GPS READINGS: N 0°2.52726' E 37°39'20.20532'

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR PROPOSED JESUS HOUSE OF PRAISE MIXED USE URBAN DEVELOPMENT

PROPOSED MIXED USE COMMERCIAL URBAN DEVELOPMENT PROJECT

OFF MERU-EMBU-NAIROBI HIGHWAY, MERU TOWN, MERU COUNTY PLOT L.R. No. NTIMA/IGOKI/3235

PROPONENT

Jesus House of Praise

P.O Box 830 – 60200,

Meru, Kenya.

STUDY PREPARED BY:

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DECLARATION

FIRM OF EXPERTS

Lakers Consultancy Ltd on behalf of the Proponent, submit the following Environmental Impact Assessment Study Report, for the **Proposed Mixed-Use Urban Development Project** on **L.R. No. NTIMA/IGOKI/3235** located along **Meru-Nairobi Highway, Meru Town, Meru county**. The Environmental ImpactAssessment Study has been carried out according to the Environmental Management and Coordination Act, 1999 and Environmental (Impact Assessment and Audit) Regulations, 2003.

Signed on September 2018.

Mr. Kevin Musiega

Signature ……

Designation: Firm of Experts NEMA Reg. No. 9125
Kevin Musiega Lead Expert Reg. No 1682

PROPONENT

I, ……on behalf of **Jesus House of Praise**

submit the following Environmental Impact Assessment Study Report, for the **Proposed Mixed**-Use **Urban Development Project** on **L.R. No. NTIMA/IGOKI/3235** located along **Meru-Nairobi Highway, Meru county**.

Signed on…… September 2018.

Signature ……

ACRONYMS

DGs	Diesel Generators
EA	Environmental Audit
EIA	Environmental Impact Assessment
EMCA	Environmental Management Coordination Act
EMP	Environmental Management Plan
EMS	Environmental Management System
Ha	Hectare
HFCs	Hydro fluorocarbons
ICs	Inspection Chambers
ICT	Information Communication Technology
IEA	Initial Environmental Audit
KPLC	Kenya Power and Lighting Company
KRA	Kenya Revenue Authority
MDGs	Millennium Development Goals
MOH	Ministry of Health
MCC	Meru City County
NEAP	National Environment Action Plan
NEC	National Environment Council
NEMA	National Environment Management Authority
NPEP	National Poverty Eradication Plan
MEWASS	Meru Water & Sewerage Company
PVC	Polyvinyl Chloride
SHE	Safety, Health and Environment
TOR	Terms of Reference
WRMA	Water Resources Management Authority
WSB	Water Services Board
WSRB	Water Services Regulatory Board

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EXECUTIVE SUMMARY

Introduction

Lakers Consultancy Limited which is a NEMA registered firm of experts was contracted by the proponent (Jesus House of Praise) to carry out an Environmental Impact Assessment for a Proposed Mixed-Use Urban Development located along Meru-Nairobi Highway, Meru town, Meru county. This was to comply with the Legal requirement stipulated in the Environmental Management and Coordination Act 1999 and the subsequent Legal supplement of 2003.

The proponent is proposing to construct a **thirty-storey mixed use urban development** on plot L.R No **NTIMA/IGOKI/3235** located along Meru-Embu-Nairobi Highway in Meru town, Meru county. The proposed development will mainly comprise of **Office spaces, Retail spaces, Apartments, a Hotel, Retail Parking, shops, a supermarket, church halls, conference halls, swimming pool, gym and associated ancillary facilities** within the proposed plot.

Environmental Impact Assessment is a tool for environmental Planning and has been identified as a key component in new project implementation. According to section 58 of the Environmental Management and Coordination Act (EMCA) No.8 of 1999 second schedule 9 (1), and Environmental (Impact Assessment and Audit) regulation, 2003, new projects must undergo Environmental Impact Assessment. The Report of the same must be submitted to National Environment Management Authority (NEMA) for approval and issuance of relevant certificates. This was necessary as many forms of developmental activities cause damage to the environment and hence the greatest challenge today is to maintain sustainable development without interfering with the environment.

Scope Objective and Criteria of the Environmental Impact Assessment (EIA)

The Kenya Government policy on all new projects, programmes or activities requires that an environmental impact assessment is carried out at the planning stages of the proposed undertaking. The scope of this Environmental Impact Assessment, therefore, covered:

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

The scope of the assessment covered construction works of the proposed development which includes ground preparation, masonry works and installation of service lines as well as the

utilities required by the development. The output of this work was a comprehensive Environmental Impact Assessment Study Report for the purposes of applying for an EIA license.

The main objective of the assignment was to assist the proponent prepare a study report after carrying out an Environmental Impact Assessment (EIA) of the proposed development to ensure that appropriate measures to mitigate any adverse impacts to the environment are taken into consideration. The Environmental Impact Assessment carried out on the project identified existing and potential environmental impacts and possible concerns that interested and/or affected parties have with the development, as well as the associated prevention and mitigation measures for the negative impacts as stipulated in the Environmental Management Plan (EMP) proposed.

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

- Description of the nature of the proposed project;
- The location of the project including the physical area that may be affected by the project's activities;
- The activities that shall be undertaken during the project construction, operation and decommissioning phases;
- The design of the project;
- The materials to be used, products and by-products, including waste to be generated by the project and the methods of their disposal;
- The potential environmental impacts of the project and the mitigation measures to be taken during and after implementation of the project;
- An action plan for the prevention and management of possible accidents during the project cycle;
- A plan to ensure the health and safety of the workers and neighbouring communities;
- The economic and socio-cultural impacts to the local community and the nation in general;
- The project budget; and
- Any other information the Authority (NEMA) may require.

Methodology outline

The general steps followed during the assessment were as follows: -

- Environment screening, in which the project was identified as among those requiring environmental impact assessment under schedule 2 of EMCA, 1999
- Environmental scoping that provided the key environmental issues
- Desktop studies and interviews
- Distribution of questionnaires
- Physical inspection of the site and surrounding areas
- Reporting

Impacts and Mitigation Measures

Adequate environmental management systems will be incorporated during the entire planning, construction and operating stages of the project to minimize any adverse environmental

impacts and assure sustainable development of the area. A Summary of major impacts and mitigation measures is presented in the Table below.

Positive impacts	Impact Description
Employment opportunities	The construction and operation of the proposed Project are expected to offer employment opportunities; These range from unskilled, casual workers, semi-skilled and formal employees.
Impacts on local and national economy	Gains in the local economy will result from the utilization of locally available materials including: building stones, iron sheets, timber, bricks, paint, electrical cables, water storage equipment, water pipes, steel, glasses, fencing posts, sand, cement, fuels, etc. and paying of taxes to the government.
Optimal land use	Change in land use from underutilized land to land on which a modern high-rise development stands will optimize land use in the Area
Improved infrastructure	The operation of the proposed Project may induce improvements in infrastructure around the facility e.g.: - improved roads, electricity connection, regular maintenance of roads, storm water drainages and power lines around the building and environs

Negative Impacts	Mitigation Measures
Noise and vibrations generation	⍰ Comply with maximum permissible noise levels for constructions sites as per Second Schedule of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 ⍰ Apply for a License from NEMA whereby maximum permissible noise levels are to be exceeded ⍰ Prescribe noise reduction measures e.g. restricted working hours, transportation hours and noise buffering; ⍰ Install portable barriers to shield compressors and stationary equipment where necessary and locate stationary noise sources as far from existing sensitive receptors as possible; ⍰ Use quiet equipment (i.e. equipment designed with noise control elements such as mufflers)
Air pollution (dust and exhaust emissions)	⍰ Provide 2.4-meter-high hoarding along site boundary ⍰ Provide effective dust screen, sheeting or netting where a scaffolding is erected around the perimeter of a building under construction, from the ground floor level of the building, or if a canopy is provided at the first-floor level, from the first-floor level, up to the highest level of the scaffolding ⍰ Any skip hoist for material transport shall be totally enclosed by impervious sheeting ⍰ Water all active construction areas when necessary ⍰ Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard; ⍰ Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction site; ⍰ Down wash of trucks (especially tyres) prior to departure from site ⍰ Use of electrically operated construction machinery to avoid externalities produced by diesel engines

Negative Impacts	Mitigation Measures
Health and safety risks	▯ Security shall be enhanced by ensuring security guards are always posted within and around the project site and strategic placement of security lights around the site. ▯ A roster of all construction workers shall be kept while measures shall be put in place to ensure that loitering by itinerant workers is discouraged ▯ Unattended public access to the construction site shall be restricted and only one entry/exit point shall be used ▯ Appropriate health and safety measures shall be implemented as per the OSHA Act 2007 ▯ Warning signs should be placed in appropriate places. ▯ Safety education and training of the construction workers should be undertaken. ▯ Appropriate Personal Protective Gear shall be worn at all times by all within the construction site including visitors ▯ Install appropriate fire management equipment
Deep trenching/ excavation risks	▯ A barricade at least 3 feet high must be erected around a trench that is 1 meter or deeper ▯ Excavated material should not be placed less than 4 feet from the edge of a trench to minimize risk of collapse due to the weight of the spoil ▯ Where a possibility of collapse or cave of an excavation exists, it should be shored, shielded, benched or battered to prevent the collapse or cave-in. ▯ Ladders must be provided no more than 20 meters apart in the area where excavation works are being carried out
Soil erosion and water logging	▯ Terrace, level and rip off compacted areas of the project site to reduce run-off velocity and increase infiltration of storm water into the soil ▯ Dig trenches and cut off drains to channel runoff into existing peripheral storm water drains ▯ Surface runoff should be harvested where applicable for reuse during construction works
Waste generation	▯ Use durable, long-lasting materials that will not need to be replaced often, thereby reducing the amount of construction waste generated over time; ▯ Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or

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Negative Impacts	Mitigation Measures
	exposure to the elements; - Use building materials that have minimal packaging to avoid the generation of excessive packaging waste; - Use construction materials containing recycled content when possible and in accordance with accepted standards - Ensure adequate collection and storage of waste on site and safe transportation to licensed disposal sites by licensed waste handlers
Increased traffic	- Any work that disturbs normal traffic signal operations shall be coordinated with the relevant authorities - Ensure that the Entry/Exit to the project site is located where it will cause minimal traffic - Ensure all construction vehicles to and from the construction site use the designated Entry/Exit to the project site - All transportation of construction raw materials and excavated materials are to be conducted at traffic off peak hours only - Cover all trucks hauling soil, sand and other loose materials to avoid spillage and dust emissions that may interfere with smooth motoring - "NO PARKING" signs will be posted around the building where Parking is prohibited and likely to cause obstruction as well as other necessary traffic signs - Traffic management/parking personnel shall be provided to monitor parking and ensure smooth motoring along the buildings adjacent roads
Increased water demand	- Promote awareness on water conservation and reducing water wastage - Reduce water delivery in taps, through the installation of low flow devices or aerators on taps - Press action taps, flush valves and urinal sensors shall be used to minimize water wastage in public washrooms - Install water efficient plumbing.
Increased Energy demand	- Improve lighting efficiency by efficient window placement during project design (day-lighting) - Identify and use equipment/systems having minimum energy consumption - Audit energy use occasionally - Use alternative energy sources such as solar power

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Negative Impacts	Mitigation Measures
	Other mitigation measures are outlined within the report

Conclusion

Considering the proposed location, construction, management and mitigation measures that will be put in place and the project's contribution in the provision of quality facility and creating employment opportunities its implementation is considered important and beneficial.

The key effort should be geared towards safeguarding the environment. This can be effectively overcome through close following and implementation of the recommended Environmental Management Plan.

1. INTRODUCTION

1.1 Background and rationale for an Environmental Impact Assessment (EIA)

Jesus House of Praise is proposing to construct a **thirty-storey** mixed use urban development on plot L.R No **NTIMA/IGOKI/3235** located along Meru-Embu-Nairobi Highway, Meru town, Meru county. The proposed development will mainly comprise of Office spaces, Retail spaces, Apartments, church halls, swimming pool, gym, supermarket, serviced apartments, hotels, conference halls, Retail Parking and associated ancillary facilities within the proposed plot.

According to Sections 58 and 138 of the Environmental Management and Coordination Act (EMCA) of 1999 and Part II and III of the Environmental (Impact Assessment and Audit) Regulations 2003 (Legal No. 101), construction of the proposed development requires an Environmental Impact Assessment Report prepared and submitted to the National Environment Management Authority (NEMA) for review and eventual Licensing before the development commences.

1.2 Terms of reference (TOR)

The TOR for this assessment is based on the Environmental (Impact Assessment and Audit) Regulations dated June 2003. According to the Regulations the Study Report should where possible, contain description of the following: -

- Description of the nature of the proposed project;
- The location of the project including the physical area that may be affected by the project's activities;
- The activities that shall be undertaken during the project construction, operation and decommissioning phases;
- The design of the project;
- The materials to be used, products and by-products, including waste to be generated by the project and the methods of their disposal;
- The potential environmental impacts of the project and the mitigation measures to be taken during and after implementation of the project;

- An action plan for the prevention and management of possible accidents during the project cycle;
- A plan to ensure the health and safety of the workers and neighbouring communities;
- The economic and socio-cultural impacts to the local community and the nation in general;
- The project budget; and
- Any other information the Authority (NEMA) may require.

1.3 Scope and objective of the Environmental Impact Assessment

1.3.1 Scope

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

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

1.4 Methodology of the Environmental Impact Assessment

1.4.1 Data collection procedures

Data collection was carried out through administration of questionnaires, use of checklists, observations and photography, site visits and desktop environmental studies, where necessary, in the manner specified in Part V (Section 31-41) of the Environmental (Impact Assessment and Audit) Regulations, 2003.

1.4.2 Desktop study

This included documentary review on the nature of the proposed activities, project documents, Meru County Development Plan, and relevant legislative and regulatory frameworks among others. It also included discussions with the developer, project managers, architects and design engineers.

1.4.3 Site assessment

Field visits were carried out specifically for physical inspection of the proposed project site characteristics and the environmental status of the surrounding areas to determine the anticipated impacts. It also included taking photographs of the proposed site, access roads that will be used to access the site and other important features within the site and the surrounding areas.

1.4.4 EIA public consultation

To ensure adequate public consultation in the EIA process, the consultant prepared questionnaires which were administered to the site neighbors within a one Kilometer radius and the information gathered was subsequently synthesized and incorporated into the EIA Study Report. The appendices contain random sample copies of the Completed questionnaires that were administered and the public meeting attendance register. Project consent forms have also been given to various agencies for their comments on the proposed project.

1.4.5 Reporting and documentation

A comprehensive EIA Study Report containing the findings has been compiled by the Consultant in accordance with NEMA guidelines and submitted to NEMA by the Firm of Experts on behalf of the proponent for consideration and approval. The Consultant ensured constant briefing of the client during the exercise. Description plans and sketches showing various activities are part of the Appendices.

The Study Report outline is as follows:

- **Executive Summary**
- **Chapter 1:** Introduction
- **Chapter 2:** Description of the Project
- **Chapter 3:** Baseline Information of the Study Area
- **Chapter 4:** Relevant Legislative and Regulatory Frameworks

- **Chapter 5:** Public Participation
- **Chapter 6:** Analysis of Project Alternatives
- **Chapter 7**: Assessment of Environmental Impacts
- **Chapter 8:** Impacts Mitigation and Monitoring
- **Chapter 9:** Environmental Management Plan
- **Chapter 10:** Conclusion and Recommendations.
- **References**
- **Appendices**

1.5 Obligations of the consultant

The Consultant undertook all the works necessary to produce the Environmental Study Report and the supporting details for submission to NEMA. In order to do this, the Proponent provided a contact person to provide information required by the Consultant and background information of the proposed project. The Proponent also provided copies of land ownership, design drawings and estimated project cost. Copies of the land title deeds of the proposed site and design drawings are appended within the Appendix of this study Report.

2 PROJECT DESCRIPTION

2.1 Project brief

Jesus House of Praise is proposing to construct a thirty-storey mixed-use urban development on plot L.R No **NTIMA/IGOKI/3235** located in Meru. The proposed development will mainly comprise of Office spaces, Retail spaces, apartments, serviced apartments, Hotels, a swimming pool, gym. Church halls, Retail Parking and associated ancillary facilities within the proposed plot. The actual design components of the project include: -

- Construction of a thirty-storey building with 2 lower ground levels
- Construction of a driveways, sidewalks and parking bays
- Development utilities (water, drainage, electricity, health and safety systems, IT systems and security)
- Site landscaping/beautification

2.2 Location and size of the project

The proposed project site is located in a Land Parcel identified as **L. R. No. NTIMA/IGOKI/3235** and covers a total area of **0.4 hectares.** The proposed project site GPS coordinates are **0°2'31.9668"N** - **37°39'13.2264"**E and it is situated along Meru-Embu-

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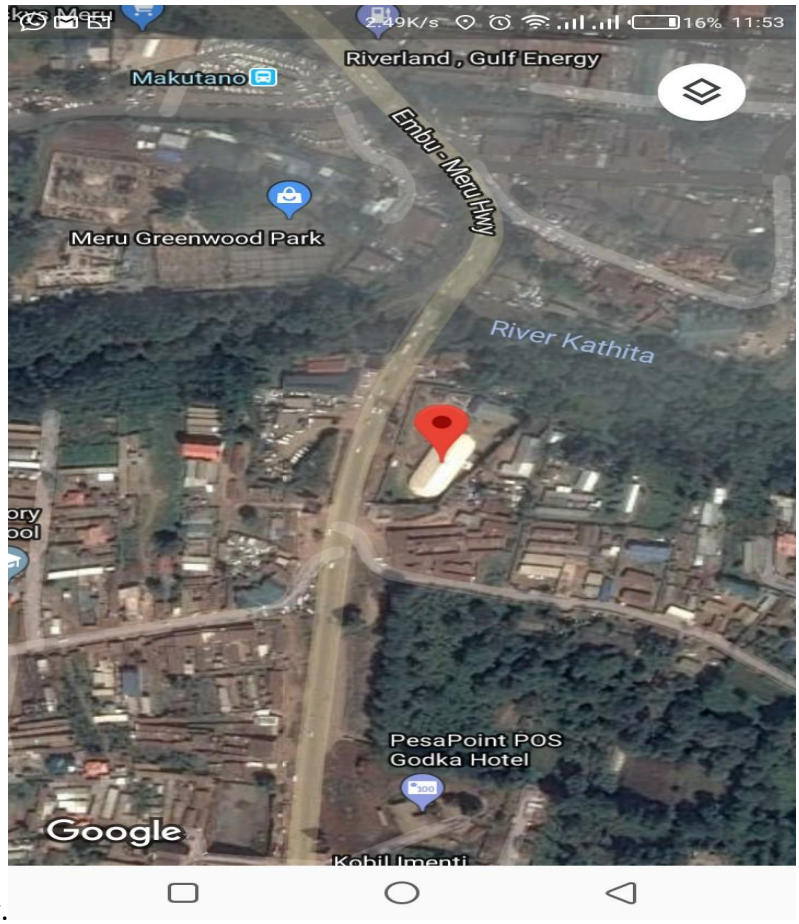
Nairobi Highway in Meru town, Meru County. The project plot can be accessed from the highway.



Map 1: Location of the proposed project

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Table 1: Project description and details

	ITEM		DETAILS
1	Proponent		**Jesus House of Praise**
2	Project Description		**Proposed mixed use urban development**
3	Main components		**Office spaces, Retail spaces, Apartments, Serviced Apartments, Hotel, restaurants, church halls, conference halls, swimming pool, gym and retail parking**
4	Number of Floors		**30-storey**
5	Project Cost		**Ksh. 4,524,042,292.14**
6	Plot LR. No.		**NTIMA/IGOKI/3235**
7	Plot Size		**0.4 Hectares**
8	Access road/street		**Meru-Embu-Nairobi Highway**
9	General area		**Meru town, Meru County**
10	GPS Coordinates	Latitude	**0°2'31.9668"N**
		Longitude	**37°39'13.2264"**E
11	Distance from Meru CBD		**1.6 KM**
12	Notable neighbours		**Solid Rock Church** **Kwa Nthambi, Gitimbine, Market** **Pesa Point POS Godka Hotel** **Destiny Academy** **Business center- Towngate Shopping Centre**
13	Available infrastructure		**Meru-Embu-Nairobi Highway** **KPLC mains** **MEWASS piped water mains** **MEWASS sewer mains**
14	Structures on site		**Tent (large)** **Semi-permanent building** **Tarmacked driveway**
15	Vegetation on site		**Trees within various parts of the compound** **Vegetable garden**

2.3 Existing Structures

As indicated in Table 1 above the proposed project site is currently occupied by several non-permanent structures. The project plot is surrounded by a natural hedge fence which fall within the plot i.e. parts of the project site extend outside the erected fences. The project plot borders Meru-Embu-Nairobi Highway to the West, Kwa Nthambi Market to the South and Solid Rock Church to the East. Parts of the compound are occupied by tall trees which surround the project site. The area is served by MEWASS piped water and sewer line connection as well as KPLC electricity power.

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Plate 1: Existing buildings/structures within the proposed project site

Plate 2: A view showing the site entrance

2.4 Character of surrounding environment

Jesus House of Praise area and the surrounding area consist mainly of several commercial premises and is an upcoming business district in the town of Meru. Currently the area is dominated by single-storey commercial and mixed-use buildings. Opposite the site is a business centre known as Town-Gate Place. The proposed development will thus be suitable for the area and will complement it in terms of development.

Plate 3: TOWNGATE Centre as seen from the project site

2.5 Building particulars

The Design of the building incorporated a 'whole building approach' in line with the design requirements of high-performance buildings. This approach generally involves the integration of all building components and systems and determines how they best work together to save energy and water and also reduce environmental impact. In general, the design of the project will essentially optimize the use of best available technology to prevent or minimize potentially significant environmental impacts associated with the project and to incorporate efficient operational controls together with trained staff, to ensure high level business and environmental performances. Specific details of the proposed development are outlined in the proposed projects Architectural Drawings containing the site plan, layouts, sections, elevation and other plans that illustrate the development in more detail attached within the appendices. The proposed buildings design proposes 30 storey structure with two lower basement levels mainly to serve as the buildings parking bays. The buildings will have the following main components,

1. Office spaces
2. Retail spaces; supermarket and shops
3. Apartments reception

4. Serviced Apartments
5. Hotel reception
6. Parking
7. Service areas/rooms
8. Church halls
9. Conference halls
10. Swimming pool and gym
11. Arcade
12. Balcony
13. Lounge
14. Stores

Table 2 below indicates on which floor each of the above components shall be located in and the gross area to be occupied by each in total ;

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Table 2: Gross area schedule summary

	Parking	Rooms	Church	Hall	Restaurant	Food Court	Kitchen	Ball Room	Arcade	Lounge	Ladies & Gents	Store	Shops	Hotel Reception	Apartment Reception	Supermarket	Lobby	Bath	Balcony	Conference Hall	Pool & Gym
Floors																					
Basement -1	64											1									
Basement -2	136											1									
Ground Floor									1				14	1	1		2				
Mezzanine 1st Flr																2	1				
Mezzanine 2-4th Flr											1		17								
Mezzanine 5th Flr						4	2				1										
Mezzanine 6th Flr				1	1		1										4				
Mezzanine 7th Flr				1				4			1						3				
Typical 1-28th Flr		28 @					4 @			8 @								28 @	28 @		
29th Floor					2		2				3						1				
30th Floor											2						2			5	
Artic Floor										1	1						4				1
Total	200	784	2	3	4	117	4	1	225	9	2	31	1	1	2	17	784	784	5	1	

2.5.1 Parking area and driveway

Two lower ground floors (basement) which are part of the project design will be designated mainly as vehicle car park. Both basement 1 and 2 which will mainly be parking spaces will have a total of 200 parking bays. All parking areas and driveways will be concrete screed or paved using cabro paving blocks while entry/exit ramps will be made of concrete. The driveways and entry/exit ramps will measure 6 meters and will be spacious such as to allow easy turning and passage of vehicles and will provided with adequate road signs and markings to ensure smooth traffic flow. A gate house will also be provided at the building entry/exit for sentries to control and monitor the in and outflow of vehicles.

2.5.2 Electrical system

The development will be connected to the electricity main line of the Kenya Power and Lighting Company which already exists within the project area and thus will be used in all phases of the project. There will be an 11,000Kva main line with a bulk meter which will then be stepped down through ABB step down transformers to 220 V. It is also expected that a generator(s) will be installed within the development once complete. The necessary guidelines and precautionary measures relating to the use of electricity shall be adhered to.

2.5.3 Security

Security within and around the project during construction and during operational phases will be enhanced by security guards posted at the site and installation of security lighting around the project site. During operation, 24 hours security will be incorporated by having security guards on site, radio call security alarms systems, closed circuit television surveillance and security lighting around and within the premises.

2.5.4 Health and Safety systems

Several health and safety implements will be incorporated into the project design so as to boost the emergency response and preparedness index of the building. Emergency staircases shall be incorporated from the topmost floor to the ground floor while hose reels shall be located at several strategic points of each floor. Portable fire extinguishers and smoke detectors shall be incorporated at strategic points in all floors including the basement floors. Emergency response and "Emergency Exit" notices will also be posted where applicable and appropriate.

2.5.5 Water reticulation system

Water from the Meru Water & Sewerage Company will be used during the construction phase of the project. It has been proposed that a borehole will be dug within the project site; if this is done water supply from MEWASS shall be augmented by borehole water during the operational phases of the project. Underground water reservoir tanks shall be built on site while overhead (rooftop) water tanks shall also be used to increase water storage capacity within the project. Necessary pumps shall be installed to facilitate water pumping into overhead tanks.

2.5.6 Storm water run-off

All storm water drainage will be channeled into storm water drains which will be constructed within the project surroundings and within the basement car parks. The drains will then be channeled to the nearby existing peripheral Meru county storm water drainage systems. All inspection chambers in the driveway and parking will have heavy duty covers.

2.5.7 Waste water/Sewerage

Foul water drainage from the building block will be connected to the Meru Water & Sewerage Company (MEWASS) main sewer line running in Meru town. All sanitary works will be up to M.O.H standards.

2.5.8 Landscaping

The project site will be landscaped after construction, using plant species available locally. This will include establishment of flower gardens and water fountains to improve the aesthetic quality of the site. Sidewalks and decks will also be incorporated around the project site to allow easy access and provide a beautiful finish to the project exterior.

2.6 Description of the project's construction activities

2.6.1 Pre-construction investigations

The implementation of the proposed project's design and construction phase will start with thorough investigation and studies of the site's biological, physical and socio-economic factors in order to minimize any unforeseen adverse impacts during the project cycle. Infrastructure assessment studies shall also be conducted so as to harmonize the proposed project with existing infrastructure and amenities.

2.6.2 Site set up and management

This involves activities such as screening, fencing the project site, setting up temporary offices, construction of temporary roads, car parks, storage areas etc.

2.6.3 Demolition works and site clearance

Site clearance process entails any obstruction on the way of the intended construction activity. This entails demolition of any existing structures on site and clearing of obstructions including vegetation that may lie within the proposed project path. In this case there are several permanent structures on the project site hence demolition works are anticipated. Clearance of existing vegetation including trees and grasses will also be inevitable if the design of the buildings is considered. Site clearance will result in significant generation of solid waste generation which should be disposed by using appropriate methods to be identified within this report.

2.6.4 Ground works

Ground works such as excavation and deep trenching, filling, and the construction of earth structures e.g. embankments, bunds and cuttings; will be carried out to prepare the site for construction of foundations and drainage systems. This may involve the use of machinery such as excavators, bulldozers, backhoes, track hoes and also manual labour.

2.6.5 Construction of foundations and structural works;

The construction of the buildings foundations, walls, floors, pavements, drainage systems and parking area among other components of the proposed project will involve a lot of masonry work and related activities. General masonry and related activities will include concrete mixing, plastering, slab construction, construction of foundations, construction of the envelope of the building, the external facings, cladding, erection of building walls and curing of fresh concrete surfaces. These activities are known to be labour intensive and will be supplement by machinery such as concrete mixers, tower hoists, pavers, concrete vibrators.

2.6.6 Structural steel works

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

2.6.7 Mechanical and electrical installations and associated trades

Electrical work during construction of the buildings will include installation of electrical gadgets and appliances including transformers, generators, meters, electrical cables, lighting apparatus, sockets etc. In addition, there will be other construction activities

involving the use of electricity such as welding, metal cutting, running electrical gadgets etc. Plumbing will entail the installation of pipe-work for water supply and distribution will be carried out within the building and associated facilities. In addition, pipe-work will be done to connect the building into the existing sewer system and for drainage of stormwater from the rooftops and driveways into the peripheral storm water drainage system. Other associated trades include as joinery, painting, window placement and plastering. These activities will include metal, wood, glass, plastic and ceramic tiles cutting, the use of adhesives, metal grinding and wall drilling among other activities.

2.6.8 Landscaping and habitat restoration or creation

To improve the aesthetic value or visual quality of the site once construction ceases, landscaping will be carried out. This will include establishment of flower gardens and sidewalks to improve the visual quality of the site. The use top soil and indigenous plant species that are available locally is preferable.

2.6.9 Site reinstatement, removal of site offices and final clear away

This includes site reinstatement, removal of temporary building structures such as scaffolds and props, removal of fittings machinery and equipment and final clear away of surplus spoil.

2.7 Description of the project's operational activities

2.7.1 Commercial and residential activities

Office, retail space, residential premises and hotel services shall be available for occupation once the construction of the building is complete. Several commercial activities such as private office use, conference and seminars, exhibition of items, running of restaurants, gymnasium etc. will thus be carried out within the building. The presence of residential premises and serviced apartments within the building will also mean that several residential activities will be carried out within the building. Vehicle use and parking will also occur.

2.7.2 Partitioning, general repairs and maintenance

The building and associated facilities will be repaired and maintained regularly during the operational phase of the project. Such activities will include repair of building walls and floors, repair and maintenance of electrical gadgets and equipment, repairs of leaking water pipes, painting, maintenance of flower gardens and replacement of worn out materials among others. Partitioning of some of the open office and retail spaces may also be carried out from time to time.

2.7.3 Housekeeping

Regular cleaning (sweeping, mopping, vacuuming, polishing etc.) of the building's floors, carpets, staircases, pavements and general compound is expected to be carried out during the operational phase of the project. Individual tenants will be responsible for cleaning their apartments while general areas shall be cleaned by the various building appointed agents.

2.8 Description of the project's decommissioning activities

2.8.1 Demolition works

Upon decommissioning, the proposed project components including the building, pavements, drainage systems, parking areas and perimeter fence will be demolished.

2.8.2 Dismantling of equipment and fixtures

All equipment including electrical installations, furniture partitions, pipe-work and sinks among others will be dismantled and removed from the site on decommissioning of the project.

3 BASELINE INFORMATION

3.1 Background information on the project area

Meru County is one of the Forty-Seven (47) counties of Kenya strategically located east of Mt. Kenya, whose peak cuts through the outskirt of its southern boundary. The county has a total area of 6,936.2Km2 out of which 972.3Km2 is gazetted forest. The county borders five counties; to the North it borders Isiolo County, to the East Tharaka/Nithi County, to the South West Nyeri County and to the West Laikipia County. It spans the equator lying 0˚6 ' North and 0˚1' South and between latitudes 37˚ West and 38˚ East. The county's position on the eastern slopes of Mt Kenya and the equator has highly influenced its natural conditions. Altitude ranges from 300m to 5,199m above sea level. This has influenced the atmospheric conditions leading to a wide variety of microclimates and agro-ecological zones. The drainage pattern in the county is characterized by rivers and streams originating from catchment areas such as Mt. Kenya and Nyambene ranges in the North of the county. The rivers cut through the hilly terrain on the upper zones to the lower zones and drain into the Tana and EwasoNyiro Rivers. The rivers form the main source of water for both domestic and agricultural use.

Kathita River is a river in eastern Kenya is the longest river in Meru. The river flows in a north-easterly direction from a source high on Mount Kenya around Ithangune and Rutundu hills from where it flows easterly through thick equatorial rainforests towards Meru Town, and in a southeasterly direction into River Tana. It is the northernmost of the Mt. Kenya tributaries of the Tana River. The Solid Rock Church, Kwa Nthambi, Gitimbine Market and River Kathita are the main landmarks surrounding or near the project area.

3.2 Constituencies

The county government administrative structure comprises of nine recognised (9) subcounties, forty five (45) wards and three hundred and ninety two (392) villages The 9 sub-counties include: Imenti South, Meru Central, Imenti North, Buuri, Tigania East, Tigania West, Igembe Central Igembe South and Igembe North. For the national government administration, there are ten (10) recognised sub-counties, namely Imenti South, Meru Central, Imenti North, Buuri, Tigania East, Tigania Central, Tigania West, Igembe Central, Igembe South and Igembe North; 28 divisions, 133 locations and 351 sub-locations.

3.3 Infrastructure

Roads Network; The county has 5,968 km of road network. This comprises of 582 km bitumen, 581 km gravel and 4,805 km of earth surface roads. This network is maintained by

different road agencies such as KeRRA, KURA, KeNHA and County Government. Eighty percent of the earth roads are under the mandate of the county government. However, during the rainy seasons, some sections of earth surface roads are impassable

Airports and Airstrips; The county is served by the Isiolo International Airport and a number of airstripts, namely: Gaitu, Mitunguu and private airstrips which include; Lewa wild life conservancy, Meru national park, Kisima farm, Oldonyo farm, Embori farm and Maarania farm airstrips.

Major Bus and Lorry Parks/Terminus; Meru county has several upgraded bus parks which include; Nkubu offset, Kionyo, Nkubu main stage, Gitimbine, Gakoromone offset, Samrat, Riverland, G4S, Meru main stage, Personality, Makutano main stage, Makutano offset, Timau main stage, Kianjai offset, Maua Main stage, Kariene, offset, Laare and Maua offset.

Information, Communication Technology; Meru County Government has focused on the investment in information and Communication Technology (ICT) to improve governance and service delivery. Most private and public organizations/Institutions have embraced ICT in the day to day operations. There is high demand for internet services and communication requirements. Most of the areas in the county are covered by mobile phone network. The areas without mobile network coverage are mainly areas of Tigania East Sub-County.

Energy Access; According to Kenya Population Census 2009, the main source of energy for cooking by household is wood fuel and charcoal which accounts for 86.1 per cent and 6.6 per cent respectively. The number of households connected to electricity is 13.6 per cent; those using paraffin are 4.5 per cent, gas 2.4 per cent, biogas 0.1 per cent and solar 6.6 per cent. Major public and private institutions are connected to national grid but the major challenge for the county is how to connect the over 85 per cent households with electricity. Meru County boasts of immense green energy generation potential. The potential can be tapped from the main rivers with good site for hydro-power, a wind speed of approximately 7m/s ideal for wind energy and solar radiation of 6.2KWh/m2 /day.

3.4 Population

The County's population growth rate is estimated at 2.1 per cent per annum. The projected population of the county in 2018 is 1,635,264, consisting of 808,596 males and 826,668 females. The county population is projected to grow to 1,703,945 in 2020 and 1,775,511 in 2022. The growth in population will be a strain on available resources such as land, water and natural resources but on the other hand provides opportunity for growth. The urban population is projected at 68,687 males and 70,007 females as at 2018 with approximately 60 per cent of the total urban population residing in Meru Town. The rise of urban

population from 115,033 in 2009 to the projected figure of 150,587 in 2022 is expected to provide an expanding urban market but will also strain the available urban resources. This calls for prior planning of available resources and expansion of social and economic facilities in the urban areas to accommodate the expanding population. The growth in population within the urban centres will expand central markets for agricultural and industrial products within these centres that call for investment in the agricultural value chain to meet this demand.

3.5 Climate

The distribution of rainfall ranges from 300mm per annum in the lower midlands in the North to 2500mm per annum in the South East. Other areas receive on average 1250mm of rainfall annually. There are two seasons with the long rains occurring from mid-March to May and short rains from October to December. Temperatures range from a low of 8oC to a high of 32oC during the cold and hot seasons respectively.

3.6 Economic activities

The economy of Meru is primarily agrarian. The growing of a variety of crops and keeping livestock in some parts of the county form a critical chunk of the economic activities of the people of Meru. The Greater Meru is endowed with soils and climatic conditions that allow for the production of a variety of commodities including wheat, barley, potatoes, millet, sorghum and maize. High grade tea, coffee, bananas and Miraa (Khat) are the key cash crops. The Meru were indeed the first Africans to grow coffee in Kenya in early 1930s upon the implementation of the Devonshire White Paper of 1923. Other crops include groundnuts and a wide range of legumes, vegetables and fruits.

3.7 Water resources and quality

The county has eleven (11) permanent rivers with major one being River Kathita which is a tributary to River Tana. The county has several shallow wells, protected springs, water pans, Public and Private Dams and boreholes. These form the major sources of water for domestic use and irrigation. The quality of waters in the county is good hence recommended for both domestic use and irrigation as it originates from pristine catchment areas within Mount Kenya and Nyambene forests. Despite this, the land use practices and increase in use of agrochemicals in agriculture sector tend to pollute the water as it flows downstream.

The county has water supply in some urban centres mainly from rivers originating from Mt. Kenya forest and Nyambene hills. Meru Water and Sewerage Company (MEWASS) is the only company licensed to supply water and sewerage services in Meru and Maua towns. IMETHA Water Company supplies water to all other towns and markets around the county. Other small water projects including church owned Diocese of Meru water and sewerage company (DOMWASCO) have been started through community initiatives due to high demand for domestic and irrigation especially in arid areas of the county.

Water management Institutions in Meru County include; MEWASS, IMETHA and DOMWASCO. These institutions work with community water projects committees to ensure sustainable usage of water in the county. The County Government is embarking on various

activities to protect water catchment areas for sustainability through of planting bamboo trees.

3.8 Environment

The main causes of environmental degradation in the county is attributed to anthropogenic activities such as farming, mining, road construction, human settlements and overstocking of livestock. Human activities such over cultivation, overgrazing, uncontrolled mining as well as settlements along sensitive ecosystems disturb the ecological setup and expose soil to erosion, reducing its ability to sustain natural regeneration. The major degraded areas within the county comprise of degraded river ecosystems, hill ecosystems and forest ecosystems. Among the major hotspots comprise of stone and sand mining quarries which are prone to collapsing especially during rainy seasons. Nchuura hills are prone to massive erosion which has resulted to heavy losses of fertile soils within Nkomo and Kianja wards. The primary contributor to all the natural atrocities is the ever-increasing population which as a result exerts more pressure to the finite land resource.

Deforestation poses a serious challenge which is the loss or reduction of tree cover and forests. Most of the public hills have been demarcated and allotment done to individuals, this has posed challenges making conservation planning slow or impossible. Within the grazing areas, there has been reported cases of invasive species colonizing the area. The invasive species have colonized the grazing lands due to their unpalatability.

GPS READINGS: N 0°2.52726’ E 37°39'20.20532’

4 RELEVANT LEGISLATIVE AND REGULATORY FRAMEWORKS

4.1 Introduction

According to Sections 58 and 138 of the Environmental Management and Coordination Act (EMCA) No. 8 of 1999 and Section 3 of the Environmental (Impact Assessment and Audit) Regulations 2003 (Legal No. 101), new projects require an Environmental Impact Assessment project report prepared and submitted to the National Environment Management Authority (NEMA) for review and eventual Licensing before the development commences. This was necessary as many forms of developmental activities cause damage to the environment and hence the greatest challenge today is to maintain sustainable development without interfering with the environment.

4.2 Environmental Policy Framework

Environmental Impact Assessment (EIA) is a methodology used to identify the actual and probable impacts of the projects and programmes on the environment and to recommend alternatives and mitigating measures. The assessment is required at all stages of project development with a view to ensuring environmentally sustainable development for both existing and proposed public and private sector development ventures. The National EIA regulations were issued in accordance with the provisions of Environmental Management and Coordination Act (EMCA) of 1999. The EIA Regulations must be administered, taking into cognizance provisions of EMCA 1999 and other relevant national laws. The intention is to approve and license only those projects that take into consideration all aspects of concern to the public as they impact on health and the quality of the environment.

4.3 Institutional Framework

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

4.3.1 National Environmental Management Authority (NEMA)

The object 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.

4.4 Environmental Legal Framework

Environmental Management and Co-ordination Act No. 8 of 1999, provide a legal and institutional framework for the management of the environmental related matters. It is the framework law on environment, which was enacted on the 14th of January 1999 and commenced in January 2002. Topmost in the administration of EMCA is National

Environment Council (NEC), which formulates policies, set goals, and promotes environmental protection programmes. The implementing organ is National Environment Management Authority (NEMA). EMCA comprises of the parts covering all aspects of the environment.

Part VIII, section 72 of the Act prohibits discharging or applying poisonous, toxic, noxious or obstructing matter, radioactive or any other pollutants into aquatic environment. Section 73 requires that operators of projects which discharge effluent or other pollutants submit to NEMA accurate information about the quantities and quality of the effluent. Section 74 demands that all effluent generated from point sources are discharged only into the existing sewages system upon issuance of prescribed permit from the Local Authorities.

4.4.1 Environmental Management and Coordination Act (EMCA), 1999

Environmental Management and Co-ordination Act No. 8 of 1999, provides a legal and institutional framework for the management of the environmental related matters. It is the framework law on environment, which was enacted on the 14th of January 1999 and commenced in January 2002. Topmost in the administration of EMCA is National Environment Council (NEC), which formulates policies, set goals, and promotes environmental protection programmes. The implementing organ is National Environment Management Authority (NEMA). EMCA comprises of the parts covering all aspects of the environment. The Second Schedule to the Act specifies the projects for which an EIA and environmental audit must be carried out. According to the Act, Section 68, all projects listed in the Second Schedule of the Act must undertake an Environmental Impact Assessment, keep accurate records and make annual reports to NEMA or as NEMA may, in writing, require. The Environmental (Impact Assessment and Audit) Regulations, 2003, provide the basis for procedures for carrying out Environmental Impact Assessments (EIAs) and Environmental Audits (EAs). The main objectives of the Act are to:

- Provide guidelines for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya;
- Provide a framework legislation for over 70 statutes in Kenya that contain environmental provisions;
- Provide guidelines for environmental impact assessment, environmental audit and monitoring, environmental quality standards and environmental protection orders.

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

The Environmental (Impact Assessment and Audit) Regulations, 2003 state in Regulation 3 that "the Regulations shall apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Act". Regulation 4(1) further states that:

''…no proponent shall implement a project:

a) likely to have a negative environmental impact; or

b) for which an environmental impact assessment is required under the Act or these Regulation unless an environmental impact assessment has been concluded and approved in accordance with these Regulations…''

Compliance

- **The Proponent has commissioned the carrying out of an Environmental Impact Assessment for submission to NEMA for approval.**
- **The Proponent undertakes to protect the environment during the implementation (Construction and Operation) of the project and also carry out annual Environmental Audits.**

4.4.3 Waste Management Regulations, 2006

Part II of the Waste Management Regulations 4 (1) states that no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated receptacle. Regulation 4 (2) further states that a waste generator shall collect, segregate and dispose such waste in the manner provided for under the regulations.

Compliance

- **The proponent has undertaken to ensure that all waste generated is collected and handled appropriately and disposed off at a designated waste disposal sites**

4.4.4 Noise and Excessive Vibrations

Part II of the Noise and Excessive Vibrations regulations, regulation 3 (1) states that Except as otherwise provided in these Regulations, 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.

Regulation 4 of the Noise and Excessive vibrations: - states that except as otherwise provided in the Regulations, no person shall-

(a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, 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; Regulation 11 on Machinery: - states that any person wishing to

(a) operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device; or

(b) Engage in any commercial or industrial activity, which is likely to emit noise or excessive vibrations shall carry out the activity or activities within the relevant levels prescribed in the First Schedule to the Regulations as shown in the **Table 4** below

Table 4: Maximum permissible noise levels

ZONE		Sound Level Limits dB(A) (Leq,14 h)		Noise Rating Level (NR) (Leq,14 h)	
A	Silent Zone	40	35	30	25
B	Places of worship	40	35	30	25
C	Residential : Indoor Outdoor	 45 50	 35 35	 35 40	 25 25
D	Mixed residential (with some commercial and places of entertainment)	55	35	50	25
E	Commercial	60	35	55	25

Compliance

- **The proponent has undertaken to ensure that all noise and vibration are kept below the maximum allowable threshold**

4.4.5 Water Quality Regulations, 2006

Part II of the Water Quality Regulations 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. Regulation 4 (2) further states no person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any

such substance in or near it, as to cause pollution. Regulation 6 (b) further states that no person shall abstract ground water or carry out any activity near any lakes, rivers, streams, springs and wells that is likely to have any adverse impact on the quantity and quality of the water, without an Environmental Impact Assessment license issued in accordance with the provisions of the Act; or (C) cultivate or undertake any development activity within a minimum of six meters and a maximum of thirty meters from the highest ever recorded flood level, on either side of a river or stream, and as may be determined by the Authority from time to time.

Compliance

- **The proponent undertakes to safeguard any natural water bodies within or near the project site.**

4.4.6 Water Act, 2002

Section 25 (1) of this Act states that a permit shall be required for any of the following purposes:

- any use of water from a water resource, except as provided by Section 26;
- the drainage of any swamp or other land;
- the discharge of a pollutant into any water resource; and
- Any purpose, to be carried out in or in relation to a water resource, which is prescribed by rules made under this Act to be a purpose for which a permit is required.

Part II, Section 18, of this Act provides for national monitoring and information system on water resources. Following on this, Sub-section 3 of the same Section, allows the Water Resources Management Authority (WRMA) to demand from any person or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may be required to be kept by a facility operator and the information thereof furnished to the Authority.

Compliance

- **The proponent undertakes to safeguard any natural water bodies within or near the project site.**

4.4.7 The Energy Act, 2006

The Act establishes an Energy Regulatory Commission 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 Environmental and Coordination Act of 1999 (No. 8 of 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.

4.4.8 The Occupational Safety and Health Act, 2007

This is an Act of Parliament to make provision for health, safety and welfare of persons employed in factories and other places, and for matters incidental thereto and connected therewith.

4.4.8.1 Building Operations and Works of Engineering Constructions

The provisions of the Factories and Other Places of Work Act relevant to engineering construction works are contained in the Abstract of the Act for Building Operations, and Works of Engineering Construction Rules. These are summarized in Table 5 below.

Table 5: Minimum health and safety requirements for engineering construction works

Legal Requirements	Description
General Requirements	
Give notice of particular operations or works	Notice should be sent in writing to the Occupational Health and Safety Officer, not later than seven days after commencement of construction and building works except where the construction works will be complete in less than six weeks or notice had already been given to the Occupational Health and Safety Officer
General Register	A general register of every person undertaking building operations or construction works is kept in adherence to the prescribed form. This register is kept at the site of operations or at the office of the person undertaking the operations or works. The register should contain: • The certificate of registration of the workplace; • Every other certificate issued by the Chief Inspector under this Act; • The prescribed particulars as to the finishing (washing, white washing, colour washing, painting or varnishing) of the facility; • The prescribed particulars as to every accident and case of occupational disease occurring in the workplace of which a notice is required to be sent to a labour officer under the provisions of any law for the time being in force; • All reports and particulars required by any other provision of this Act to be entered in or attached to the general register; • Such other matters as may be prescribed in the Occupational Safety and Health Act, 2007.
Safety Requirements	
Air receivers	These should be of sound construction and be properly maintained. They should be thoroughly examined by a competent person at intervals of 24 months and the reports of such examinations attached to the General Register
Cylinders for compressed, liquefied and dissolved gases	Such cylinders should be of good construction, sound material, and adequate strength and free from patent defect. The cylinders should conform to standards specified under the Standards Act or to a prescribed standard specification, approved in writing, by the Director, Kenya Bureau of Standards. They should be thoroughly examined by a competent person at regular intervals and a maintenance register kept

Legal Requirements	Description
Notification of accidents	The particulars of an accident causing death or disablement of a worker for more than three days from earning full wages at the work place where he was employed must be sent in the prescribed form to the Occupational Health and Safety Officer and entered in the General Register. Certain dangerous occurrences must also be reported whether or not they cause disablement
Health Requirements	
Sanitary accommodation	Sufficient and suitable sanitary conveniences must be available for persons employed. These must be kept clean and well lit
Miscellaneous Requirements	
Prohibition of deduction from wages	The occupier must not make a deduction from wages in respect of anything he has to do or provide in pursuance of the Factories Act or permit any person in his employment to receive payment from other employees for such services
Duties of persons employed	An employee must not willfully interfere with or misuse any means, appliance, convenience or other thing provided in pursuance of the Act for securing health, safety or welfare provided for his use under the Act. He must not willfully and without reasonable cause do anything likely to endanger himself or others
Inspection	The Occupational Health and Safety Officer has the power to inspect every part of the premises by day or by night. He may require the production of registers, certificates and other papers. May examine any person alone or in the presence of any other person as he thinks fit and may require him to sign a declaration of truth of the matters about which he is examined. Every person obstructing an Occupational Health and Safety Officer is liable to a penalty

4.4.9 Public Health Act (Cap. 242)

Part IX, section 115, of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health.

Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drainers or refuse pits in such state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into the public street or into the gutter or side channel or

watercourse, irrigation channel, or bed not approved for discharge is also deemed as nuisance. Other nuisances are accumulation of materials or

refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.

Compliance

- **The Proponent undertakes to safeguard the environment ensuring that all solid waste or waste water effluent emanating from the proposed project is discharged appropriately.**

4.4.10 Physical Planning Act, 1999

The Local Authorities are empowered under Section 29 of the Act to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section, therefore allows for the prohibition or control of the use and development of land and buildings in the interest of proper and orderly development of an area.

Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective Local Authority.

Finally, section 36 states that if connection with a development application, Local Authority is of the opinion that the proposed development activity will have injurious impact on the environment, the application shall be required to submit together with the application an environment impact assessment EIA report. EMCA, 1999 echoes the same by requiring that such an EIA is approved by the NEMA and should be followed by annual environmental audits. Land Planning Act (Cap. 303).

Section 9 of the subsidiary legislation (The Development and Use of Land Regulations, 1961) under this Act requires that before the Local authorities submit any plans to then Minister for approval, steps should be taken as may be necessary to acquire the owners of any land affected by such plans. Particulars of comments and objections made by the landowners should be submitted. This is intended to reduce conflict with the interest such as settlement and other social and economic activities.

Compliance

- **The Proponent has launched and obtained and shall apply for any other required approvals of the project development and licenses from all relevant Local Authority Offices.**

4.4.11 Building Code 2000

Section 194 requires that where sewer exists, the occupants of the nearby premises shall apply to the Local Authority for a permit to connect to the sewer line and all the wastewater must be discharged into sewers.

4.4.12 Urban and Cities Act No 13 of 2011

The Act came into function with regard to Article 184 of the Constitution providing regulations on the classification, governance and management of urban areas and cities and further providing the criteria of establishing urban areas. Part III of the Act gives the regulations and functions of every city or municipality with regard to integrated development plans, which shall include but not limited to environmental plans and disaster preparedness, within the area of jurisdiction in achieving objects of devolved governments under section 174 of the constitution while maintaining the socio-economic rights of the people.

Moreover, in the first schedule, the Act enlists the services the services that the any municipality shall provide to its residents which include but not limited to traffic control and parking, water and sanitation, refuse collection, solid waste management, pollution abatement services among others.

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

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

4.4.14 The Environment and Land Court Act, 2011

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

4.4.15 Licenses and permits

Ideally, the Proponent should demonstrate compliance to the legislation through acquiring of the appropriate licenses and permits. Further all contractors and consultants who will be engaged during the planning and design, construction, operation and maintenance and

decommissioning should demonstrate compliance to the necessary pieces of legislation. Those who will be involved should therefore provide the Proponent with all legal documents that shows that they are legally in the business or services that they intend to deliver to the Proponent. These includes: NEMA registration certificates and licenses, trade licenses, etc.

Compliance

- **The Proponent has launched and obtained and shall apply for any other required approvals of the project development and licenses from all relevant Local Authority Offices.**

5 PUBLIC PARTICIPATION AND CONSULTATIONS

5.1 Sources of Information

This chapter describes the process of the public consultation/participation followed to identify the key issues and impacts of the proposed mixed-use urban development in Meru. Views from the general public, local leaders, surrounding institutions and development partners who in one way or the other would be affected by the proposed project were sought through oral interviews, administering of questionnaires and a meeting on 17th September, 2018 and the findings were comprehensively analyzed. The meeting was successful with 31 participants taking part in the answering of questionnaires which have been attached in this report. Participants included primary stakeholders (deacons, bishop, pastor, Sunday school teacher, ushers, church members and security) and key informant stakeholders and they include the engineer of the project, project planner, the media, lawyer, business people, and civil servants. The various concerns and proposed mitigation measures suggested by the public, neighbours and other stakeholders have been integrated in the report. The exercise was conducted by a team of experienced & registered environmental experts from Lakers Consultancy Limited. The objective of the consultation and public participation was to: -

1. Disseminate and inform the stakeholders about the project with special reference to its key components and location
2. Gather comments, suggestions and concerns of the interested and affected parties
3. Incorporate the information collected in the EIA Study Report

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 Environmental Impact Assessment for the purpose of achieving the fundamental

principles of sustainable development. List of members of the public consulted has been attached under the public participation annex.

5.2 Issues raised

This Sub-Section covers the views and opinions of the key stake holders (local church leaders, members of the church and key informants such as engineer, project planner, business people lawyer, media, interested persons or groups. It highlights both positive and negative socio-economic and environmental impacts anticipated during the construction and operational phases of the project. Inputs from Water Resource Users Association was also captured. Through a meeting that was held with other members on 18/09/2018, the chairlady informed the group that Jesus House of Praise needs to develop their plot. The chairlady asked the developer that since the development is near the river, WRUA should do riparian marking and give their report. She asked the members to give their ideas on how the marking needs to be done. WRUA then provided their approval of the project and they stated that they have no objections to the development of the project. The approvals were done by the chairperson, secretary and treasurer. This is followed by suggested mitigation measures that the developer should incorporate to minimize environmental degradation and promote sustainable development.

5.3 Positive comments

Several positive impacts shall emanate from the proposed project as both directly and directly as viewed by the public. They include: -

- The project shall lead to the creation of employment during both the construction and operational phases both directly and indirectly. For example, Duncan Munene of ID No 27547778 notes that he mainly supports the project because it will avail many employment opportunities especially to the specialized groups such as youth and women.
- The currently idle land (unoccupied) shall be used optimally through the implementation of the project and that will increase value of land in the area. Jackson Bassey ID No states that the project will add positive value to the surrounding environment.
- The construction shall create demand for construction material and other electronic installations. There are various business people such as Jane M. Elijah who saw opportunities in this project because they will supply construction materials and perform electronic installations.

- Increased business opportunities due to the mixed-use nature of the building. There are various businesses which will need space in the building and that will bring diversity of business people in the building.
- Security will improve. The proponent will install security lighting and cameras on the site. There sill also be employment of security personnel who will be tasked with manning the project site to ensure that nothing wrong happens

5.4 Negative concerns

5.4.1 Noise and Dust emissions

Noise and Dust emissions will be generated at the project site during construction which if unmitigated can interfere with neighbours comfort and health. Mr. Daniel Musyoka ID No 33444984 states that the project will cause a lot of noise to those who are nearby. The project will also lead to dust emission because of the excavation activities.

5.4.2 Obstruction and traffic increase

Obstruction by construction transport vehicles during the construction phase and increased number of vehicles coming to and from the project during the operational phase will lead to increase in traffic along Meru-Nairobi highway. If entry and exit access routes to the building are not planned well traffic flow along the highway shall be also be disrupted. Mr. Daniel Musyoka also states that there will be huge traffic snurl-ups along the highway if proper measures are not put in place.

5.4.3 Dilapidation of existing roads

Heavy trucks transporting excavated materials and raw materials to and from the project site may lead to dilapidation of existing roads and also cause spillage of these materials on roads hence interfering with smooth motoring.

5.4.4 Insecurity

The proposed project may cause an increase in insecurity during the construction phase due to the increased number of transient workers and suppliers within and around the project site. Jane Elijah, ID No. 23004983 states that the road is narrow and there would be accidents around especially when children pass-by. That is the reason the proponent should have security personnel who will ensure that access to the site is for the workers.

5.4.5 Overstretching of infrastructure

It was feared by some that the conversion of idle land to a high-rise mixed-use commercial building may lead to the overstretching of public utilities and infrastructure such as sewer lines, water mains supply and roads

5.4.6 Storm water drainage

The sub-regional manager of water resources management authority in Meru, Mrs. Jackline had two issues of concern which included the management of waste water disposal and water abstraction for the construction project. She stated that she will wait for the full study report and then give her views.

5.4.7 Clearing of existing vegetation

Several sections of the project site earmarked for construction of the proposed project is currently occupied by mature trees and shrubs. The construction of the proposed development will thus inevitably lead to loss of some of this vegetation. It is recommended that all necessary permits be acquired before land clearing such that
some of the vegetation that does not fall on the building's footprint will be spared and incorporated into the projects landscaping plan.

5.4.8 Increased water and electricity demand

It is expected that both the workers and the construction works will create an increased demand for water and electricity in addition to the existing demand.

5.5 Suggestions and recommendations

- Conduct a Traffic Assessment Survey so as to aid in appropriate planning of traffic flow within and around the project site and the adjacent highway
- Consult all relevant service providers and relevant authorities (i.e. KURA, KPLC, Meru County, MEWASS, NEMA amongst others) so as to harmonize the projects infrastructural and socio-economic developments with existing facilities
- Ensure an elaborate landscaping program is put in place as the construction phase is being concluded so as to replenish vegetation around the project site by planting trees, flowers and lawns where applicable
- Increase security during construction and operational phases by ensuring security guards are always posted within and around the project site and strategic placement of security lights around the site
- Adhere to all relevant construction, occupational, health and safety regulations and any other relevant law.

- It was also suggested that renewable energy should be used where applicable

6 ANALYSIS OF PROJECT ALTERNATIVES

6.1 No project alternative

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions.

This option will however, involve several losses both to the landowner and the community as a whole. The landowner will continue to pay land rent on the plot while the property remains underutilized. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The economic status of the local people would remain unchanged.
- No employment opportunities will be created for Kenyans who will work in the project area.
- Increased urban poverty and crime in Kenya.
- No development shall be provided to alleviate a critical shortage.
- Discouragement for investors
- Development of infrastructural facilities (roads, electrical etc.) will not be undertaken.

From the analysis above, it becomes apparent that the No Project alternative is not an alternative to the local people, county government, and the government of Kenya.

6.2 Relocation option

Relocation option to a different site is an option available for the project implementation. However, at present the landowner/developer does not have an alternative site. This means that he has to look for the land. Looking for the land to accommodate the scale and size of the project and completing official transaction on it may take up to two (2) years although there is no guarantee that the land would be available. The developer will spend more time on design and approvals since design and planning has to be according to site conditions. Project design and planning before the stage of implementation will cost the developer a large sum of money. Whatever has been done and paid to date will be counted as a loss to the developer.

The time wasted on these deliberations would cause delays that the proponent and our economy can ill afford. This would also lead to a situation like No Project Alternative option. The other consequence of this is that it would be a discouragement for private/local

investors especially in the commercial development sector. In consideration of the above concerns and assessment of the current proposed site, relocation of the project is not a viable option.

6.3 Carrying on with the proposed development alternative

Under the proposed project alternative, the Proponents of the proposed project would be issued with an EIA License. In issuing the license, NEMA would approve the Proponent's proposed development, provided all environmental measures are complied with during the construction period and occupation phases. This alternative consists of the applicant's final proposal with the inclusion of the NEMA regulations and procedures as stipulated in the environmental impacts to the maximum extent practicable. This is the most suitable option.

6.4 Analysis of alternative construction materials and technology

The buildings will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Equipment and materials that save energy and water will be given first priority without compromising on cost or availability factors. The concrete pillars and walls will be made using locally sourced stones, cement, sand, metal bars and fittings that meet the Kenya Bureau of Standards requirements.

Beautiful and durable clay tiles will be used because they are good in heat insulation as compared to the iron sheet roofs. This will ensure that the rainwater harvested will be used in gardening and other purposes. Heavy use of timber during construction is discouraged because of destruction of forests. The indigenous species would be preferred to foreign species in the construction where need will arise.

6.5 Domestic waste water management alternatives

Three suitable technologies are discussed below:

6.5.1 Alternative one: Connection to the sewer system

Connection to an existing main sewer line will solve the waste water management issue at a very minimal cost and in an environmental efficient manner. Currently this option is available and considered the best option since the existing sewer line runs along the plot boundary.

6.5.2 Alternative two: Construction of a treatment plant

This involves the construction of a treatment plant. A Net Work of Plant Effluent Drains, Aeration Pits, Tanks etc., It is very expensive to construct and not suitable for the domestic waste water to be generated from the building and in a town setup. Centralized treatment plants can cause a nuisance of bad odour to tenants near the plant and are usually

neglected after a few years leading to breakdowns and malfunctions which may also lead to other environmental problems such as emission of raw effluent to the environment. This option is thus not suitable.

6.5.3 Alternative three: Use of septic tanks

This involves the construction of underground concrete-made tanks to store the sludge with soak pits. It is not expensive to construct however regular emptying in large
discharge points like the large-scale commercial building development is required. Given the kind of liquid waste emanating from the proposed project this option is not preferred since it will be uneconomical and inefficient.

6.5.4 Alternative three: Use of Bio-digester

Bio digester is an on-site sanitation unit that utilizes anaerobic technology for the disposal of toilet (black) wastewater as well as of kitchen and bathroom (grey) water, in a closed system. This is a sanitation technology, which treats wastewater in an environmentally friendly manner, facilitating its use for irrigation or its return to water bodies without polluting them. The process also generates organic fertilizer and biogas (a form of fuel) by allowing naturally occurring bacteria to break down solid waste. From the analysis and economic as well as environmental; considerations use of bio digester system is a viable option for the proponent to adopt in order to supplement connection to the sewer system. Te proponent intends to adopt bio-digester technology

6.6 Solid waste management alternatives

A lot of solid wastes will be generated from the proposed project. An integrated solid waste management system is recommendable. First, the proponent will give priority to Reduction at Source of the materials. This option will demand a solid waste management awareness programme in the management and the residents.

Secondly, Recycling, Reuse and composting of the waste will be the second alternative in priority. This will call for a source separation programme to be put in place. The waste will be sold to waste buyers within the surrounding area or be collected by a private waste management company. The third priority in the hierarchy of options is combustion of the waste that is not recyclable. Finally, sanitary land filling will be the last option for the Proponent.

7 ASSESSMENT OF ENVIRONMENTAL IMPACTS

7.1 Introduction

This Section identifies and discusses both positive and negative impacts associated with the proposed project. The potential impacts from the proposed project area are identified and assessed based on the nature, magnitude and merits/or demerits of the various activities associated with the project.

This chapter describes the anticipated positive and negative impacts of the proposed project during construction, operation and decommissioning phases.

7.2 Negative impacts during construction phase

The following negative impacts are also associated with the construction of the proposed project.

7.2.1 Loss of vegetation

Before the construction process begins clearing of some of the existing vegetation cover has to occur, especially within the areas where the buildings and driveways are to be constructed. The project designers have taken great care to ensure that the portions earmarked for construction of the proposed project buildings avoid areas currently occupied by mature trees/vegetation. However, construction activities will inevitably lead to loss of vegetation in some areas hence leading to degradation of natural and aesthetic environment.

7.2.2 Extraction and use of building materials

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

7.2.3 Noise pollution and vibration

Significant increases in noise and vibration levels may be expected during construction of the proposed project. Such noise and vibrations may be generated from excavators,

movement; loaders; concrete mixer trucks; concrete pumps; concrete vibrators; dump trucks; hammering; vibrators; compactors, diesel generators (DGs); water pumps and even construction workers.

The impact of noise and vibrations on the surrounding community depends upon:

- Characteristics of the noise and vibrations source (instantaneous, intermittent, or continuous in nature);
- Time of day at which noise and vibrations occur; and
- Location of noise and vibrations source with respect to sensitive receptor.

Though the level of discomfort caused by noise and vibrations is subjective, the most commonly reported impacts of increased noise levels are interference in oral communication, hearing loss, anxiety and disturbance of sleep. Vibration impacts may include the cracking of nearby existing structures such as foundations, walls and swimming pools.

Noise and vibrations may also have an impact on the workers in the proposed project. Nonetheless, all the noise and vibrations generating activities shall be undertaken during day hours and appropriate measures shall be instituted to counter the said pollution.

7.2.4 Impact on air quality (generation of exhaust and dust emissions)

Potential impacts on the air quality during the construction stage will be due to the fugitive dust and the exhaust gases generated in and around the construction site. The sources of air emission can be grouped into three categories of point, area and line sources:

- A point source is a single source of emission with an identified location, such as an industry;
- An area source is when the sources of emission are many widely distributed points sources having relatively comparable significance; and
- A line source is when the sources of emission from a number of fixed or moving facilities have relatively comparable significance, such as roads.

Fugitive dust (depending on the timing of construction) and vehicular emissions are the major components of air pollution. The following construction related activities are generally associated with these emissions:

- Site clearance, excavation and use of heavy vehicles and machinery/equipment at construction site;
- Transportation of construction materials such as sand, cement, steel, masonry stone to the construction site; and
- Operating of construction machinery and equipments

During the period of maximum construction activity, the fuel consumption is expected to rise significantly and the background concentrations of suspended particulate matter (SPM), respirable particulate matter (RPM), sulphur dioxide (SO2), nitrogen dioxide (NO2) and both carbon monoxide (CO) and lead (Pb) are also expected to rise.

These emissions if not appropriately mitigated can have significant respiratory and cardio-pulmonary effects on the local population, the health effects may range from subtle biochemical and physiological changes to difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac conditions. The impacts of such emissions can be greater in areas where the materials are sourced and at the construction site as a result of frequent gunning of vehicle engines, activities associated with site clearance, excavations, spreading of the topsoil during construction, frequent and fast vehicle movement in the loading and offloading areas. Because large quantities of building materials are required, some of which are sourced outside far from the project site, such emissions can be enormous and may affect a wider geographical area.

7.2.5 Disposal of solid waste

Construction activities create solid wastes that need to be disposed. Such wastes include: Sand, Concrete, Gravel, Stones, Bricks, Plastics, Paper, Wood, Metals, Glass, and Cleared biomass among others. These wastes if handled inappropriately may have a direct impact on the local community. Disposal of the same solid wastes off-site could also be a social inconvenience if done in wrong places. The off-site effects could be un-aesthetic view, pest breeding, unhygienic conditions, choking of nearby drains and pollution of physical environment. The severity of such impacts will depend upon the magnitude and type of construction waste. All construction waste should be disposed in sites approved by the Meru County by NEMA licensed firms.

7.2.6 Soil erosion and water logging

Soil erosion is likely to occur during construction at the site once exposed by excavation works especially during rainy and windy seasons due to the slope gradient of the proposed project plot. Considering the land clearing, excavation and other construction processes, soil will be exposed to erosion agents leading to soil/land degradation hence impacting negatively on the environment. Water logging of the proposed site may also occur in the event of heavy rainfall after excavation.

7.2.7 Surface and ground water hydrology and water quality degradation

Construction activities for the proposed development can have impacts on hydrology and ground water quality of the area. Changes in surface hydrology can occur due to landscaping; construction of impervious surfaces such as parking lots, roads and buildings (buildings increase the volume and rate of runoff, resulting in habitat destruction, increased pollutant loads, and flooding); blockage of existing drainages can also influence groundwater hydrology (i.e. recharge rates, flow, conditions).

Potential sources of impacts on hydrology and ground water quality during the construction phases are as follows:

- Soil run-off from the site leading to off-site contamination- particularly during rainy season: The excavated area, if linear, could act as a conduit to extend groundwater contamination to new areas.
- Improper disposal of construction debris leading to offsite contamination of water resources or blocking of drainages leading to flooding.
- Spillage of oil and grease from the vehicles and wastewater stream generated from on-site activities.

7.2.8 Increased water demand

During the construction phase, both the construction works and the construction workers will create additional demand for water in addition to the existing local demand. Water will mostly be used in the creation of concrete for construction works and for wetting surfaces or cleaning completed structures. It will also be used by the construction workers for washing and drinking.

7.2.9 Energy consumption

The proposed project will consume fossil fuels for construction machines (mainly Concrete mixers, heavy and light trucks; concrete pumps; concrete vibrators; dump trucks; compactors, diesel generators; water pumps) to run.

Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. The proposed project will also use electricity supplied by Kenya Power and Lighting Company (KPLC) Ltd. Electricity in Kenya is generated mainly through natural resources, namely, water and geothermal resources. In this regard, there will be need to use electricity sparingly since high consumption of electricity negatively impacts on these natural resources and their sustainability.

7.2.10 Increased insecurity

The proposed project may cause an increase in insecurity during the construction phase due to the increased number of transient workers and suppliers within and around the project site. Construction sites are known to attract large numbers of semi-skilled and un-skilled labour searching for job openings and may also use the opportunity to scout for potential robbery or terror targets.

7.2.11 Increased traffic

Obstruction by construction transport vehicles and construction activities adjacent to the nearby highway during the construction phase may lead to the increase in traffic along the Meru-Nairobi. This may be exacerbated if these activities time/schedule coincide with Peak Traffic hours.

7.2.12 Workers accidents and public safety

In any civil works, public as well as construction staff safety risks can arise from various construction activities such as: -

- Deep excavations;
- Operation and movement of heavy equipment and vehicles;
- Injuries from falling objects; and
- Injuries from hand tools.

Because of the duration and complexity of the construction phase of the proposed project, such activities need to be controlled and consequently the associated risks will be reduced. Proper supervision, high workmanship performance, and provision of adequate safety measures will suppress the likelihood of such impacts on the public and ensure enhanced occupational safety.

7.3 Positive impacts during construction phase

A number of positive impacts are associated with the proposed project during construction phase. These are as discussed below.

7.3.1 Employment opportunities

The construction of the proposed project is expected to provide direct and indirect employment to a number of workers. However, the exact number cannot be predetermined at this stage. These range from unskilled casual workers, semi-skilled and skilled employees.

7.3.2 Provision of market for supply of building materials

The proposed project will require supply of large quantities of building materials most of which will be sourced locally in the surrounding areas. Producers and suppliers of materials

such as: masonry stone, iron sheets, timber, paint, electrical cables, water storage equipment, water pipes, steel, glass, sand, cement, fuel, will thus get a ready market for their merchandise.

7.3.3 Improving growth of the economy

Through the use of locally available materials during the construction phase of the project including cement, concrete and ceramic tiles, timber, sand, ballast electrical cables etc, the project will contribute towards growth of the economy by contributing to the gross domestic product. The consumption of these materials, fuel oil and others will attract taxes including VAT which will be payable to the government hence increasing government revenue while the cost of these raw materials will be payable directly to the producers.

7.4 Negative impacts during operation phase

The following negative impacts are associated with the proposed project during its operation phase.

7.4.1 Increased traffic

It is expected that the number of vehicles around the project site shall increase hence leading to the possibility of commensurate increase in traffic along Meru-Nairobi highway. This shall be dependent on the location of the building's car park entry/exit, traffic control measures in place, number of tenants/visitors to the building, the nature of businesses within the building amongst other factors.

7.4.2 Water use

During operation of the proposed project, a lot of water will be used. Water use is driven by the number of uses and users within the buildings. Water will be sourced from the Meru Water and Sewerage Company (MEWASS) mains supply line and several rain water storage tanks.

7.4.3 Electricity consumption

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

7.4.4 Increased storm water flow

The building roofs and pavements will lead to increased volume and velocity of storm water around the project site. This will lead to increased amounts of storm water entering the peripheral storm water drains.

7.4.5 Solid waste generation

During the operation phase, solid waste generation is expected to occur from various sources and activities carried out within the building. Solid waste impacts are expected to be minor but there impact maybe significant in the absence of a proper waste management plan i.e. improper disposal of waste may have adverse environmental effects.

7.4.6 Increased noise level

There will be increased noise pollution due to traffic from visitors who will be coming to the commercial building.

7.5 Positive impacts during operation phase

Just as in the construction phase, there are positive impacts associated with the proposed project during operation phase. These positive impacts are discussed below.

7.5.1 Employment opportunities

Employment opportunities are one of the long-term major impacts of the proposed project. A number of people will be employed in various capacities in different professional and non-professional areas at the building.

7.5.2 Increase in revenue to national and local governments

The commissioning of the proposed project will result in positive gains for numerous authorities- Kenya Revenue Authority (KRA), KPLC, and Meru county through payment of relevant taxes, rates and fees to the respective institutions.

7.5.3 Optimal use of land

Change in land use from idle land to land on which a modern commercial building blocks stand will optimize land use.

7.6 Negative impacts during decommissioning phase

The negative impacts discussed below are associated with the proposed project during decommissioning phase.

7.6.1 Noise and vibration

The demolition works will lead to significant deterioration of the acoustic environment within the proposed Project site and the surrounding areas. This will be as a result of the noise and vibrations that will be experienced during demolition.

7.6.2 Air quality

Dust will be generated during demolition works of the proposed project from the demolition activities. This will mainly affect demolition workers. In addition, soil will be used

in rehabilitation and re-instatement to pre-project status, this will add to the amount of dust that will be generated during rehabilitation. However, it will be minimal.

Exhaust emission will also be experienced during decommissioning from the trucks that will be transporting the demolished objects to the disposal sites and storage areas. Large quantities of dust will be generated during demolition works. This will affect both demolition staff as well as the neighbouring establishments.

7.6.3 Solid waste generation

Demolition of the proposed project will result in large quantities of solid waste. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, sulphate and ammonia which may be released as a result of leaching of demolition waste, are known to lead to degradation of groundwater quality.

7.6.4 Health and safety

Risk of accidents and ill health as a result of the demolition activities is likely to be experienced. This could be as a result of accidents involving construction equipment.

7.7 Positive impacts during decommissioning phase

In the event that the building is to be relocated, found to be economically unviable or condemned as structurally unstable. It can be abandoned and/or demolished. The following are positive impacts associated with decommissioning of the proposed project.

7.7.1 Rehabilitation

Decommissioning will involve phasing out the envisaged operations of the building. This may involve conversion of the facility to other uses or rehabilitation of the project site in line with the projected plans. This may involve new landscaping schemes and demolition of some structures within the facility.

7.7.2 Employment opportunities

For demolition to take place properly and in good time, several people will be involved. As a result, large number of jobs will be created in various positions both in supervisory and non-supervisory positions.

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8 IMPACTS MITIGATION AND MONITORING

8.1 Introduction

This Chapter highlights the necessary mitigation measures that will be adopted to prevent or minimize significant negative environmental, health and safety impacts associated with the activities the proposed project during its construction, operation and decommissioning phases. Allocation of responsibilities, time frame and estimated costs for implementation of these measures are presented in the Environmental Management Programme (EMP) in Chapter 8.

8.2 Mitigation of construction phase impacts

8.2.1 Minimizing vegetation disturbance

To minimize effects and mitigate vegetation disturbance the proponent shall: -

- Ensure proper demarcation of the project area to be affected by the construction works. This will be aimed at ensuring that any disturbance to flora is restricted to the actual project area and avoid spillover effects on the neighbouring areas.
- Ensure strict control of construction vehicles to ensure that they operate only within the area to be disturbed by access routes and other works.
- Re-vegetate of some of the disturbed areas through implementation of a well-designed landscaping programme.

8.2.2 Efficient sourcing and use of raw materials

The Proponent will source building materials such as sand, ballast and hard core from registered quarry and sand mining firms, whose projects have undergone satisfactory environmental impact assessment/audit and received NEMA approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are considerably well mitigated.

To reduce the negative impacts on availability and sustainability of the materials, the Proponent will only order for what will be required through accurate budgeting and estimation of actual construction requirements. This will ensure that materials are not extracted or purchased in excessive quantities. Moreover, the Proponent will ensure that wastage, damage or loss (through run-off, wind, etc.) of materials at the construction site is

kept minimal, as these would lead to additional demand for and extraction or purchase materials.

In addition to the above measures, the Proponent shall consider reuse of building materials and use of recycled building materials where applicable. This will lead to

reduction in the amount of raw materials extracted from natural resources as well as reducing impacts at the extraction sites.

8.2.3 Minimization of noise and vibration

The Contractor of the proposed project shall put in place several measures that will mitigate noise and vibration pollution arising during the construction phase. The proponent shall ensure that he complies with all relevant requirements in the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 by: -

- Apply for a License from NEMA whereby maximum permissible noise levels are to be exceeded

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

- Prescribe noise reduction measures if appropriate e.g. restricted working hours and transport hours and noise buffering;
- Install portable barriers to shield compressors and other small stationary equipment where necessary and locate stationary noise sources as far from existing sensitive receptors as possible;
- Use quiet equipment (i.e. equipment designed with noise control elements such as mufflers);
- Co-ordinate with relevant agencies regarding all construction activities in the project site;
- Limit trucks and other small equipment to minimize idling time and observe a common-sense approach to vehicle use such as shutting up idle engines whenever possible; and
- Ensure use of well serviced and maintained vehicles and equipment.

8.2.4 Minimization of dust generation and emission

Controlling dust during construction is useful in minimizing nuisance conditions and consequently health (respiratory and eye) complications. It is recommended that a standard set of feasible dust control measures be implemented for all construction activities. Emissions of other contaminants (Nitrogen oxides, Carbon dioxide, Sulphur oxides, and diesel related Particulate Matter PM10) that would occur in the exhaust from heavy equipment are also included.

The Proponent shall be committed to implementing measures that shall reduce air quality impacts associated with construction. Dust emissions will be controlled by the following measures: -

- Provide 2.4-metre-high hoarding along site boundary
- Provide effective dust screen, sheeting or netting where a scaffolding is erected around the perimeter of a building under construction, from the ground floor level of the building, or if a canopy is provided at the first-floor level, from the first-floor level, up to the highest level of the scaffolding;
- Any skip hoist for material transport shall be totally enclosed by impervious sheeting;
- Water all active construction areas when necessary;
- Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction site;
- Down wash of trucks (especially tyres) prior to departure from site;
- Use of electrically operated construction machinery to avoid externalities produced by diesel engines. This procedural change may reduce problems related to emission, idling and maintenance; and
- Rapid on-site construction so as to reduce duration of traffic interference and therefore reducing emissions from traffic delays.

All personnel working on the proposed project will be trained prior to starting construction on methods for minimizing air quality impacts during construction. Specific training will be focused on minimizing dust and exhaust gas emissions from heavy construction vehicles.

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

The following measures shall be implemented during construction: -

- The engine size of the construction equipment shall be the minimum practical size;
- The number of construction equipment operating simultaneously shall be minimized through efficient management practices;
- To ensure that the smallest practical number is operating at any one time;
- Construction equipment shall be maintained in tune per the manufacture's specifications;

- Idling of heavy-duty diesel trucks during loading and unloading shall be minimized; and
- Alternatively, fuelled construction equipment shall be used where feasible.

8.2.5 Minimization of construction waste

It is recommended that construction waste be recycled or reused to ensure that materials that would otherwise be disposed of as waste are diverted for productive uses. In this regard, the Proponent shall be committed to ensuring that construction materials left over at the end of construction will be used in other projects rather than being disposed of.

In addition, damaged or wasted construction materials including cabinets, doors, plumbing and lighting fixtures, marbles, ceramic tiles and glass will be recovered for refurbishing and use in other projects. Such measures will involve the sale or donation of such recyclable/reusable materials to construction companies, local community groups, institutions and individual residents or homeowners.

The Proponent shall put in place measures to ensure that construction materials requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal.

It is further recommended that the Proponent should consider the use of recycled or refurbished construction materials. Purchasing and using once-used or recovered construction materials will lead to financial savings and reduction of the amount of construction debris disposed of as waste.

Additional recommendations for minimization of solid waste during construction of the proposed project include: -

- Use of durable, long- lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time;
- Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements;
- Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste; and
- Use of construction materials containing recycled content when possible and in accordance with accepted standards.

8.2.6 Minimization of insecurity

The Proponent shall be committed to implementing measures that shall reduce security threats by the following measures: -

- The proposed project plot has shall be accessed through a designated entry/exit point during the transportation of all raw materials in and out the construction phase of the project.
- Security shall be enhanced by ensuring security guards are always posted within and around the project site and strategic placement of security lights around the site.
- A roster of all construction workers shall be kept while measures shall be put in place to ensure that loitering by itinerant workers is discouraged.
- Unattended public access to the construction site shall be restricted and only one entry/exit point shall be used.

8.2.7 Controlling soil erosion, water logging

The Proponent will put in place some measures aimed at minimizing soil erosion and associated water logging from the proposed project site during construction. These measures will include: -

- Terracing, levelling and ripping off compacted areas of the project site to reduce run-off velocity and increase infiltration of storm water into the soil
- Digging trenches and cut off drains to channel runoff into drainages
- Proper planning of site excavation works such that a section is completed and rehabilitated before another section begins
- Ensuring that construction vehicles are restricted to existing graded roads to avoid soil compaction within the project site
- Surface runoff and roof water shall be harvested and stored in underground reservoir for reuse
- A storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structures will be designed.

8.2.8 Minimization of surface and groundwater contamination

Several measures shall be put in place to mitigate the impacts that are likely to lead to surface and groundwater quality degradation. The Proponent will prepare a hazardous substance control systems and emergency response plans that will include preparations for quick and safe cleanup of accidental spills. It will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an

emergency response programme to ensure quick and safe cleanup of accidental spills. The plan will identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted.

8.2.9 Minimization of water use

A combination of water saving appliances and water management measures will be planned in the proposed project. Rain water harvesting can serve as a solution to the water problem by capturing the run off. Rainwater harvesting will help in utilizing the primary source of water and prevent the runoff from going into sewer or storm drains.

8.2.10 Minimization of energy consumption

The Proponent shall ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. In addition, proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. Complementary to these measures, the Proponent shall monitor energy use during construction and set targets for reduction of energy use.

8.2.11 Minimization of construction related traffic

The following measures shall be put in place so as to manage traffic along surrounding roads during construction: -

- Ensure that the Entry/Exit to the project site is located where it will cause minimal traffic along Meru-Nairobi Highway
- Ensure all construction vehicles to and from the construction site use the designated Entry/Exit to the project site
- All transportation of construction raw materials and excavated materials are to be conducted at traffic off peak hours only
- Sensitize truck drivers to avoid unnecessary road obstruction
- Cover all trucks hauling soil, sand and other loose materials to avoid spillage and dust emissions that may interfere with smooth motoring
- Work hours shall be restricted to the period between 8:30 a.m. and 3:30 p.m., Monday through Friday, unless approved otherwise. When night work is required, work hours shall be 9 p.m. to 5 a.m.

- Access to driveways will be maintained at all times unless other arrangements are made

8.2.12 Minimization of risks of accidents and injuries to workers

To reduce the construction workers accidents and hazards during the construction phase of the proposed project, the Proponent shall be committed to adherence to the occupational safety and health administration rules and regulations stipulated in Occupational, Safety and Health Act, 2007. In this regard, the Proponent shall be committed to provision of appropriate personal protective equipment, as well as ensuring a safe and healthy environment for construction workers as outlined in the EMP.

8.3 Mitigation of operation phase impacts

8.3.1 Traffic management

The following measures shall be put in place so as to manage traffic along the highway during operational phase of the project: -

- "NO PARKING" signs will be posted around the building where Parking is prohibited and likely to cause obstruction as well as other necessary traffic signs
- Traffic management/parking personnel shall be provided to monitor parking and ensure smooth motoring along the building's adjacent roads
- Access to driveways will be maintained at all times
- Any work that disturbs normal traffic signal operations shall be coordinated with the relevant authorities

8.3.2 Ensure efficient water use

The Proponent should install water-conserving automatic taps and toilets. Moreover, any water leaks through damaged pipes and faulty taps will be fixed promptly by qualified staff. In addition, the occupants will be sensitized to use water efficiently. The following water saving investments should be taken into consideration: -

- Reduce water delivery in taps, through the installation of low flow devices or aerators on taps
- Press action taps and flush valves shall be used to minimize water wastage Sensors on urinals, which ensure flushes, occur only when required in public areas of the proposed project; and
- Install water efficient plumbing.

8.3.3 Ensure efficient energy consumption

The Proponent plans to install an energy-efficient lighting system at the building as well as solar power equipment. This will contribute immensely to energy saving during the operational phase of the proposed project. In addition, all staff members will be sensitized to ensure energy efficiency in their operations. To complement these measures, it will be important to monitor energy use during the operation and set targets for efficient energy use. The following energy saving techniques can be applied: -

- Staff shall be sensitized to switch off machinery, equipment and lights when not being used
- Install energy saving bulbs and fluorescent lights
- Use of variable-speed motors to optimize the basement car park ventilation system performance
- Install alternative energy such as solar power and/or consider use of a highly efficient, inverter-type split-cycle system for heating and cooling, which also uses a more environmentally friendly refrigerant

8.3.4 Ensuring efficient solid waste management

During the operation phase of the proposed project, waste will be generated. All these wastes should be handled according to the Environmental Management and Coordination (Waste Management) Regulations, 2006.

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

Since the proposed project will be generating a substantial amount of waste, an integrated solid waste management system is recommended. First, the Proponent will give priority to reduction at source of the materials. This option will demand a solid waste management awareness programme in the management and the employed staff.

Secondly, recycling, reuse and composting of the waste will be the second alternative in priority. This will call for a source separation programme to be put in place. The third priority in the hierarchy of options is combustion of the waste that is not recyclable in order to produce energy. Finally, sanitary land filling will be the last option for the Proponent to consider. In order to achieve the above three recommendations, the following will be done.

Public awareness

- Sign boards and information notices informing the public to dispose waste appropriately shall be posted within the premises.

Waste segregation

- Segregation or sorting of waste at its source should be practiced in order to encourage reuse/recycling and to maximize the negative effects of the waste and increase its economic value. With segregation at source recyclables do not lose their commercial value due to cross contamination; and
- On all floors dedicated bins will be placed to collect biodegradable and non-biodegradable wastes.

Collection bins

- Daily collection of wastes shall take place from all the bins;
- Daily sweeping and collection of waste from common areas such as lobbies, staircases, entrances shall be done daily by management appointed cleaners; and
- Wastes shall be collected daily from all bins to a transfer station awaiting final collection. Separate collection for bio-degradable and non-biodegradable wastes will be ensured.

Waste treatment and disposal

- Solid waste generated by the proposed project would be collected and disposed of by a licensed private firm.

8.4 Mitigation of decommissioning phase impacts

8.4.1 Efficient solid waste management

Solid waste resulting from demolition or dismantling works will be managed as described in Section 7.2.4.

8.4.2 Reduction of dust concentration

High levels of dust concentration resulting from demolition or dismantling works will be minimized as described in Section 7.2.3.

8.4.3 Minimization of noise and vibration

Significant impacts on the acoustic environment will be mitigated as described in Section 7.2.2.

8.4.4 Health and safety

Risk of accidents and ill health as a result of demolition activities, shall be mitigated by ensuring that appropriate health and safety measures are applied in all activities; fence all unsafe and dangerous areas; and continue to monitor environmental health (air quality, water quality, vegetation, noise) at all main receptor points around the site until site handover.

9 ENVIRONMENTAL MANAGEMENT PLAN

9.1 Introduction

The proposed project Proponent realizes that its development and operational activities will have some impacts on the biophysical environment, health and safety of its staff, clients and members of the public, and socio-economic wellbeing of the local community.

An environmental management plan has been developed to assist the Proponent in mitigating and managing environmental impacts associated with the life cycle of the project. The EMP has been developed to provide a basis for an Environmental Management System (EMS; ISO 14001 principles) for the project. It is noteworthy that key factors and processes may change through the life of the project and considerable provisions have been made for dynamism and flexibility of the EMP. As such, the EMP will be subject to a regular regime of periodic review.

Tables **6, 7** and **8** form the core of this EMP for the construction, operational and decommissioning phases of the project. In general, the Tables outline the potential safety, health and environmental risks associated with the project and detail all the necessary mitigation measures, their financial costs, as well as the persons responsible for their implementation and monitoring. The EMP will be used as checklist in future environmental audits.

9.1.1 Construction Phase EMP

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the construction phase of the project are outlined in **Table 6** below.

Table 6: Environmental management plan for the construction phase of the proposed project

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
1. Minimize extraction site impacts and ensure efficient use of raw materials in construction				
High demand of raw material	**1.** Source building materials from local suppliers who use environmentally friendly processes in their operations.	Project Manager & Contractor	Throughout construction period	
	2. Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered.	Project Manager & Contractor	Throughout construction period	
	3. Ensure that damage or loss of materials at the construction site is kept minimal through proper storage.	Project Manager & Contractor	Throughout construction period	200,000
	4. Use at least 5%-10% recycled, refurbished or salvaged materials to reduce the use of raw materials and divert material from landfills	Project Manager & Contractor	Throughout construction period	0
2. Minimize vegetation disturbance at and or around construction site				
Vegetation disturbance	**1.** Ensure proper demarcation and delineation of the project area to be affected by construction works.	Contractor, Civil engineer & Project Manager	3 Days	20,000
	2. Specify locations for trailers, cranes & equipment, & areas of the site which should be kept free of traffic, equipment, and storage.		10 Days	20,000
	3. Designate access routes and parking within the site.		5 Days	-
	4. Introduction of vegetation (trees, shrubs and grass) on open spaces and around the project site and their maintenance.	Architect & Landscape specialist	Monthly to Annually	20,000
	5. Design and implement an appropriate landscaping programme to help in re-vegetation of part of the project area after construction.	Architect & Landscape specialist	2 months	150,000
3. Avoid encroaching on road reserves				
	1. Comply with the Public Roads and Roads of Access Act (Cap. 399) by ensuring no development is within the 30-meter Meru-Nairobi Road Reserve running along the plot boundary	Project proponent, architect & Contractor	During planning and throughout construction period	

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Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
4. Reduce storm-water, runoff and soil erosion				
Increased storm water, runoff and soil erosion	**1.** Surface runoff and roof water shall be harvested and stored in underground reservoir tanks for reuse.	The Civil Engineer, Mechanical Engineer and Project Manager	2 months	10,000 per unit
	2. A storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structure will be designed.		1 month	
	3. Apply soil erosion control measures such as leveling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil.		1 months	
	4. Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the project site.	The Civil Engineer, Mechanical Engineer and Project Manager	Throughout construction period	
	5. Ensure that any compacted areas are ripped to reduce run-off.		2 months	
	6. Site excavation works to be planned such that a section is completed and rehabilitated before another section begins.	Project Manager	Throughout construction period	5,000 per unit
	7. Open drains all interconnected will be provided on site.	Civil Engineer	Throughout construction period	5,000 per unit
	8. Roof catchments will be used to collect the storm water for some other uses.	Civil Engineer	Throughout construction period	
	9. Construction of water storage tanks to collect storm water for construction use.	Civil Engineer	Throughout construction period	
5. Minimize deep trenching and excavation hazards				
Persons falling	**1.** A barricade at least 900mm high must be erected around a trench that is 1 meter or deeper unless it is not possible only workers involved in the trench will be in the area; or another form of barrier exists (such as excavated materials near the trench).	The Civil Engineer and Project Manager	Throughout excavation works period	

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Trench collapse or cave-in	**1.** Excavated material should not be placed less than 600mm from the edge of a trench to minimize risk of collapse due to the weight of the spoil.	The Civil Engineer and Project Manager	Throughout excavation works period	
	2. An excavation where a possibility of collapse or cave-in exists should be shored, shielded, benched or battered to prevent the collapse or cave-in.	The Civil Engineer and Project Manager	Throughout excavation works period	
Safe access and exit	Ladders must be provided no more than 9 meters apart in the area where work will be carried out	The Civil Engineer and Project Manager	Throughout excavation works	20,000
6. Minimize solid waste generation and ensure efficient solid waste management during construction				
Increased solid waste generation	**1.** Use of an integrated solid waste management system i.e. through a hierarchy of options including: Source reduction, Recycling, Reuse, Combustion and Sanitary land filling.	Project Manager & Contractor	Throughout construction period	300,000
	2. Through accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed	Project Manager & Contractor	One-off	0
	3. Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of.	Project Manager & Contractor	One-off	0
	4. Ensure that damaged or wasted construction materials will be recovered for refurbishing and use in other projects.	Project Manager & Contractor	One-off	-
	5. Donate recyclable/reusable or residual materials to other users where applicable	Project Manager & Contractor	One-off	0
	6. Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time	Project Manager & Contractor	Throughout construction period	-

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	7.Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements	Project Manager & Contractor	One-off	30,000
	8. Use building materials that have minimal or no packaging to avoid packaging waste	Project Manager & Contractor	Throughout construction period	0
	9. Use construction materials containing recycled content when possible and in accordance with accepted standards.	Project Manager & Contractor	Throughout construction period	0
	10. Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at the site	Project Manager & Contractor	Throughout construction period	0
	11. Dispose waste more responsibly by dumping at designated dumping sites or landfills only.	Project Manager & Contractor	Throughout construction period	50,000/month
	12. Waste collection bins to be provided at designated points on site	Project Manager & Contractor	Throughout construction period	4,000 per truckload
	13. Private waste disposal company to be contracted to transport and dispose the solid waste from site	Project Manager & Contractor	Throughout construction period	
7. Reduce dust emissions				
Dust emission	**1.** Provide 2.4 m high hoarding along site boundary	Project Manager & Contractor	Throughout construction period	15,000
	2. Provide effective dust screen, sheeting or netting where a scaffolding is erected around the perimeter of a building	Project Manager & Contractor	Throughout construction of building envelope	
	3. Water all active construction areas when necessary;	Project Manager & Contractor	Throughout construction period	3,000
	4. Cover all trucks hauling soil, sand and other loose materials	Project Manager & Contractor	Throughout construction period	0

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	5. Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction site	Project Manager & Contractor	Throughout construction period	20,000
	6. Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites;	Project Manager & Contractor	Throughout construction period	
	7. Down wash of trucks (especially tyres) prior to departure from site;	Project Manager & Contractor	Throughout construction period	-
	8. Post signs that limit vehicle speeds onto unpaved roads and over disturbed soils;	Project Manager & Contractor	One off	5,000
	9. Use of electrically operated construction machinery to avoid externalities produced by diesel engines	Project Manager & Contractor	Throughout construction period	
	10. Personal Protective equipment to be worn by all staff members	Project Manager & Contractor	Throughout construction period	100,000
8. Minimization of exhaust emissions				
Exhaust emission	**1.** Vehicle idling time shall be minimized	Project Manager & Contractor	Throughout construction period	0
	2. Alternatively, fueled construction equipment shall be used where feasible equipment shall be properly tuned and maintained			
	3. Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas, and to switch off or keep vehicle engines at these points	Project Manager & Contractor	Throughout construction period	0
9. Minimization of noise and vibration				
Noise and vibration	**1.** Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.	Project Manager & Contractor	Throughout construction period	1,000
	2. Use quiet equipment (i.e. equipment designed with noise control elements such as mufflers);	Project Manager & Contractor	Throughout construction period	-

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	3. Install portable barriers to shield compressors and other small stationary equipment where necessary and locate stationary noise sources as far from existing sensitive receptors as possible;	Project Manager & Contractor	Throughout construction period	-
	4. Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, residential areas and schools	Project Manager & Contractor	Throughout construction period	1,000
	5. Ensure that construction machinery is kept in good condition to reduce noise generation	Project Manager & Contractor	Throughout construction period	25,000
	6. Ensure that all generators and heavy-duty equipment are insulated or placed in enclosures to minimize ambient noise levels.	Project Manager & Contractor	Throughout construction period	15,000
	7. Trees to be planted around the site to provide some buffer against noise propagation	Project Manager & site foreman	Throughout construction period	4,000
	8. Prescribe noise reduction measures if appropriate e.g. restricted working hours and transport hours and noise buffering;	Project Manager & site foreman	Throughout construction period	0
10. Minimization of energy consumption				
Increased energy consumption	**1.**Ensure electrical equipment, machinery and lights are switched off when not being used	Project Manager & Contractor	Throughout construction period	0
	2. Install energy saving fluorescent tubes at all lighting points instead of bulbs which consume higher electric energy	Project Manager & Contractor	Throughout construction period	5,000
	3. Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts	Project Manager & Contractor	Throughout construction period	10,000
	4. Monitor energy use during construction and set targets for reduction of energy use	Project Manager & Contractor	Throughout construction period	5,000
11. Minimize water consumption and ensure more efficient and safe water use				
High water demand	**1.** Connect to the existing MEWASS main supply	Mechanical Engineer and Project Manager	One-off	50,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	2. Harness rainwater for construction activities usage	Mechanical Engineer and Project Manager	Throughout construction period	
	3. Install water conserving taps that turn-off automatically when water is not being used	Project Manager & Contractor	One-off	10-40 % higher than price of ordinary taps
	4. Promote recycling and reuse of water as much as possible	Project Manager & Contractor	Throughout construction period	2,000
	5. Install a discharge meter at all water outlets to determine and monitor total water usage	Project Manager & Contractor	One-off	2,000 per unit
	6. Promptly detect and repair of water pipe and tank leaks	Project Manager & Contractor	Throughout construction period	1,000 per month
	7. Ensure taps are not running when not in use			1,000
12. Minimize release of liquid effluent				
Generation of wastewater	**1.** Provide means for handling sewage generated by construction workers, e.g. mobile toilets	Mechanical Engineer & Project Manager	One-off	40,000 per month
	2. Conduct regular checks for sewage pipe blockages or damages	Mechanical Engineer & Project Manager	Throughout construction period	2,000/month
13. Ensure the general safety and security of the construction site and surrounding				
Safety and security	Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the construction sites.	Project Manager & Contractor	Continuous	50,000/month
14.Mininize hydrology and water quality degradation				
Surface and groundwater contamination	**1.** Hazardous substance control and emergency response plan that will include preparations for quick and safe clean up of accidental spills.	The Mechanical Engineer, Project Manager, Contractor & the Developer	Continuous	30,000

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Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	2. Hazardous-materials handling procedures to reduce the potential for a spill during construction to be prescribed	The Mechanical Engineer	Continuous	2,000
	3. Identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted	The Mechanical Engineer	Continuous	-
	4. Ground water, will be collected during construction contained and disposed of in accordance with all applicable regulations	The Mechanical Engineer	Continuous	
15. Increased pressure on infrastructure				
Dilapidation of existing infrastructure	**1.** Coordinate relevant service providers and authorities (i.e. KPLC, Meru county, MEWASS, NEMA amongst others) so as to harmonize the projects infrastructural and socio-economic developments with existing facilities	Architect, Project Manager, Contact or and the Developer	Continuous	200,000
	2. Upgrade existing infrastructure and services, if and where feasible.	Architect, Project Manager, Contactor and the Developer	Continuous	300,000
16. Minimize traffic around the project site and adjacent roads				
Increased traffic, obstruction	**1.** Ensure all construction vehicles to and from the construction site use the designated Entry/Exit to the project site	Project Manager and Site Foreman	Throughout construction period	-
	2. All transportation of construction raw materials and excavated materials are to be conducted at traffic off peak hours only	Project Manager and Contactor	Throughout construction period	-
	3. Sensitize truck drivers to avoid unnecessary road obstruction	Project Manager, Contactor & site foreman	Throughout construction period	-
	4. Cover all trucks hauling soil, sand and other loose materials to avoid spillage and dust emissions that may interfere with smooth motoring	Project Manager, Contactor & site foreman	Throughout construction period	-

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Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	5. Work hours shall be restricted to the period between 8:30 a.m. and 3:30 p.m., Monday through Friday, unless approved otherwise.	Project Manager, Contactor & site foreman	Throughout construction period	
	6. Access to driveways will be maintained at all times unless other arrangements are made	Project Manager, Contactor & site foreman	Throughout construction period	
17. Minimize occupational health and safety risks				
Approval of building plans	Ensure that all building plans are approved by the Local Authority and the Local Occupational Health and Safety Office	Developer	One-off	50,000
Registration of the premises	Registration of the project under the Occupational Safety and Health Act,2007 Laws of Kenya is mandatory	Developer	One-off	5,000
General register	A general register should be kept within the facility as stipulated in Occupational Safety and Health Act,2007.	Project Manager & Contractor	One-off	1,000
Incidents, accidents and dangerous occurrences.	**1.** Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the local Occupational Health and Safety Office (OHSO) are in place.	Project Manager, Developer & Contractor	Continuous	500/month
	2. Enforcing adherence to safety procedures and preparing contingency plan for accident response in addition safety education and training shall be emphasized.	The Contractor, Project Manager& Site Safety Officer	Continuous	20,000
Insurance	Ensure that the premises are insured as per statutory requirements (third party and workman's compensation)	Developer	Annually	-
Site organization	Develop a clear site organization plan and construction schedule	The Contractor, Project Manager& Site Safety Officer	Continuous	5,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Deliver and store materials at appropriate locations	The Contractor, Project Manager & Site Safety Officer	Continuous	10,000
	Hire the right number of workers with clear work schedule and appropriate dress gear	The Contractor, Project Manager & Site Safety Officer	Continuous	2,000
Safety, health and environment (SHE) policy	Develop, document and display prominently an appropriate SHE policy for construction works	Project Manager, Developer & Contractor	One-off	1,000
Health and safety committee	Provisions must be put in place for the formation of a Health and Safety Committee, in which the employer and the workers are represented	Project Manager	One-off	10,000
Sanitary conveniences	**1.** Suitable, efficient, clean, well-lit and adequate sanitary conveniences should be provided for construction workers	Project Manager	One-off	20,000
	2. Mobile toilets, changed regularly, to be provided on site or latrines	Project Manager	Throughout construction period	10,000-30,000 per unit
Medical examination	Arrangements must be in place for the medical examination of all construction workers before, during and after termination of employment	Project Manager, Developer & Contractor	Continuous	1,000 per examination
Machinery/equipment safety	**1.** Ensure that machinery, equipment, personal protective equipment, appliances and hand tools used in construction do comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded	Project Manager, Developer & Contractor	One-off	0
	2. Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain	Project Manager, Developer & Contractor	Continuous	0

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	3. All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury	Project Manager	One-off	0
	4. Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery use and other procedures/operations	Project Manager	Continuous	5,000 per training
	5. Equipment such as fire extinguishers must be examined by an authorized agency. The equipment may only be used if a certificate of examination has been issued	Project Manager	Continuous	5,000 per examination
	6. Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register	Project Manager	Continuous	5,000 per examination
Storage of materials	**1.** Ensure that materials are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse	Project Manager	Continuous	15,000
	2. Ensure that items are not stored/stacked against weak walls and partitions	Project Manager	Continuous	0
Safe means of access and safe place of employment	**1.** All floors, steps, stairs and passages of must be of sound construction and properly maintained	Project Manager & Contractor	Continuous	-
	2. Securely fence or cover all openings in floors	Project Manager & Contractor	One-off	-
	3. Provide all staircases within the building with suitable handrails on both sides	Project Manager & Contractor	One-off	-
	4. Ensure that construction workers are not locked up such that they would not escape in case of an emergency	Project Manager & Contractor	Continuous	-
	5. All ladders used in construction works must be of good construction and sound material of adequate strength and be properly maintained	Project Manager & Contractor	One-off	0
	6. All of scaffolds and work platforms shall be erected, altered and dismantled by competent persons	Project Manager & Contractor	Throughout construction period	-

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	7. All uprights must be provided with base plates (and, where necessary, timber sole plates) or prevented in some other way from slipping or sinking	Project Manager & Contractor	Throughout construction period	-
	8. All scaffolds must be secured to the building in enough places to prevent collapse	Project Manager & Contractor	Throughout construction period	-
	9. Guard rails or equivalent protection to be in place to stop falls from open edges on scaffolds, mobile elevating work platforms, buildings, gangways, excavations, etc.	Project Manager & Contractor	Throughout construction period	-
	10. Enough barriers must be erected at rooftop edges to protect workers or materials falling from roofs	Project Manager & Contractor	Throughout construction period	
Emergency preparedness and evacuation procedures	**1.** Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency	Project Manager & Contractor	One-off	2,000
	2. Such procedures must be tested at regular intervals	Project Manager & Contractor	Every 3 months	2,000
	3. Ensure that adequate provisions are in place to immediately stop any operations where there in an imminent and serious danger to health and safety and to evacuate workers	Project Manager & Contractor	One-off	10,000
	4. Ensure that the most current emergency telephone numbers posters are prominently and strategically displayed within the construction site	Project Manager & Contractor	One-off	1,000
	5. Provide measures to deal with emergencies and accidents including adequate first aid arrangements	Project Manager & Contractor	Continuous	5,000
First Aid	**1.** Well stocked first aid box which is easily available and accessible should be provided within the construction site	Project Manager & Contractor	One-off	5,000
	2. Provision must be made for persons to be trained in first aid, with a certificate issued by a recognized body.	Project Manager & Contractor	One-off	10,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Fire protection	**1.** Firefighting equipment such as fire extinguishers should be provided at strategic locations such as stores and construction areas.	Project Manager & Contractor	One-off	30,000
	2. Regular inspection and servicing of the equipment must be undertaken by a reputable service provider and records of such inspections maintained	Project Manager & Contractor	Every 3 months	5,000
	3. Signs such as "NO SMOKING" must be prominently displayed within the construction site, especially in parts where inflammable materials are stored	Project Manager & Contractor	One-off	2,000
Ventilation	Enough space must be provided within the premises to allow for adequate natural ventilation through circulation of fresh air	Project Manager & Contractor	One-off	0
Lighting	There must be adequate provision for artificial or natural lighting in all parts the super structure in which persons are working or passing	Project Manager & Contractor	One-off	0
Electrical Safety	**1.** Circuits must not be overloaded	Project Manager & Contractor	Continuous	0
	2. Distribution board switches must be clearly marked to indicate respective circuits and pumps	Project Manager & Contractor	One-off	0
	3. There should be no live exposed connections	Project Manager & Contractor	Continuous	0
	4. Electrical fittings near all potential sources of ignition should be flame proof	Project Manager & Contractor	One-off	0
	5. All electrical equipment must be earthed	Project Manager & Contractor	One-off	0
Chemical Safety	**1.** Develop a suitable system for the safe collection, recycling and disposal of chemical wastes, obsolete chemicals and empty chemical containers to avoid their reuse for other purposes and to eliminate or minimize the risks to safety, health and environment	Project Manager & Contractor	One-off	10,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	2. Ensure that all chemicals used in construction are appropriately labeled or marked and that material safety data sheets containing essential information regarding their identity, supplier's classification of hazards, safety precautions and emergency procedures are provided and are made available to employees and their representatives	Project Manager & Contractor	One-off	0
	3. Keep a record of all hazardous chemicals used at the site, cross-referenced to the appropriate chemical safety data sheets	Project Manager & Contractor	Continuous	0
	4. There should be no eating or drinking in areas where chemicals are stored or used	Project Manager & Contractor	Continuous	0
	5. Provide workers in areas with elevated noise and vibration levels, with suitable ear protection equipment such as ear masks	Project Manager & Contractor	One-off	5,000
Supply of clean drinking water	Ensure that construction workers are provided with an adequate supply of wholesome drinking water which should be maintained at suitable and accessible points.	Project Manager & Contractor	One-off	5,000/month
Washing facilities	Ensure that conveniently accessible, clean, orderly, adequate and suitable washing facilities are provided and maintained within the site	Project Manager & Contractor	One-off	5,000
Ergonomics	**1.** Provision for repairing and maintaining of hand tools must be in place	Project Manager & Contractor	One-off	5,000
	2. Hand tools must be of appropriate size and shape for easy and safe use	Project Manager & Contractor	One-off	0
	3. Height of equipment, controls or work surfaces should be positioned to reduce bending posture for standing workers	Project Manager & Contractor	One-off	0

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9.1.2 Operational Phase EMP

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the operational phase of the project are outlined in **Table 7**.

Table 7: Environmental management plan for the operation phase of the proposed project

Expected Negative impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
1. Minimization of solid waste generation and ensuring more efficient solid waste management				
Solid waste generation	1. Provide solid waste handling facilities such as waste bins and skips	Proponent/Building management	One-off	10,000
	2. Ensure that solid waste generated at the building is regularly disposed of appropriately at authorized dumping sites	Proponent/Building management	Continuous	50,000/month
	3. Ensure that building occupants manage their waste efficiently through recycling, reuse and proper disposal procedures.	Proponent/Building management	Continuous	–
	3. Donate redundant but serviceable equipment to charities and institutions	Proponent/Building management	Continuous	0
2. Minimize risks of sewage release into environment				
Sewage disposal	1. Provide adequate and safe means of handling sewage generated (i.e. MEWASS sewer mains)	Building management	One-off	-
	2. Conduct regular inspections for sewage pipe blockages or damages and fix appropriately	Building management	Continuous	500 per inspection
3. Minimize energy consumption				
Energy resource utilization	1. Switch off electrical equipment, appliances and lights when not being used	Staffs/ Building management	Continuous	–
	2. Install occupation sensing lighting at various locations such as storage areas which are not in use all the time	Building management	One-off	10-40 % higher than ordinary lighting

Expected Negative impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	3. Install energy saving fluorescent tubes at all lighting points within the building instead of bulbs which consume higher electric energy	Building management	One-off	10-40 % higher than ordinary lighting
	4. Monitor energy use during the operation of the project and set targets for efficient energy use	Building management	Continuous	2,000/month
	5. Sensitize tenants & employees to use energy efficiently	Building management/Staffs	Continuous	500/month
4. Minimize water consumption and ensure more efficient and safe water use				
Water consumption	1. Promptly detect and repair water pipe and tank leaks	Building management	Continuous	2,000/month
	2. Encourage tenants and staffs to conserve water	Building management/Staffs	Continuous	500/month
	3. Ensure taps are not running when not in use	Building management/Staff	Continuous	500/month
	4. Install water conserving taps that turn-off automatically when water is not being used	Building management	One-off	10-40 % higher than ordinary taps
	5. Install a discharge meter at water outlets to determine and monitor total water usage	Building management	One-off	2,000
6. Minimize Traffic around adjacent road				
Traffic generation	1. "NO PARKING" signs will be posted around the building where Parking is prohibited and likely to cause obstruction as well as other necessary traffic signs	Building Management & Traffic/Parking Attendant	Continuous	-
	2. Traffic management/parking personnel shall be provided to monitor parking and ensure smooth motoring along the buildings adjacent roads	Building Management	Continuous	15,000/ month

Expected Negative impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	3. Access to driveways will be maintained at all times	Traffic/Parking Attendant	Continuous	-
	4. Any work that disturbs normal traffic signal operations shall be coordinated with the relevant authorities	Building Management & Traffic/Parking Attendant	Continuous	-
5. Minimization of health and safety impacts				
1. Implement all necessary measures to ensure health and safety of the workers and the general public during operation of the project as stipulated in Occupational Safety and Health Act, 2007		Proponent	Continuous	-
6. Ensure the general safety and security of the premises and surrounding areas				
1. Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.		Proponent	Continuous	50,000-100,000/month
7. Environmental monitoring of the project				
The Firm of Experts (Stalin Environment) will undertake continuous environmental monitoring of the project in liaison to the National Environment Management Authority and the Proponent. This will ensure that environmental concerns are integrated into the project at every stage of implementation. An Initial Environmental Audit will be conducted in the first year of operation/occupation to confirm the efficacy and adequacy of the EMP and to propose a comprehensive operational Phase EMP in harmony with the building's custom fittings		Proponent, Firm of Experts and NEMA	Continuous	-

9.1.3 Decommissioning Phase EMP

In addition to the mitigation measures provided in **Tables 6** and **7** it is necessary to outline some basic mitigation measures that will be required to be undertaken once all operational activities of the project have ceased. The necessary objectives, mitigation measures, allocation of responsibilities, time frames and costs pertaining to prevention, minimization and monitoring of all potential impacts associated with the decommissioning and closure phase of the project are outlined in **Table 8**.

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Table 8: Environmental management plan for the decommissioning phase of the proposed project

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
1. Demolition waste management				
Demolition waste	**1.** Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3. Composting and reuse 4. Combustion 5. Sanitary land filling.	Project Manager & Contractor	One-off	-
	2. All buildings, machinery, equipment, structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible	Project Manager & Contractor	One-off	0
	3. All foundations must be removed and recycled, reused or disposed of at a licensed disposal site	Project Manager & Contractor	One-off	0
	4. Where recycling/reuse of the machinery, equipment, implements, structures, partitions and other demolition waste is not possible; the materials should be taken to a licensed waste disposal site	Project Manager & Contractor	One-off	0
	5. Donate reusable demolition waste to charitable organizations, individuals and institutions	Project Manager & Contractor	One-off	0
	6. Rehabilitate accordingly	Architect, Project Manager		

10 CONCLUSION AND RECOMMENDATION

Recommendations

- Consult all relevant service providers and authorities (i.e. Meru County Planning Department, Kenya Urban Roads Department, KPLC, MEWASS, NEMA, amongst others) to harmonize the projects infrastructural and socio-economic developments with existing facilities
- Adhere to all relevant construction, occupational, health and safety regulations and any other relevant law.
- Ensure Water and Energy Management Systems are put in place as outlined within the report and incorporate rain water harvesting facilities
- Solid waste management during construction and operational phases of the project must adhere to the Environmental Management and Coordination (Waste Management) Regulations, 2006
- Ensure strict adherence to provisions of Environmental Management and Coordination (Noise and Excessive Vibrations Pollution) Regulations, 2009
- Ensure waste water is disposed off as per standards set in the Environmental Management and Coordination (Water Quality) Regulations, 2006
- Ensure strict adherence to Occupational Health and Safety Act, 2007
- Ensure an elaborate landscaping program is put in place as the construction phase is being concluded so as to replenish vegetation around the project site by planting trees, flowers and lawns where applicable.

Conclusion

The Proponent of the proposed project shall be committed to putting in place several measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the project identified within this report. It is recommended that in addition to this commitment, the proponent shall focus on implementing the measures outlined in the EMP as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects.

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

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- Meru County Integrated Development Plan 2018-2022

- Wikipedia; https://en.wikipedia.org/wiki/Kathita_River

APPENDICES

1) Land ownership documents
2) Approved Architectural Drawings for the Proposed Project
3) Summary of Bill of Quantities for the proposed project
4) Site layout plan for the proposed project site
5) Stakeholder consultation questionnaires, minutes and consent forms.

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PHOTO GALLERY

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1. APPENDIX ONE:

LAND OWNERSHIP DOCUMENTS

2. APPENDIX TWO:

APPROVED ARCHITECTURAL DRAWINGS FOR THE PROPOSED PROJECT

3. APPENDIX THREE:

SUMMARY OF BILL OF QUANTITIES FOR THE PROPOSED PROJECT

4. APPENDIX FOUR:

SITE LAYOUT PLAN FOR THE PROPOSED PROJECT

SITE

5. APPENDIX FIVE:

STAKEHOLDER CONSULTATION QUESTIONNAIRES

AND PUBLIC PARTICIPATION LIST

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