise was conducted in different ways, namely;

i. interviews and discussion,
ii. field surveys and observations,
iii. administering of questionnaires,

iv. Public meeting was held on 9th November, 2018*(attached is a copy of the minutes and pictures).*

Plate 7; Public meeting within the project site



Source; Public meeting 09/11/2018

7.4 Analysis of the Public Consultation findings

7.4.1 Positive Issues

i. The proposed development addresses the demand for office spaces in the area
ii. Creation of job opportunities
iii. Bringing retail services closer to the residents of Riverside Area.
iv. The project is geared towards achievement of government's Big four agenda

7.4.2 Negative Issues

The following are negative issues raised by the neighbors/affected parties (AP) that need to be addressed;

i. Increased waste generation (both liquid and solid)
ii. Noise and air pollution specially dust.
iii. Insecurity issues due to the number of workmen that will be involved in the project
iv. Increased water demand
v. Increased traffic along the access road

CHAPTER EIGHT: ANALYSIS OF PROJECT ALTERNATIVES

8.1 Introduction

In order to enable the proposed project to seek different ways of minimizing its impacts on the environment and at the same time achieve its objectives several alternatives were assessed through its architectural and engineering designs and environmental planning through this EIA to come up with the most suitable options in implementing this project

8.2 No project alternative

This option implies forfeiting the proposed development and thus avoiding both the positive and negative impacts that would have arisen during its implementation. This option is mostly applicable in situations where the proposed project area is in ecologically sensitive areas. The land in which the proposed project is to be constructed is in a stable environment and therefore will not be affected by this development activity. From a socio-economic perspective the "no action" alternative may not be the best alternative as the numerous benefits to be gained from the development both locally and nationally would not be realized and the resources in the area would continue to be underutilized since the land lies idle. The 'No Project Option' is the least preferred from the socio-economic perspective.

8.3 Proposed Project Alternative

The proposed project will consist of two blocks of twelve floors covering a total of 15,227 m^2 of office and retail spaces and other auxiliary facilities. The project is in line with the planning of the area as the region is in Zone 4 which allows for mixed use (commercial developments). The proposed project will provide modernized high quality retail and office facilities, increase in government revenue through taxes, market for goods and services and optimal use of the land. Thus, the project is a timely venture and this is the best option for the proposed site.

8.4 Alternative design

This option curtails undertaking the project but with different infrastructural designs that encompass buildings layouts and location of supporting infrastructure. The presented project design was however achieved by considering the options available that would ensure cost-effectiveness and avoid or reduce environmental and social impacts as much as possible.

An analysis of designs revealed that this prevailing design would increase commercial viability as well as its targeted balance with nature that will create ambient working conditions for its

occupants. The proponent hence settled on this design as a unique design that best meets the objectives of the project.

8.5 Alternative construction materials and technologies

The proposed project will be constructed using reinforced concrete, natural stones for the walling, cement for mortar and plaster works, structural steel, metal scaffolds and formwork. The concrete structure will be built using locally sourced sand, cement, metal bars and fittings that meet the Kenya Bureau of Standards (KBS) requirements. The metal scaffolds will be advantageous than timber because it will reduce the wasting of precious trees, has a longer lifetime, provides a steady and firm standing, easily assembled and dismantled and it increases the work efficiency.

The technologies available include the conventional brick and mortar style, concrete frame construction, prefabricated concrete panels, timber construction, steel and aluminum frame and Expanded Polystyrene Technology. The proponent has preferred the use of reinforced concrete frame construction as the technology is durable, offers outstanding resistance to explosion and/or impact and performs well during both natural and manmade disaster. Reinforced concrete can also endure very high temperatures from fire for a long time without loss of structural integrity.

CHAPTER NINE: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMP)

Environmental monitoring involves measurement of relevant parameters, at a level of details accurate enough, to distinguish the anticipated changes. Monitoring aims at determining the effectiveness of actions to improve environmental quality. The EMPs outlined in the table addresses the identified issues of concern (potential negative impacts) and mitigation measures as well as roles, costs and monitorable indicators that can help to determine the effectiveness of actions to upgrade the quality of environment; as regards the proposed project.

The EMPs have considered for all phases; construction, operational and decommissioning.

9.1 EMP FOR THE CONSTRUCTION PHASE

Table 3: Environmental Management and Monitoring Plan during construction phase

Environmental/ Social Impact	Proposed Mitigation Measures	Responsibility for mitigation	Monitoring frequency	Estimated Cost (Kshs)
Demolition of the existing structure	• Apply for demolition permit from relevant authorities before commencing the demolition • Engage a registered private contractor to carry out the demolition • Provide workers with PPE • The demolition exercise to be limited to day time only • Comply with EMCA (Noise and excessive vibration pollution control) Regulations 2009	- Project proponent - Contractor - NEMA inspectors	Daily inspection	250,000
Soil erosion	• Ensure management of excavation activities • Providing soil erosion control structures on the steeper areas of the site & controlling activities during the rainy season. • Compact loose soils to minimize wind erosion	- Proponent - Contractor	Routine inspection	200,000
Air pollution	• Regular sprinkling of water on dusty areas and access roads • Careful screening of construction site to contain and arrest construction related dust. • Enclosing, covering and watering of exposed stockpiles e.g. sand	- Proponent - Contractor - Workers and Drivers	Daily inspection Routine maintenance	200,000

	• Ensure construction machinery and equipment are well maintained to reduce exhaust gas emission • Drivers of construction including bulldozers, earth-movers etc. will be under strict instructions to minimize unnecessary trips and minimize idling of engines. • Using efficient machines with low emission technologies for the ones that burn fossil fuels. • Comply with EMCA (Air quality) Regulations 2008			
Noise and excessive vibrations	• Construction activities to be restricted to daytime i.e. 8am to 6pm • Use of suppressors or noise shields on noisy equipment for instance corrugated iron sheet structures • Sensitize operators of construction machinery on effects of noise • Trucks used at construction site shall be routed away from noise sensitive areas where feasible. • Maintain plant equipment to suppress frictional noise • Workers in the vicinity or involved in high-level noise to wear PPE • Minimize vibrations by using hi-tech equipment that produces lesser vibrations during excavation. • Comply with EMCA (Noise and excessive vibration pollution control) Regulations 2009	- Proponent - Contractor - Workers - Drivers	Random inspection Routine maintenance	250,000
Oil pollution	• Proper storage, handling and disposal of new / used oil and related wastes • Maintain construction machinery and equipment to avoid leaks • Maintenance of construction vehicles to be carried out in the contractors yard (off the site)	- Proponent - Contractor	Routine inspection maintenance	50,000
Storm water drainage	• Proper installation of drainage structures/facility • Ensure efficiency of drainage structures through proper design and maintenance	- Proponent - Contractor	Routine inspection and maintenance	100,000
Solid waste and liquid waste	• Segregate the waste at the site • Ensure proper disposal of construction waste to approved sites • Engage services of a registered NEMA waste handler to dispose the waste • Covering of the trucks during transportation, all the building materials and waste	- Proponent - Contractor - Workers	Weekly inspection	300,000

	• Sensitize workers on the reuse of materials where appropriate. • Provision of adequate and appropriate sanitary facilities for the construction workers • Proper decommissioning of all the sanitary facilities • Connect to NCWSCo • Comply with EMCA (Waste management) Regulations 2006			
Increased water demand	• Drill a borehole to supplement water from NCWSCo • Employ services of waters vendors to supplement water supply • Sensitize occupants and workers to reduce water wastage e.g by reusing where applicable • Install water efficient appliances	- Contractor - Workers	Daily inspection	350,000
Traffic congestion	• Employ traffic marshals to control traffic in and out of site • Ferry building materials during off-peak hours • Provide traffic control signs at the site/entrance to notify motorists and general public about the development • Enforce speed limits for construction vehicles especially along the roads leading to the site • Ensure that the vehicles comply with axle load limits • Employ well trained and experienced drivers	- Proponent - Contractor - Drivers	Daily inspection	200,000
Health and safety of workers	• Construction work shall be limited to daytime only • Workers to be adequately insured against accidents. • All workers will be sensitized before construction begins on how to control accidents related to construction. • Keep record of the public emergency service telephone numbers including: Police, Fire brigade, Ambulance at strategic points • Provide first aid kits at strategic places in the site • All workers to wear protective gear during construction e.g. helmets. • Ensure that the workers are registered with NHIF / NSSF and remits appropriate fees • A comprehensive contingency plan shall be prepared before construction begins on accident response.	- Proponent - Contractor - Workers	Weekly inspection	200,000
Insecurity	• Provide security guards to monitor movement in and out of the site during construction period for both day and night • Install security lights at the site to enhance security	- Contractor - Proponent	Daily inspection	200,000
Fire	• Installation of firefighting facilities following City County's Fire Masters requirements approval. • Develop and adapt an (fire) emergency response plan for the project	- Workers	Routine inspection and maintenance	100,000

	(during construction and occupation stages). • Ensure that all firefighting equipment are regularly maintained and serviced. • Provide fire hazard signs such as 'No Smoking' sign, Direction to exit in case of any fire incidence and emergency numbers.			

9.2 EMP FOR THE OPERATION PHASE

Table 4: Environmental management and monitoring plan during Operation phase

Environmental/ Social Impact	Proposed Mitigation Measures	Responsibility for mitigation	Monitoring frequency	Estimated Cost (Kshs)
Liquid waste	• Regular inspection and maintenance of the internal sewer system. • Utilize the Waste water treatment plant to treat all liquid wastes before channeling it to the trunk sewer system	- Proponent - Occupants	Periodic checks Routine Maintenance	300,000
Solid waste generation	• Encourage segregation of waste (organic and inorganic) • Provide for clearly marked dustbins to serve the specified use. • Ensure that wastes generated are efficiently managed through recycling, reuse and proper disposal procedures. • A private NEMA licensed company to be contracted to handle solid waste and dispose it of in designated dumpsites. • Routine cleaning of the waste management rooms	- Proponent - Occupants	Periodic inspection	250,000
Air pollution	• Regular cleaning of dust prone areas such as driveways and corridors • Comply with EMCA (Air Quality regulations) 2014	- Proponent - Occupants	Routine maintenance	100,000
Noise and vibration Pollution	• Do annual noise monitoring, to adhere to acceptable standards • Sensitize occupants on minimal permissible noise levels • Comply with EMCA (Noise and excessive vibration pollution control) Regulations 2009	- Proponent - Occupants	Periodic inspection	250,000
Storm water drainage	• Proper maintenance of drainage structures • Inspection and maintenance of water harvesting facilities • Collection of excess storm water into underground tanks for reuse e.g. car washing	- Proponent	Routine inspection and maintenance	100,000
Increased water use	• Use water efficient appliances and fittings • Reuse of harvested rain-water e.g. cleaning pavements and cars • Place notices at water taps e.g. 'TURN OFF TAP AFTER USE' • Provision of roof/ underground tanks for water storage • Regular maintenance of all water components	- Proponent - Occupants	Periodic Inspection Routine maintenance	150,000
Increased energy use	• Switch off electrical appliances when not in use. • Maintenance of electrical components.	- Proponent - Occupants	Daily Observation	150,000

	• Use energy efficient electrical appliances and fixtures such as bulbs • Use of solar energy as alternative energy supply for the project		Routine maintenance	
Fire	• Install firefighting equipment • Sensitize the occupants on fire risks i.e. conduct regular fire drills • Adapt effective emergency response plan • Maintain firefighting equipment regularly • Provide emergency numbers at strategic points	- Proponent - Occupants	Routine inspection	100,000
Insecurity	• Engage services of security guards to man the premises day and night • Installation of CCTV cameras at strategic points for monitoring and enhancing the security of the property during operation phase. • Placing alarms around the project and establishing emergency preparedness and response procedures • Place hotline numbers on strategic places • Sensitize occupants on security precautions	- Proponent - Occupants	Periodic inspection Routine maintenance	150,000
Traffic	• Provide traffic signs to reduce risk of accidents • Provision of adequate on-site parking bays • Regular maintenance of the parking bays • Provide separate entry and exit points for motorized and non-motorized traffic to ease traffic flow and avoid collisions.	- Proponent	Routine maintenance	100,000

9.3 EMP FOR THE DECOMMISSIONING PHASE

Note: A due diligence environmental audit will be undertaken and submitted to NEMA at least three months prior to decommissioning and in line with the Environmental Management and Coordination Act No. 8 of 1999.

Table 5: Environmental management and monitoring plan during Decommissioning phase

Environmental/ Social Impact	Proposed Mitigation Measures	Responsibility for mitigation	Recommended frequency of monitoring	Estimated Cost (KShs)
Demolition of existing structures	▪ Apply for demolition permit from relevant authorities before commencing the demolition ▪ Engage a registered private contractor to carry out the demolition ▪ Provide workers with PPE ▪ The demolition exercise to be limited to day time only ▪ Comply with EMCA (Noise and excessive vibration pollution control) Regulations 2009	- Project proponent - Contractor - NEMA inspectors	Daily inspection	500,000
Air pollution	▪ Dust suppression with water sprays on dusty areas ▪ Careful screening of construction site to contain and arrest construction related dust ▪ Ensure demolition machinery and equipment are well maintained to reduce exhaust gas emission	- Proponent - Contractor - NEMA inspectors	Daily inspection Routine maintenance	150,000
Noise and excessive vibrations	▪ Demolition activities to be restricted to daytime (8am to 5pm) ▪ Use of Suppressors on noisy equipment or use of noise shields for instance corrugated iron sheet structures ▪ Workers in the vicinity or involved in high level noise to wear respective safety & protective gear. ▪ Comply with EMCA (Noise and excessive vibration pollution control) Regulations 2009	- Proponent - Contractor - Workers - NEMA inspectors	Routine inspection and maintenance	250,000
Health and safety of workers	▪ All workers to wear PPEs e.g. helmets, safety boots and ear muffs ▪ All workers will be sensitized before demolition begins, on how to control accidents related to construction. ▪ Accordingly, adherence to safety procedures will be enforced. ▪ All workers will be adequately insured against accidents.	- Contractor - Workers - Proponent - NEMA inspectors	Daily monitoring	200,000
Solid and liquid	▪ Ensure proper solid waste disposal and collection facilities	- Contractor	Daily monitoring	300,000

waste	▪ Refuse collection vehicles will be covered to prevent scatter of wastes by wind. ▪ Demolition wastes to be collected by a licensed operator to avoid illegal final dumping at unauthorized sites. ▪ All persons involved in refuse collection shall be in full protective attire. ▪ Dismantling all fixtures and equipment of the internal sewer system	- Proponent - NEMA inspectors		
Re-vegetation and comprehensive landscaping	▪ Put in place an appropriate re-vegetation programme to restore the site to its original status ▪ During the re-vegetation period, appropriate surface water run off controls will be taken to prevent surface erosion; ▪ Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences; ▪ Fencing and signs restricting access will be posted to minimize disturbance to newly-vegetated areas;	- Contractor - Proponent	Random inspection and monitoring	350,000

CHAPTER TEN: CONCLUSION AND RECOMMENDATIONS

The proposed development shall bring with it numerous positive impacts including increase in the office and retail spaces, creation of employment opportunities, improved businesses in the project area especially for various suppliers and increase in revenue to both the county and national governments among others as outlined in the report.

The negative environmental impacts that will result from establishment of the project which include increase in traffic along the access roads, air and noise pollution, increased water demand, strain to existing infrastructure among others can however be mitigated.

The proponent has committed to put in place various mitigation measures to mitigate the negative environmental, safety, health and social impacts associated with the proposed development. It is recommended that in addition to this commitment, the proponent should focus on implementing the measures outlined in the EMP as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects.

It is also recommended that the positive impacts that emanate from such activities shall be maximized as much as possible. It is expected that these measures will go a long way in ensuring the best possible environmental compliance and performance standards.

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APPENDICES

1. Copy of ownership documents
2. Copy of expert practicing licenses
3. Copy of architectural plans
4. Copy of change of use approval
5. Copy of ToR Approval letter
6. Location map
7. Copy of the invitation letter
8. Copy of minutes of the public meeting and attendance sheet
9. Questionnaires