

**ENVIRONMENTAL IMPACT ASSESSMENT STUDY
REPORT FOR THE PROPOSED HOTEL SUITES
DEVELOPMENT WITH SUPPORT FACILITIES ON
PLOT L.R NO. 7258/54(7258/3/55) LOCATED ALONG
LIMURU ROAD BETWEEN CANADIAN HIGH
COMMISSION AND RWANDAN HIGH COMMISSION
IN NAIROBI CITY COUNTY.**

COORDINATES: 1.240734° S, 36.812726° E



PROPONENT

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JUNE 2018

DOCUMENT AUTHENTICATION

This Environmental Impact Assessment Study report has been prepared by Green Builders & Planning Consultants Limited (NEMA Reg. No. 9571) in accordance with the Environmental Management and Coordination Act (EMCA) 1999 and the Environmental Impact Assessment and Audit Regulations 2003 which requires that every development project must have an EIA report prepared for submission to the National Environmental Management Authority (NEMA). We the undersigned, certify that the particulars in this report are correct and righteous to the best of our knowledge.

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DISCLAIMER

This EIA Study report is strictly confidential to Mediview Limited (the Client) and any use of the materials thereof should strictly be in accordance with the agreement between the client and the EIA/EA Expert mentioned herein (Green Builders & Planning consultants Limited). It is however, subject to conditions spelt out in the Environmental (Impact Assessment and Audit) Regulations, 2003 under the Kenya Gazette Supplement No. 56 of 13th June 2003. It provides information on the proposed project as per the time of the assessment of the proposed hotel development with support facilities.

ABBREVIATIONS

EIA	-	Environmental Impact Assessment
EA	-	Environmental Audit
NEMA	-	National Environment Management Authority
NCWSC	-	Nairobi City Water and sewerage Company
EMCA	-	Environmental Management and Coordination Act
KTTC	-	Kenya Technical Teachers College
NBSAP	-	National Bio-diversity Strategy and Action Plan
CBD	-	Convention on Biological Diversity
NEAP	-	National Environmental Action Plan
EMP	-	Environmental Management Plan
EHS	-	Environmental Health and Safety
KPLC	-	Kenya Power and Lighting Company
OHS	-	Occupational Health and Safety
TOR	-	Terms of Reference
EHS	-	Environmental Health and Safety

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EXECUTIVE SUMMARY

Introduction

Globalization, urbanization, migration and technological advancements have continued to drive cities forward right from their infant stages, the cyclic processes, growth, through to their renewal and regeneration. More and more people are moving and positioned themselves in cities for business, work, venturing forth and recreation. The demand for commercial developments in Kenyan urban areas has remained under tremendous pressure. Both the government and private sector have had a role to play with the government servicing the land and leaving it to private entrepreneurs to develop. However, the provision of hotels has not kept pace with the said phenomenon.

Mediview Limited, herein referred to as “**the proponent**” has realized the above mentioned opportunities in Kenya’s commercial sector. They have proposed to put up hotel suites development on Plot L.R No. 7258/54 (7258/3/55) Located along Limuru Road between Rwandan High Commission and Canadian High Commission opposite Kenya Technical Teachers College (K.T.T.C) football field in Nairobi City County. The coordinates are 1.240734⁰S, 36.812726⁰E.

For a long time the world over, policy makers directed all the efforts in economic development without due regard to the resource base on which the economic development depend on. As a result, there has been unprecedented environmental degradation due to lack of environmental conservation resulting to unsustainable development. More recently, investors and developers, spurred on by regulators world over, have recognized the need for change in order to safeguard the environment.

Reference to this, environmental concerns have now been integrated in the planning and implementation processes of any proposed projects in Kenya. The key objective is to mitigate conflicts with the environment at the vicinity during implementation and operation phases. In addition, it is now mandatory for Environmental Impact Assessments (EIAs) to be undertaken on projects of such magnitude and nature; to enhance Sustainable Environmental Management as well as controlling and revitalizing the much-degraded environment. The environmental management is regulated by the National Environmental Management Environment (NEMA) in Kenya.

Pursuant to the prevailing legal requirements as envisaged in the Environmental Management and Coordination Act (EMCA), CAP 387 and to ensure sustainable environmental management, the

proponent undertook this EIA on the proposed project's site; and incorporated substantial environmental aspects as advised by NEMA. This EIA report thus provides relevant information and environmental considerations on the project proponent's intention to seek approval from NEMA for the development of the proposed project. Environmental Experts who are registered by the Authority conducted the assessment.

Scope, Objectives and Terms of Reference

The major objective of the EIA study is to evaluate the effects/impacts of proposed development in relation to the environment i.e. physical, biological, and social-economic environments. It aims at influencing the protection and co-existence of the development with the surroundings as well as the compatibility of the proposed development to the area; to ensure and facilitate sustainable environmental management during construction and occupation phases.

The scope of the assessment study covered the physical extent of the project site and its immediate environs, construction works of the proposed development, installation of basic utilities/facilities and services as required by the physical planning. The output of the study was the production of an Environmental Impact Assessment project report for submission to NEMA for the purposes of seeking an EIA license.

Project Description

The proposed project is located on Plot L.R No. 7258/54(7258/3/55) involves construction of hotel suites development with support facilities. Detailed description is discussed in chapter three.

Socio- Economic (Positive) Impacts of the Project

The proposed development has positive impacts to both the proponent and general society. The benefits will be experienced during construction and occupation phases. They include the following:

- i. Provision of recreation and accommodation services
- ii. The optimal use of land i.e. increased utility of the parcel of land, which is currently underutilized.

- iii. Boost local investment; to both government and the proponent.
- iv. Creation of market for goods and services. Many secondary businesses are also likely to spring up during the construction phase especially those providing foods and beverages to the construction workers.
- v. Provision of employment during both construction and occupational phases.

Issues of concern associated with project implementation

Against the background of the above positive impacts, there are a few issues of concern anticipated from the implementation of the subject project. These shall be experienced during implementation/construction phase, operation/occupation phase and decommissioning phase. They include soil degradation; air quality; noise; oil wastes; water resources; solid and liquid waste management; drainage, terrestrial ecology, visual and landscape; traffic; public comfort; occupation, health and safety (OHS); and energy.

The impacts have been elaborated as follows:

- i. Impact to soil (including soil erosion) especially when laying the foundation (pillars)
- ii. Increased noise and vibration mostly during construction phase.
- iii. Impact (constraints/pressure) to the existing infrastructure i.e. water, power, surface drains, roads among others.
- iv. Increased waste generation (both solid and liquid) during construction and operational/occupation.
- v. Increased storm water/ run off resulting from the roof catchments and as a result of decreased recharge areas, after pavement of most areas.
- vi. Air pollution as a result of dust particles emanating from cement, excavation and construction activities. Exhausts from the involved machinery will lead to increased levels of noxious gases.
- vii. The health and safety of workers and immediate neighbors may be compromised in case of occurrence of incidences, pollution and disturbance

Proposed potential mitigation measures

To minimize the occurrence and magnitude of the negative impacts, mitigation measures have been proposed against each of the anticipated impacts. Other measures have been integrated in the project designs with a view to ensuring compliance with applicable environmental laws and guidelines. The measures include the following:

- i. Careful siting, planning and implementation processes- to ensure that it is sympathetic to its surroundings and is in line with County Government's Physical Planning and Construction standards.
- ii. Soil compaction and watering of loose soils on all unpaved access paths/roads, cleared surfaces, construction materials at the site to minimize air pollution (suppress dust) and erosion by the agents of soil erosion i.e. water and wind.
- iii. Erection of warning / informative signs at the site during the implementation phase, and traffic control along the connecting road.
- iv. To avoid strain on water supply, the contractor should employ water conservation measures such as water reuse, water harvesting and use of run-off for construction purposes (where applicable), minimization or avoidance on misuse of water and provision of rainwater harvesting systems to the entire roof catchments of the proposed project.
- v. To cater for surface drainage, well-designed drain channels should be installed to harmonize management of the resulting storm water within the site. The drains should be installed to channel the run-off to the drainage system. The drains should be regularly maintained and covered with gratings to avoid accidents and dirt entry. Storm water/ runoff will be greatly reduced by rainwater harvesting and storage.
- vi. To reduce noise pollution, portable barriers to shield compressors and other small stationary equipment (where necessary) should be installed; sensitize workers on the need to switch off engines whenever possible; ensure that the machinery are well maintained; install silencers whenever possible and ensure that the work is carried out between specified time i.e. 7a.m. to 6p.m.
- vii. Proper and regular tuning and maintenance of construction machinery/equipment to minimize emission of noxious fumes and noise emanating from friction of the rubbing metal parts. Vehicle/machinery idling should be minimized/controlled. The maintenance should

be conducted in appropriate and designated service bays to reduce chances of contamination of environment by resulting oils and greases. Any of such oils should be collected and disposed appropriately.

- viii. Workers should be provided with full personal protective gear (PPE) to beef up on their health and safety standards and they should be sensitized on health, safety and environmental conservation aspects. The site should be fenced off during construction to keep off animals and the general public.
- ix. To reduce the health and safety risks, effective emergence response plans should be adapted both during implementation and operation phase. There should be a specific area for hazardous material storage, machinery maintenance activities and refuelling and these should be clearly indicated and adhered to.
- x. The Sewerage system should be properly designed, installed (using approved materials and standards) and regularly maintained to effectively drain effluent into the sewer line. The Sewer should be closely monitored and evaluated to assess its efficiency.
- xi. Provision of sound waste management systems and procedures. During implementation phase, the contractor should put in place effective and efficient waste disposal systems. The proponent/contractor should provide acceptable and standard sanitary conveniences to the workers during the construction.
- xii. Comprehensive landscaping should follow on completion of the proposed development to prevent soil erosion and upgrade the site to its appropriate environmental standard.
- xiii. The proponent should respect the 30 metres riparian zone
- xiv. Adapt the proposed Environmental Management and Monitoring Plans involving all relevant stakeholders during implementation phase and inhabitants, during operation phase.

Conclusion and Recommendations

The analysis of the EIA study indicates that the proposed project has significant benefit to the local and national service and commercial sector. The analysis reveals that the benefits far outweigh the associated costs and negative impacts. The benefits include increase in quality commercial modern hotels for recreation and accommodation, creation of employment opportunities, and increase utility of the land, creation of employment opportunities especially during project implementation phase, increase in government revenue and improvement of local standards of living. Nevertheless, the project will come with some negative impacts such as increased pressure on existing infrastructure, pollution (to Air, Water, soil) mostly during construction phase, increased waste (solid and liquid) generation and effect on ecology (flora) and fauna.

In relation to the proposed mitigation measures that will be incorporated during implementation and occupation phases; the project's input to the Kenyan commercial sector; and cognizance of the fact that the project proponent is environmentally conscious, the subject project is beneficial and important for a developing country (like Kenya). It is our recommendation that the proponent be granted EIA license to implement the project. Major concerns should nevertheless be geared towards minimizing the occurrence of impacts that would degrade the general environment. This will however be overcome through close following and implementation of the outlined Environmental Management and Monitoring Plans (EMPs); which have been strategically packaged with key environmental sustainability elements, tailored toward enhancing the adoption of *Integrated Ecosystem Management (IEM)*. This will form the (now) widely accepted keystone of the environmental action agenda

CHAPTER ONE: INTRODUCTION

1.1 General Overview

Kenyan key urban areas have for the last two decades experienced increased population due to rapid rural-urban migration. During the same period, there has been a rapid development and especially in the Capital City-Nairobi. Both the government and private sector have had a role to play with the government servicing the land and leaving it to the private entrepreneurs. Fortunately, the Government has with great concern realized the situation.

The proponent intends to put up hotel suites development. The proposed project is located on Plot L.R No. 7258/54(7258/3/55) involves construction of a hotel suites development with support facilities. Detailed description is discussed in chapter three. The project will enhance provision of quality modern hotel services. The project will optimize land use and its utility; in line with the local physical planning. It will also provide employment especially during construction phase. It will create a market for goods and services (construction inputs) which include raw materials, construction machinery and labor. Many secondary businesses are also likely to spring up during the construction phase.

Environmental concerns have now been integrated in the planning and implementation processes of any proposed projects; to mitigate conflicts with the environment at the vicinity. In addition, it is now mandatory for Environmental Impact Assessments (EIA) to be undertaken on projects of such magnitude and nature to enhance Sustainable Environmental Management as well as controlling and revitalizing the much-degraded environment.

Pursuant to the prevailing legal requirements as envisaged in the EMCA, CAP 387 and to ensure sustainable environmental management, the proponent undertook this EIA; and incorporated substantial environmental aspects as advised by NEMA. This *EIA* project report thus provides relevant information and environmental considerations on the project proponent's intention to seek approval from NEMA for the implementation of the proposed project. Environmental Experts who are registered by the Authority (NEMA) conducted the assessment.

1.2 Objectives of the EIA

Environmental Impact Assessment (EIA) is a process having the ultimate objective of providing decision makers with an indication of the likely environmental consequences of a proposed activity.

The main objectives of this EIA therefore include the following:

- To determine environmental compatibility of the project
- To identify and evaluate the significant environmental impacts of the project
- To evaluate and select the best project alternative from the options available
- To incorporate environmental management plans and monitoring mechanisms
- To assess the environmental costs and benefits of the project to the society

1.3 Terms of Reference (TOR)

This Environmental Impact Assessment considered the following aspects and others that proved of significance during the study.

- The evaluation of ecological effects.
- Determination of the effects on landscape and land use
- Effects of the development on current demands on water sources as well as possible implications on surface water.
- Proposition of mitigation measures to be undertaken during and after implementation of the project; and development of an Environmental Management Plan with mechanisms for monitoring and evaluating the compliance and environmental performance.

1.4 Scope of EIA Study

The EIA study includes an assessment of impacts of the construction and operations on the following:

- Description of the proposed project
- Baseline information (Biophysical and Socio-Economic environment, land use and zoning approval, etc.).

- Assessment of the potential environmental impacts on the project area.
- A review of the policy, legal and administrative framework.
- Development of the mitigation measures and future monitoring plans.
- Proposition of alternatives.
- Occupational Health and Safety -OHS

1.5 Methodology

Following a preliminary visit of the proposed site, the following was undertaken:-

- Screening of the project, a process that identified the project as being among those requiring EIA under schedule 2 of the Environmental Management and Coordination Act CAP 387
- A scoping exercise that identified the key issues to be addressed in the assessment.
- Documentary review on the nature of the proposed activities, policy and legal framework, environmental setting of the area and other available relevant data/information.
- Public participation and consultation-detailed discussions with the immediate neighbors, proponent and architects.
- Physical investigation of the site and the surrounding areas using a pre-prepared checklist identifying possible environmental and human safety issues that are likely to be affected,
- Reviewing the proposed project designs and implementation plan/schedules with a view to suggesting suitable alternatives,
- Developing an environmental management plan outline with responsibilities, schedules, monitorable indicators and time frames among other aspects,

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

CHAPTER TWO: POLICY, LEGAL AND LEGISLATIVE FRAMEWORK

Environmental Impact Assessment is an instrument for environmental management and development control. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound. It is a condition of the Kenya Government for developers to conduct Environmental Impact Assessment (EIA) on the development Projects. 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 Notice No.101), construction of buildings 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.

2.1 Policy Framework.

Environmental policies cut across all sectors and government departments. As such policy formulation should be consultative steered by interdisciplinary committees. Recent policies which the government is working on include; Draft Wildlife Policy; Draft National Land Policy; and Wetlands Management and Conservation Policy among others.

2.1.1 National Environmental Action Plan (NEAP).

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

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

2.1.2 National Shelter Strategy to the Year 2000.

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

2.1.3 The National Poverty Eradication Plan (NPEP).

The objective of NPEP is to alleviate poverty in rural and urban areas by 50 percent by the year 2015; as well as the capabilities of the poor and vulnerable groups to earn income. It also aims to

narrow gender and geographical disparities and a healthy, better educated and more productive population. This plan has been prepared in line with the goals and commitments of the World Summit for the Sustainable Development (WSSD) of 1995. Since poor housing is among the indicators of poor societies, pursuits to address it build individuals capacity to relieve poverty.

2.1.4 National Policy on Water Resources Management and Development

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

In addition, the policy provides for charging levies on waste water on the basis of quantity and quality. The "polluter-pays-principle" applies in which case parties contaminating water are required to meet the appropriate cost of remediation. Consequently, to ensure water quality, the policy provides for establishment of standards to protect water bodies receiving wastewater, a process that is on-going. The standards and measures to prevent pollution to water resources are provided for in the Environmental Management and Coordination (Water Quality) Regulations, 2006 which is a supplementary legislation to EMCA, 1999.

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

The key objectives of the Policy include: -

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

Under this paper, broad categories of development issues have been covered that require a "sustainable development" approach. These issues relate to waste management and human settlement. The policy recommends the need for enhanced re-use/recycling of residues including wastewater, use of low or non-waste technologies, increased public awareness raising and appreciation of a clean environment. It also encourages participation of stakeholders in the management of wastes within their localities. Regarding human settlement, the paper encourages better planning in both rural and urban areas and provision of basic needs such as water, drainage and waste disposal facilities among others.

2.2 Legal and Legislative Framework

2.2.1 Environmental Management and Coordination Act No.8 of 1999

This project report has been undertaken in accordance with the Environment (Impact Assessment and Audit) Regulations, 2003, which operationalizes the Environmental Management and Coordination Act, 1999. The report is prepared in conformity with the requirements stipulated in the Environmental Management and Coordination Act No. 8 of 1999 (EMCA) and the Environmental Impact Assessment and audit Regulations 2003, Regulation 7 (1) and the Second Schedule.

Part II of the said act states that every person is entitled to a clean and healthy environment and has the duty to safeguard the same. In order to achieve the goal of a clean environment for all, new projects listed under the second schedule of Section 58 of EMCA No. 8 of 1999 shall undergo an Environmental Impact Assessment. This includes development activities such as this new housing development. In addition to the legal compliance above, the following legal aspects have also been taken into consideration or will be taken into consideration before commencement of construction:

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

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

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

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

The proponent will have to ensure that environmental protection facilities or measures to prevent pollution and ecological deterioration such as water treatment plant connections, solid waste management plans, and

landscaping and aesthetic improvement program are implemented and maintained throughout the project cycle. As well the; proponent will have to ensure that appropriate measures to prevent pollution of underground and surface water are implemented throughout the project cycle.

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

Legal Notice No. 121: Section 4-6

Part II of the Environmental Management and Co-ordination (Waste Management) Regulations, 2006 states that: - 4. (1) No person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle.

(2) Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed off such waste in the manner provided for under these Regulations.

(3) Without prejudice to the foregoing, any person whose activities generates waste has an obligation to ensure that such waste is transferred to a person who is licensed to transport and dispose off such waste in a designated waste disposal facility. In addition, the Regulations state that:

5. (1) a waste generator shall minimize the waste generated by adopting the following cleaner production methods

a). Improvement of production process through:-

- i. Conserving raw materials and energy;
- ii. Eliminating the use of toxic raw materials; and
- iii. Reducing toxic emissions and wastes

b). monitoring the production cycle from beginning to end by:-

- i. Identifying and eliminating potential negative impacts of the product;
- ii. Enabling the recovery and re-use of the product where possible;
- iii. Reclamation and recycling

c). Incorporating environmental concerns in the design and disposal of a product.

6. A waste generator shall segregate waste by separating hazardous wastes from non-hazardous waste and shall dispose of such wastes in such facility as shall be provided by the relevant County authority.

(23) No person shall engage in any activity likely to generate any hazardous waste without a valid Environmental Impact Assessment license issued by Authority under the provisions of the Act.

The proponent shall ensure that the main contractor adopts and implements all possible cleaner production methods during the construction phase of the project. During the construction phase of the project, the proponent shall ensure that the main contractor implements the above mentioned measures as necessary to enhance sound Environmental Management and Coordination (Noise management of waste).

The proponent will connect the facility to a waste water treatment plant

2.2.3 Waste Water Management;

Legal Notice No. 120; Part II – Protection of Sources of Water for Domestic Use.

4. (1) 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 these Regulations

(2) 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

5. All sources of water for domestic uses shall comply with the standards set out in the First Schedule of these Regulations.

The proponent and project Architect as well as engineer are urged to ensure that drainage channels are well designed during the construction phase of the project, and upon completion the entire project is supposed to be connected to waste water sewer line for proper management of liquid waste.

2.2.4 Public Health Act Cap 242

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

The plans for the above project have been approved by Nairobi City County

2.2.5 Physical planning act, 1999

The said Act section 29 empowers the County Authorities to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section allows for prohibition or control of the use and development of an area. Section 30 state 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 residential or industrial use or occupation of any building without a development permission granted by the respective County Authority.

2.2.6 Land planning act cap 303

Section 9 of the subsidiary legislation (the development and use of land Regulations 1961) under which it requires that before the County authority to 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, which intends to reduce conflict of interest with other socio economic activities.

2.2.7 Building code 2000

A person who erects a building or develops land or changes the use of a building or land, or who owns or occupies a building or land shall comply with the requirements of these by- laws. For the

purpose of this by-laws and the following operations shall be deemed to be the erection of a building:-

- a) The alteration or extension of a building.
- b) The changing of the use or uses to which land or building is put.
- c) The formation or lying out of an access to a plot.

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

2.2.8 Water Act

The water act No. 8 of 2002 provides for the management, conservation, use and control of water resources and for acquisition and regulation of rights to use water; to provide for the regulation and management of water supply and sewerage services. Section 18 of this Act provides for national monitoring and information systems on water resources. Following on this, sub-Section 3 mandates the Water Resources Management Authority to demand from any person or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may require to be kept by a site operator and the information thereof furnished to the authority. Section 73 of the Act provides that a person who is licensed to supply water has a responsibility of safeguarding the water sources against degradation. According to section 75 (1) such a person is required to construct and maintain drains, sewers and other works for intercepting, treating or disposing of any foul water arising or flowing upon land for preventing pollution of water sources within his/her jurisdiction.

On the other hand section 76 makes it an offence for any person to discharge any trade effluent from any trade premises into sewers of a licensee without the consent of the licensee which should be sought by making an application indicating the nature and composition of the effluent, maximum quantity anticipated, flow rate of the effluent and any other information deemed necessary. The consent shall be issued on conditions including payment of rates for the discharge as provided under Section 77 of the same Act. Section 94 of the Act also makes it an offence to throw or convey or cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive or unwholesome matter or thing into or near to water resource in such a manner as to cause, or be likely to cause, pollution of the water resource

The main contractor will be required to implement necessary measures to ensure water conservation and also to prevent potential for water contamination during the construction phase to comply with this the developer will use a channel to direct water to the main channel just like the houses in the surrounding neighborhood.

2.2.9 County Government Act (265)

The Act commenced on 30th April 1963 and provides for the establishment of authorities of the County government and to define their functions among other things. These County authorities may manage and let land besides regulating and licensing trade activities including construction in

their areas of jurisdiction besides provision and maintenance of roads, footways, street lighting and sewerage in their areas. Section 160 of the act empowers municipal authorities to establish and maintain sanitary services for the removal and destruction of, or otherwise deal with all kinds of refuse and effluent and where such service is established, compel its use by persons to whom the service is available.

Similarly, section 163 (e) empowers the County Authorities to prohibit businesses which by reason of smoke, fumes, chemicals, gases, dust, smell, noise, vibration or other cause, may be or become a source of danger, discomfort or annoyance to the neighborhood, and to prescribe conditions subject to which such business shall be carried on. It is in this vein that section 165 mandates the council to grant or to renew business licenses or to refuse the same.

In order to discharge its duties effectively, section 170 of the act allows the right of access to private property at all times by County authorities, its officers and servants for purposes of inspection, maintenance and alteration or repairs of sewers. According to section 173, any person who, without prior consent in writing from the council, erects a building on; excavate or opens-up; or injures or destroys a sewers, drains or pipes shall be guilty of an offence. Any demolitions and repairs thereof shall be carried out at the expense of the offender. The Act, by virtue of section 176 also empowers the County authority to regulate sewerage and drainage, fix charges for use of sewers and drains and ensure that connecting premises meets the related costs.

2.2.10 The Electricity Power Act, 1997

Section 55 (1) in the execution of works in connection with the construction, modification, maintenance or operation of an electric supply line or apparatus or conductor connected thereto, every licensee shall:-In no way injure the works, conveniences or property belonging to any such other such authority, company or person, nor obstruct or interfere with public traffic, except with the previous consent of the board. Take adequate precautions to protect from danger any person engaged upon such works by the provision and maintenance in safe and efficient conditions of the necessary safety appliances for the use of such persons and by ensuring their proper use, or by other means approved by the board.

2.2.11 The Penal Code (Cap. 63)

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

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

2.3 Other relevant Provisions

The following are the relevant environmental treaties to which Kenya is signatory in order of ratification:

- Montreal Protocol on Substances that Deplete the Ozone Layer (1987) ratified 9 November 1988
- United Nations Convention to Combat Desertification (1994), ratified 12 June 1994

- United Nations Framework Convention on Climate Change (1992), ratified 30 August 1994
- Convention on Biological Diversity (1992), ratified 11 September 1994
- Bamako Convention (1991), ratified 17 December 2003
- Kyoto Protocol (2004), ratified 25 February 2005

2.4 Institutional Framework

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

2.4.1 National Environmental Management Authority (NEMA).

The object and purpose for which NEMA is established is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment. A Director General appointed by the president heads NEMA. The Authority shall, among others:

- Co-ordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plans, programs and projects with a view to ensuring the proper management and rational utilization of the natural resources environment on a sustainable yield basis for the improvement of the quality of human life in Kenya.
- Take stock of the natural resources in Kenya and their utilization and consultation, with the relevant lead agencies, and develop land use guidelines.
- Examine land use patterns to determine their impact on the quality and quantity of the natural resources among others. Moreover NEMA mandate is designated to the following committees:

2.4.3 County Environment Committee (2015)

County Environment Committees are responsible for the proper management of the environment within the County in respect of which they are appointed to. They are also to perform such additional functions as are prescribed by the Act or as may, from time to time be assigned by the Minister by gazette notice. The decisions of these committees are legal and it is an offence not to implement them. The County Environment Committee has an oversight and decision making role at the County level. The County Environment Committees are responsible for the proper management of the environment within the County, which they are appointed. They are also to perform such additional functions as are prescribed by this Act or as may from time to time be assigned by the Minister by gazette notice.

2.4.5 Public Complaints Committee.

The Committee is charged with the following functions:

Investigating allegations/ complaints against any person or against the Authority (NEMA) in relation to the condition of the environment and its management, Prepare and submit to the Council periodic reports of its activities which shall form part of the annual report on the state of the environment, and to perform such other functions and exercise such powers as may be assigned to it by the Council.

2.4.6 National Environment Action Plan Committee.

This Committee is responsible for the development of a 5-year Environment Action plan among other things. The National Environment Action Plan shall contain:

Analysis of the Natural Resources of Kenya with an indication as to any pattern of change in their distribution and quantity over time, and Analytical profile of the various uses and value of the natural resources incorporating considerations of intergenerational and intra-generational equity among other duties as the EMCA specifies.

2.4.7 Standards and Enforcement Review Committee.

This is a technical Committee responsible for environmental standards formulation methods of analysis, inspection, monitoring and technical advice on necessary mitigation measures. Standards and Enforcement Review Committee consists of the members set out in the third schedule to the Environmental Management and Co-ordination Act.

2.4.8 National Environmental Tribunal.

This tribunal guides the handling of cases related to environmental offences in the Republic of Kenya. The Tribunal hears appeals against the decisions of the Authority. Any person who feels aggrieved may challenge the tribunal in the High Court.

2.4.9 The Occupational Safety and Health Act, 2007.

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

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

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

Under section 6 of this act, every occupier is obliged to ensure safety, health and welfare of all persons working in his workplace. The occupier shall achieve this objective by preparing and as often as may be appropriate, revising a written statement of his general policy with respect to the safety and health at work of his employees and the organization and arrangements for the time being in force for carrying out that policy (Section 7).

He is also required to establish a safety and health committee at the workplace in a situation where the number of employees exceeds twenty (section 9) and to cause a thorough safety and health audit of his workplace to be carried out at least once in every period of twelve months by a registered safety and health Advisor (Section 11). In addition, any accident, dangerous occurrence, or occupational poisoning which has occurred at the workplace needs to be reported to the occupational safety and health officer of the respective area by an employer or self-employed person (section 21). According to section 44, potential occupiers are required to obtain a registration certificate from the Director for all premises intended for use as workplaces. Such places shall be maintained in a clean state during the operation phase (section 47).

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

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

design evacuation procedures to be used during any emergency situation and to have them tested at regular intervals.

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

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

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

2.4.10 Trade Licensing Act (Cap 497)

Section 5 of the Act makes it mandatory for all businesses to obtain trading licenses.

2.4.11 Environmental Vibration Pollution (Control) Regulations, 2009

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

- i. Prohibition of excessive noise and vibration
- ii. Provisions relating to noise from certain sources
- iii. Provisions relating to licensing procedures for certain activities with a potential of emitting excessive noise and/or vibrations and
- iv. Noise and excessive vibrations mapping.

According to regulation 3 (1), 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 prohibits any person to (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 metres from any moving source.

Regulation 5 further makes it an offence for any person to make, continue or cause to be made or continued any noise in excess of the noise levels set in the First Schedule to these Regulations, unless such noise is reasonably necessary to the preservation of life, health, safety or property.

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

Regulation 13 (1) provides that except for the purposes specified in sub-Regulation (2) there under, no person shall operate construction equipment (including but not limited to any pile driver, steam shovel, pneumatic hammer, derrick or steam or electric hoist) or perform any outside construction or repair work so as to emit noise in excess of the permissible levels as set out in the Second Schedule to these Regulations.

Regulation 16 (1) stipulates that where a sound source is planned, installed or intended to be installed or modified by any person in such a manner that such source shall create or is likely to emit noise or excessive vibrations, or otherwise fail to comply with the provisions of these Regulations, such person shall apply for a License to the Authority. According to regulation 18 (6) the license shall be valid for a period not exceeding seven (7) days. Regulation 19 (1) prohibits any person to carry out activities relating to fireworks, demolitions, firing ranges or specific heavy industry without a valid permit issued by the Authority. According to sub regulation 4, such permit shall be valid for a period not exceeding three months.

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

CHAPTER THREE: PROJECT DESCRIPTION, DESIGN AND IMPLEMENTATION

3.1 Nature of the Project

The proposed project will include construction of hotel suites development with support facilities on plot L.R NO. 7258/54 (7258/3/55).

3.2 Location of the Project

The proposed project site is located on PLOT L.R NO. 7258/54 (7258/3/55) located along Limuru road between Canadian High Commission and Rwandan High Commission opposite Kenya Technical Teachers College(K.T.T.C) football field Nairobi City County. The proponent will build an overpass road from Limuru road in to the proposed site bypassing the services road serving Canadian embassy. The coordinates are 1.240734°S , $36.812726^{\circ}\text{E}$.



Entrance view - View of the slip road below the Limuru Road approx. 2m lower. Entrance to the plot is at the behind the standing guard (source: field survey March. 2018)

And

View from the main gate towards the plot. Slope can only be seen towards the middle as it drops significantly after the middle point



View from the centre of the plot showing slope to the river



View from middle of the plot towards top Rwanda High Commission



View from Bottom (River) towards top of plot and on the left Rwanda High Commission



View from Bottom (River) right (Rwanda High Commission) towards Canadian High Commission



Transversal view from Canadian High Commission towards Rwanda High Commission



View of Karura Forest at the River



Site location plan (source: Nairobi cadastral)

3.3 Land Ownership

The said parcel of land is held under a freehold .it is registered under **Mediview Limited** .Copies of the ownership documents are annexed herein. The parcel of land measures approximately 2.7 acres.

3.4 Project Description

3.4.1 Hotel suites Definition

A Hotel Suites development is a hotel with two components being a normal hotel set up with rooms between and a component of larger rooms for extended for long stay guests (1 to 6 months). The extended stay units normally have a kitchenette and have possibilities of connecting room. Size of room units and extended stay units will depends on the brand, star rating category and location.

3.4.2 Project Details

The proposed project have two components being an extended stay hotel (1 to 6 months stay) with a size varying between 45sqm and 70sqm and standard hotel rooms between 25 to 28sqm.

Connecting rooms possibilities are also provided.

The facility is located on a highly sloppy site with a height difference of 34m between the highest contour being Limuru road (at the front) and lowest contour being the river bank (at the back) . The development borders and faces directly the Karura forest on the back of the plot.

Based on the Limuru road, the development is Ground plus Three (3) and takes advantage of the sloppiness of the plot towards the river. In total there are 3 blocks of maximum of 7 staggered levels to take advantage of the very sloppy terrain. Overall, the development will have approximately 200 units.

The proposed development will be managed by one of the top three international hotel operator (Marriott, Accor or Intercontinental Group)

Other facilities include: restaurant and bar, meeting rooms and business centre, swimming pool, gym, stores, linen stores, furniture stores, canteen, parking bays, security and control office.

In addition; Roofs will be landscape and harvesting of rain water is part of the concept. The rainwater will be reused in toilets and irrigations

The roof of the main building will have solar panels which will be used as the main source of water heating.

An adequate capacity sewage treatment plant has been planned (capacity around 300cm³). The recycled water will be used internally mainly for irrigation and toilets

More/fine details of the development, Specifications and features of the proposed project have been given.

(The details are found in the copies of the architectural drawings annexed).



3D images of the proposed Hotel Suites

3.5 Project Construction

The building will be constructed based on applicable building standards of Kenya. Other building standards will be incorporated. They include Building Code and the British Building Standards *BS 8110, BS 5950, BS4449, BS4461 etc.* The development shall also incorporate environmental guidelines, health and safety measures.

3.5.1 Construction Activities and inputs

The project inputs include the following:

- Construction raw materials i.e. sand, cement, stones, crushed rock (gravel/ ballast), ceramic tiles and other ceramic fittings, steel and wooden fixtures and fittings, glass, steel metals, timber, roofing materials, painting materials among others. All these should be obtained from licensed dealers and especially those that have complied with the environmental management guidelines and policies.
- Construction machines including machinery such as trucks, concrete mixers, and tools and other relevant construction equipment. These will be used for the transportation of materials, clearing of the site and construction debris. Most of the machinery will use electrical and petroleum products to provide energy.
- A construction labor force of both skilled and non-skilled workers. These will require services such as energy, water supply and sanitation facilities.
- Water for construction purposes.
- Power from the mains grid or provided by generators.

Construction activities include the following

- Procurement of construction materials from approved dealers.
- Transportation of construction materials and debris using heavy and light machinery
- Appropriate storage of the construction materials.
- Site clearing, excavation and filling and laying of foundation
- Construction works i.e. masonry works/building works including, finishes, fixtures and fittings.
- Disposal of debris/ materials. All debris and excavated materials will be dumped on sites approved by the Municipal Engineer.
- Electrical, civil, and water engineering and sanitary works. These will be done by qualified and registered expertise.
- Landscaping works and earth works mostly on completion of the proposed development.

- Completion of the development and occupation.

3.6 Infrastructure and Services

3.6.1 Roads and accessibility

The proposed project's site is located in an area served with good road network. The major trunk road servicing the area is Limuru Road. The site however is located along Limuru road and is accessed through a slip road. The accessibility of the site will be instrumental during project implementation process and occupation phase. Through consultation with the immediate embassies, the proponent has come up with traffic management plan.

3.6.2 Water supply

The general area is served with water from N.C.W.S.CO. The developer intends to connect to the existing line. The use of roof catchments supplies to enhance provision of water, shall also be put into consideration. The proponent/contractor shall install standard roof water collection systems for the roof catchments of the proposed Development. These include gutters, down pipes and suitable water storage tanks for the harvested rainwater. It will greatly help in minimizing pressure on the existing water supply. The proponent should consider drilling borehole to supplement NCWSCO.

3.6.3 Sewer System

The general area is not served with public sewerage system (trunk sewer). The proponent therefore intends to connect waste water to treatment plant. All sanitary works will be done to the entire satisfaction of county and Ministry of Health, Public Health Office.

Copies of approved waste water treatment plant designs are annexed.

3.6.4 Surface Drainage

The site area does not experience drainage problems since the site is gently sloping towards the river. However, increased surface run-off is anticipated from roof catchments of building structure; drive way and parking, which are partially impervious. Therefore as rain falls much water/run-off is anticipated due to slight decrease in recharge areas. In connection to this, the volume of water reaching the *drain system* will be large and as such it greatly influences the design of effective surface drainage system of the proposed project.

In line with the above, surface drainage systems will effectively be designed and installed to manage the storm water such as may be derived from the parking, driveways and roof of the building blocks.

3.6.5 Solid Waste Management

Increased solid waste generation (from the project) is anticipated mainly arising from the construction activities (wooden, glass, plastics, and sanitary litter etc.). The streams of the solid wastes (thus) include the following:-

- Debris resulting from earth works and minimal vegetative materials to be cleared to pave way for the proposed project.
- All stones, wooden and glass materials resulting from related activities, during implementation of the proposed project.
- Plastic materials resulting from such works as sewerage, drainage and water systems, electricity works etc.
- Sanitary litter as generated during implementation and occupation of the project.
- Kitchen materials and other refuse especially on the occupation/operational stages of the proposed project

All debris generated during project implementation process will be disposed suitably into the approved dumpsite or as directed by the Engineer, Ministry of Works.

Handling of wastes during occupation phase shall be fundamentally considered and especially through inclusion of **Waste Collection Centre (WCC)** at the entrance to the site. This shall enhance *storage, collection, transportation and disposal* of all solid waste of the entire project, on occupation.

The proponent should engage the services of a NEMA licensed waste handlers.

3.6.6 Energy

Construction machineries will require fuels (petroleum) during construction phase. Electrical power will come in handy; in driving the selected construction machinery. Energy will also be needed during occupation/ operational phase of the project. The general area is supplied with electricity

from the national grid. The proposed development will be connected to the national grid. A standby generator will also be put in place to ensure that the premises have power all through.

In addition to the above, the need for energy conservation will be emphasized during construction and occupation phases. During occupation phase, the use of energy conserving appliances (i.e. bulbs) and renewable energy sources such as solar energy will be encouraged.

3.6.7 Communication

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

CHAPTER FOUR: BASELINE INFORMATION OF THE STUDY AREA

4.1 Introduction

This chapter has information on the location, bio- physical, socio and economic aspects of the project area. These are elaborately discussed in order to identify areas likely to be affected as a result of project activities. This study therefore considered the physical location, climatic data, geology, drainage, infrastructure, demography and socioeconomic information.

4.2 Climatic Conditions

The general climate of Nairobi County is semi-arid with an altitude of about 1,795 meters above sea level. There are two rainy seasons but rainfall can be moderate. The cloudiest part of the year is just after the first rainy season, when, until September, conditions are usually overcast with drizzle. The difference between the seasons (wet season and dry season) is minimal as Nairobi is close to the Equator.

4.2.1 Temperatures

The sunniest and warmest part of the year is from December to March, when temperatures average the mid-twenties during the day. The mean maximum temperature for this period is 24 °C (75 °F). The minimum temperature also remains low during cloudy nights, usually hovering around 11 °C and at times reaching 8°C. Clear skies in January and February also bring colder nights. Temperatures range from a minimum of 9.1°C to a maximum of 26.7°C

4.2.2 Rainfall

There are two rainy seasons but rainfall can be moderate. The cloudiest part of the year is just after the first rainy season, when, until September, conditions are usually overcast with drizzle. Rainfall ranges from 500 mm to 900 mm per annum.

4.2.3 Wind Flows

The lower winds throughout the year are of the easterly type. Between October and April they shift to the northeast while as from May to September they move to the southeast. Prior to the “Long Rain” season strong winds prevail with an average speed of 22.5 Miles/hour. The rest of the year has wind speed varying from 10 to 15 Miles/hour. However, during night, the winds are usually calm.

4.2.4 Sunshine

Early mornings in Nairobi in general are often blue sky, but the sun peeks through by midmorning. Throughout the year, there is an average of ten hours of sunshine per day. Thirty percent more sunlight reaches the ground during the afternoon than in the morning. Of course, there is more sun shine during the summer months, when the sun is more overhead in the southern hemisphere.

Infrequently during the rainy season the sun never show through the clouds. Even in August, the cloudiest month, there is an average of four hours of sunshine.

4.3 Biological Environment

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

4.3.1 Flora

The site is planted with vegetation (mature trees). Some of the species identified include bougainvillea along the boundaries. Natural vegetation is also found on site. However, the site does not have any endangered species. Some of this flora will be cleared during construction. However vegetation and proper landscaping will be done after completion of construction works.

4.3.2 Fauna

The site is situated within an area depicting mixed land users where human activities have altered the natural habitat over the years. Consequently, there are no major animals in the environs except birds, insects, and small rodents. Therefore there is no fauna threatened by the proposed project. The project's effect may seem insignificant to such lives but it is of great concern to the environment at large. It is expected that the area will be populated by small mammals such as mice, rats, moles and other members of the Rodent Family. Bird species were also observed at the site. None of the faunal species observed are rare or endangered.

4.4 Land use:

Urban land use refers to spatial distribution of social and economic activities. Accordingly, an up-to-date land use inventory is frequently required to facilitate urban planning and growth patterns as well as monitoring of urban expansion. A study by the Department of Resource Surveys and Remote Sensing (DRSRS 1994) identified eight major land-use classes in major urban centres in Kenya. These include Residential use Industrial, commercial and service centres, Infrastructure land use, Recreational areas, urban agriculture as well as Water bodies and riverine areas.

CHAPTER FIVE: IMPACT ASSESSMENT METHODOLOGY & ANALYSIS OF ALTERNATIVES

5.1 Introduction

This chapter will describe the impact assessment methodology to be used for this project. The methodology has been developed by the consultants and aims to provide a relatively objective approach for the assessment of potential impacts.

5.2 Methodology

To ensure a direct comparison between various impacts, standard rating scales have been defined for assessing and quantifying the identified impacts. This is necessary since impacts have a number of parameters that need to be assessed. Five factors need to be considered when assessing the significance of impacts, namely:

1. Relationship of the impact to **temporal** scales – the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.
2. Relationship of the impact to **spatial** scales – it defines the physical extent of the impact.
3. The severity of the impact – the **severity/beneficial** scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party.
4. The **likelihood** of the impact occurring – the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance. Each criterion is ranked with scores assigned to determine the overall **significance** of an activity

5.3 Analysis of Alternatives

5.3.1 The No Action Alternative

The No Action Alternative in respect to the proposed project implies that the status quo is maintained i.e. no construction/development of the proposed project. This option is most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. However, the need for such development is of great importance and the anticipated environmental impacts resulting from constructions are less significant. This option will involve several losses both to the project proponent/land owner and the Kenya society and Government. The property will remain under-utilized or neglected. The No Project Option is the least preferred from the socio-economic and partly environmental perspective since if the project is not done: -

- The economic benefits especially during construction i.e. provision of jobs for skilled and non-skilled workers will not be realized.
- High demand for modern hotel will remain unchanged

- The social-economic status of Kenyans would remain unchanged.
- The local skills would remain under utilized
- No employment opportunities will be created for Kenyans.

5.3.2 The relocation Alternative

Relocation option to a different site is an option available for the project implementation. At the moment, there are no alternative sites for the proposed development. The current site is the only land owned by the proponent and suitable for the proposed development. This means that the proponent has to look for the land if relocation is proposed. Looking for the land to accommodate the scale and size of the project and completing official transaction on it may take a long period. In addition, it is not a guarantee that such land would be available. It's also worth noting that the said project is already underway in terms of seeking development approvals in various government departments. The project proponent would spend another long period of time on design and approvals of the plans by the relevant government departments. The project design and planning before the stage of implementation would call for costs; already incurred in the proposed development i.e. whatever has been done and paid to date would be counted as a loss to the proponent. In consideration of the above concerns and assessment of the current proposed site, relocation is not a viable option. From the analysis above, it becomes apparent that the No Project Alternative is not the appropriate alternative to the local people, Kenyans, and the Government of Kenya.

Alternative to Construction Materials and Technology

There is a wide range of construction and furnishing materials which can be sourced locally and internationally. In this construction, certified raw materials/equipments and modern technology will be used. Also, electrical appliances that save energy will be given first priority. The concrete pillars and walls will be made using locally sourced stones, cement, sand (washed and clean), metal bars and fittings that meet the Kenya Bureau of Standards requirements.

Solid Waste Management Alternatives

Throughout construction, the project will produce wastes such as soil, wood chips, cement bags, metal scraps and paper wrappings among other. Wastes to be generated during operation phase are mainly domestic in nature. The Proponent is expected to observe EMCA (Waste Management Regulations, 2006). Priority will be given to reduction of wastes, recycling, and reuse. This will minimize environmental pollution.

CHAPTER SIX: POTENTIAL ENVIRONMENTAL IMPACTS

6.1 Introduction

This chapter outlines the potential negative and positive impacts that will be associated with the construction of the proposed hotel. The impacts will be related to activities to be carried out during construction of the project. The operational phase impacts of the project will be associated with the activities carried out by the residents/tenants, which will mainly be domestic. In addition, closure and decommissioning phase impacts of the project are also highlighted. These can be either positive or negative.

6.2 Anticipated Environmental Impacts

During the field survey, key impacts both positive and negative relating to the proposed development were identified. They were obtained by making physical observations at the project site as well as existing land use in the neighborhood.

6.3 Positive Environmental Impacts of Construction Activities

6.3.1 Creation of Employment Opportunities

Several employment opportunities will be created for construction workers during the construction phase of the project. This will be a significant impact since unemployment is currently quite high in the country at large.

6.3.2 Provision of Market for Supply of Building Materials

The project will require supply of large quantities of building materials most, of which will be sourced locally. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

6.3.3 Increased Business Opportunities

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

6.3.4 Optimal Use of Land

The proposed development will ensure optimal use of the land considering it's currently undeveloped

6.3.5 Revenue to Government.

Value Added Tax (VAT) on construction materials/ tools to be purchased etc.

6.3.6 Enhanced Security.

During the operation of the project, security will be enhanced in the premise and the houses through distribution of suitable security lights and presence of a security guard. This will lead to improvement in the general security in the surrounding area.

6.3.7 Improved Infrastructure.

Project activities will lead to improvement of transport, sewerage, water supply and telecommunication networks. Such services are a prerequisite to development in any region.

6.4 Negative Environmental Impacts of Construction Activities

6.4.1 Extraction and Use of Building Materials

Building materials such as hard core, ballast, cement, rough stone and sand required for construction of the housing project will be obtained from quarries, hardware shops and sand harvesters who extract such materials from natural resource banks such as rivers and land. Since substantial quantities of these materials will be required for construction of the buildings, 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.

6.4.2 Dust Emissions

During construction, the project will generate substantial quantities of dust at the construction site and its surrounding. The sources of dust emissions will include site preparation and levelling works, and to a small extent, transport vehicles delivering building materials. Emission of large quantities of dust may lead to significant impacts on construction workers and the local residents, which will be accentuated during dry weather conditions.

6.4.3 Exhaust Emissions.

The trucks used to transport various building materials from their sources to the project site contribute to increases in emissions of CO₂, NO₂ and fine particulate along the way as a result of diesel combustion. Such emissions can lead to several environmental impacts including global warming and health impacts. Because large quantities of building materials are required, some of which are sourced outside Nairobi, such emissions can be enormous and may affect a wider geographical area. 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, frequent vehicle turning and slow vehicle movement in the loading and offloading areas.

6.4.4 Traffic flow during construction

There is a likelihood of increase in traffic on road accessing the site during construction. The proponent has come up with traffic management plan. The trucks used to transport various building

materials from their sources to the project site will contribute to increases in emissions of CO₂, NO_x and fine particulate along the way as a result of diesel combustion. Such emissions can lead to several environmental impacts including global warming and health impacts. Because large quantities of building materials are required, some of which are sourced outside Nairobi, such emissions can be enormous and may affect a wider geographical area. 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 running of vehicle engines, frequent vehicle turning and slow vehicle movement in the loading and offloading areas such trucks may slow down traffic flow.

6.4.5 Noise and Vibration

The construction works, delivery of building materials by heavy trucks and the use of machinery/equipment including bulldozers, generators, metal grinders and concrete mixers will contribute high levels of noise and vibration within the construction site and the surrounding area. Elevated noise levels within the site can affect project workers, neighboring Rwandan high commission, Canadian high commission workers, residents, passers-by and other persons in within the vicinity of the project site.

6.4.6 Risks of Accidents and Injuries to Workers

Because of the intensive engineering and construction activities including erection and fastening of roofing materials, metal grinding and cutting, concrete work, steel erection and welding among others, construction workers will be exposed to risks of accidents and injuries. Such injuries can result from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others.

6.4.7 Solid Waste Generation

Large quantities of solid waste (soil) will be generated as a result of excavation of the site. In addition, additional solid waste will be generated at the site during construction of the building and related infrastructure. Such waste will consist of metal cuttings, rejected materials, surplus materials, surplus oil, excavated materials, paper bags, empty cartons, empty paint and solvent containers, broken glass among others. Such solid waste materials can be injurious to the environment through blockage of drainage systems, choking of water bodies and negative impacts on human and animal health. This may be accentuated by the fact that some of the waste materials contain hazardous substances such as paints, cement, adhesives and cleaning solvents, while some of the waste materials including metal cuttings and plastic containers are not biodegradable and can have long-term and cumulative effects on the environment.

6.4.8 Energy Consumption

The project will consume fossil fuels (mainly diesel) to run transport vehicles and construction machinery. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. The project will also use electricity supplied

by supplied by Kenya Power & 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.

6.4.9 Water Use

The construction activities will require large quantities of water. Water will mainly be used for concrete mixing, curing, sanitary and washing purposes. Excessive water use may negatively impact on the water source and its sustainability.

6.5 Positive Environmental Impacts of Operational Activities

6.5.1 Availability of recreational facilities

The hotel will provide both recreational and accommodation services to the middle class.

6.5.2 Employment Opportunities

Many people will be employed by the project as management agents, caretakers, chefs, waiters, house keepers, receptionists, cleaners, security personnel and technicians among others.

6.5.3 Improved Security

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

6.6 Negative Environmental Impacts of Operational Activities

6.6.1 Solid Waste Generation

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

6.6.2 Energy Consumption

During operation, the hotel will use a lot of electrical energy mainly for lighting, cooking, running of air conditioning equipment, running of refrigeration systems, 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.

6.6.3 Water Use

Daily activities during the operation phase of the project will involve the use of large quantities of water supplied by NCWSC. The proponent should consider drilling a borehole to supplement NCWSC supply.

6.7 Negative Environmental Impacts of Decommissioning Activities

6.7.1 Solid Waste

Demolition of the project small buildings and related infrastructure will result in large quantities of solid waste. The waste will contain the materials used in construction including concrete, metal, drywall, wood, glass, paints, adhesives, sealants and fasteners. 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.

6.7.2 Noise and Vibration

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas.

6.8 Positive Environmental Impacts of Decommissioning Activities

6.8.1 Rehabilitation

Upon decommissioning the project, rehabilitation of the project site will be carried out to restore the site to acceptable status. This will include replacement of topsoil and re-vegetation that will lead to improved visual quality of the area.

6.8.2 Employment Opportunities

Several employment opportunities will be created for demolition and construction staff.

CHAPTER SEVEN: IMPACTS MITIGATION MEASURES

7.1 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 of the 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.

7.2 Mitigation of Construction Phase Impacts

7.2.1. 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. This will lead to reduction in the amount of raw materials extracted from natural resources as well as reducing impacts at the extraction sites.

7.2.2. Minimization of Run-off

The proponent will put in place some measures aimed at minimizing soil erosion and associated sediment release from the project site. These measures will include terracing and levelling the project site to reduce run-off velocity and increase infiltration of rainwater into the soil. In addition, construction vehicles will be restricted to designated areas to avoid soil compaction within the project site, while any compacted areas will be ripped to reduce run-off.

7.2.3. Minimization of Construction Waste

It is recommended that demolition and construction waste be recycled or reused to ensure that materials that would otherwise be disposed off as waste are diverted for productive use. In this regard, the proponent is 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 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 project include:-

- i. 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
- ii. 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
- iii. Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste
- iv. Use of construction materials containing recycled content when possible and in accordance with accepted standards.

7.2.4. Reduction of Dust Generation and Emission

Dust emission during construction will be minimized through strict enforcement of onsite speed controls as well as limiting unnecessary traffic within the project site. In addition, it is recommended that excavation works be carried out in wet conditions; and traffic routes on site be sprinkled with water regularly to reduce amount of dust generated by the construction trucks. The proposed construction of a perimeter wall will greatly reduce spread of dust in the neighborhood.

7.2.5. Minimization of impacts on traffic flow

The proponent will put in place measures to address such concerns by ensuring that construction vehicles preferably deliver materials during off-peak hours when traffic volume is low. There will also be provision for caution signs on the access road to alert users on construction activities in progress in order to prevent occurrence of accidents. This 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 proponent will build an overpass access road from limuru road bypassing the Canadian embassy service road.

7.2.6. Minimization of Noise and Vibration

Noise and vibration will be minimized in the project site and surrounding areas through sensitization of construction truck drivers to switch off vehicle engines while offloading materials. In addition, they will be instructed to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as the neighboring embassies, construction machinery shall be kept in good condition to reduce noise generation. It is recommended that all generators and heavy-duty equipment be insulated or placed in enclosures to minimize ambient noise levels.

7.2.7. Health and safety of Workers on site

The proponent is committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Health and Safety Act (Cap 514). In this regard, the proponent is committed to provision of appropriate personal protective equipment such as gloves; helmets, overall as well as ensuring a safe and healthy environment for construction workers by providing sanitary facilities (toilets) and portable water while food will be bought by workers from the nearby shopping centres.

7.2.8. Reduction 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.

7.2.9. Minimization of Water Use

The proponent shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water usage.

7.3 Mitigation of Operation Phase Impacts

7.3.1 Ensuring Efficient Solid Waste Management

The proponent will be responsible for efficient management of solid waste generated by the project during its operation. In this regard, the proponent will provide waste handling facilities such as waste bins and skips for temporarily holding domestic waste generated at the site. In addition, the proponent will ensure that such disposed of regularly and appropriately. It is recommended that the proponent put in place measures to ensure that the occupants of the Houses manage their waste efficiently through recycling, reuse and proper disposal procedures.

7.3.2 Minimization of Sewage Release

The proponent intends to put in place a waste treatment plant for handling waste water. Treated water will be collected in a separate tank where it will be re-used for cleaning the premises and watering flowers in the compound.

Copies of the treatment plant designs are attached

7.3.3 Ensure Efficient Energy Consumption

The proponent plans to install an energy-efficient lighting system for the project. This will contribute immensely to energy saving during the operational phase of the project. In addition, the staff will be sensitized to ensure energy efficiency in their daily operations. To complement these measures, it will be important to monitor energy use during the occupation and set targets for efficient energy use.

7.3.4 Security

Security and privacy of the immediate neighbors (Canadian and Rwandan High Commissions) will be observed. The proponent intends to install screens at the balcony to obstruct the view to the embassies. Landscaping will also be done on the roof.

7.3.5 Ensure Efficient Water Use

The proponent will 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 staff will be sensitized to use water efficiently.

7.4 Mitigation of Decommissioning Phase Impacts

7.4.1 Efficient Solid Waste Management

Solid waste resulting from demolition or dismantling works will be managed as previously described.

7.4.2 Minimization of Noise and Vibration

Significant impacts on the acoustic environment will be mitigated as described above.

CHAPTER EIGHT: ENVIRONMENTAL MANAGEMENT PLAN

8.1 Introduction

Integrating environmental issues in business management, such as those related to development is that it increases efficiency while enhancing the project proponent financial and environmental management. These issues, which are normally of financial concern, are: costs, product quality, investments, level of productivity and planning. Environmental planning and management as a concept seeks to improve and protect environmental quality for both the project site and the neighborhood through segregation of activities that are environmentally incompatible. Environmental planning and management integrates land use structure, social systems, regulatory law, environmental awareness and ethics.

Environmental management plan (EMP) for development projects such as the proposed hotel aims at providing a logical framework within which identified negative environmental impacts can be mitigated and monitored. In addition, EMP assigns responsibilities for action to various actors, and provides time frame within which mitigation measures can be done. EMP is a vital output for an environmental impact assessment as it provides a checklist for project monitoring and evaluation. A number of mitigation measures are already incorporated into the project design. The EMP outlined in Table 8-1 has addressed the identified potential negative impacts and mitigation measures for the proposed hotel development.

8.2 Environmental Monitoring and Evaluation

Environmental monitoring and evaluation are essential in the project lifespan as they are conducted to establish if the project implementation has complied with the set environmental management standards as articulated in the Environmental Management and Coordination Act (EMCA) No. 8 of 1999, and its attendant Environmental (Impact Assessment and Audit) Regulations, 2003.

In the context of the proposed project, design has made provisions for an elaborate operational monitoring framework for the following among others:

- Disruption of natural environment and modification of microclimate
- Air and noise pollution
- Proliferation of related businesses
- Workers accidents and health infections during construction process

TABLE 8.1: ENVIRONMENTAL MANAGEMENT PLAN IMPLIMENTATION PHASE

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	RESPONSIBILITY	COST (KES) ESTIMATE	MONITORING MEASURES
Commissioning of the Construction Works	- Site hand-over and Ground breaking	Project team (Lead Consultant/Architect, contractor Proponent)	Part of/Covered in the Project Cost	Presence of the project Team
Securing the Construction Site	- Construction of Perimeter Wall and Hoarding	Contractor	Part of/Covered in the Project Cost	Presence of Perimeter Fence
Security for Construction Material	- Construction of Site Stores - Construction materials to be delivered in small quantities to minimize storage problems	Contractor	500,000	Presence of Site store
Extraction and Use of Building Materials	- Availability and sustainability of the extraction sites as they are non-renewable in the short term - Landscape changes e.g. displacement of animals and vegetation, poor visual quality and opening of depressions on the surface	Contractor/Proponent/project team	Part of/Covered in the Project Cost	Material site rehabilitation
Collapse of Building during Construction	- Ensuring Building Strength and stability - Use of appropriate construction materials and reinforcements as per specifications - Ensuring building components are as per designs - Proper supervision - Ensure proper timelines are followed e.g. curing time	Contractor/project team	Part of/Covered in the Project Cost	Presence of the project Team
Disturbance of Traffic flow during construction	- Proper signage - Awareness creation - Education to truck drivers - The proponent has come up with a traffic management plan	Contractor/Project team and general public	800,000	- Presence of site Notice Board /Hoarding - Presence of Security guards to control traffic - warning signs

CONSTRUCTION PHASE				
ENVIRONMENTAL IMPACT	MITIGATION MEASURES	RESPONSIBILITY	COST (KES)	MONITORING MEASURES
Soil Excavation leading to site disturbance	<ul style="list-style-type: none"> - Excavate only areas to be affected by buildings - Dumping of excess excavated materials to sites designated by NEMA and County - Restoration of sites Excavated 	Contractor	4,000,000	Landscaping after completion of construction
Soil Erosion	<ul style="list-style-type: none"> - Create and Maintain soil traps and embankments. - Landscaping after completion of construction 	Contractor/Proponent, Architect/Site engineer Landscape Architect	1,000,000	Lack/Absence of Soil Erosion
Noise Pollution and Vibration	<ul style="list-style-type: none"> - Ensure use of serviced and greased equipment - Switch off engines not in use - Construction work to be confined to between 7am to 5pm - Ensure use of earmuffs by machine operators 	Proponent and Contractor	Part of Routine operation procedure	Lack of complaints from the immediate neighbors
Air Quality	<ul style="list-style-type: none"> - Water sprinkling of driveways or the use of biodegradable hydrant e.g. Terrasorb polymer will reduce dust emission during construction - Ensure servicing of vehicles regularly 	Proponent and Contractor	1,000,000	<ul style="list-style-type: none"> - Lack of complaints - Workers wearing protective clothing and earmuffs
Risks of Accidents and Injuries to Workers	<ul style="list-style-type: none"> - Education and awareness to all construction workers - Ensure use of appropriate personal protective clothing - Provide First Aid Kits on site - Ensuring Building Strength and stability - Proper supervision 	Proponent Contractor	800,000	<ul style="list-style-type: none"> - Presence of well-equipped First Aid kit - Presence of Security Guards on site - Presence of a register on the site
Health and Safety	<ul style="list-style-type: none"> - Provide First Aid Kits on site - Proper signage and warning to public of heavy vehicle turning - Ensuring Building Strength and stability - Provide clean water and food to the workers - The contractor to abide by all construction conditions especially clause B12 which stipulates health safety and workforce welfare 	Proponent Contractor	1,000,000	<ul style="list-style-type: none"> - Presence of well-equipped First Aid kit - Presence of Security Guards on site - Presence of a register on the site

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	RESPONSIBILITY	COST (KES)	MONITORING MEASURES
Solid Waste Generation	<ul style="list-style-type: none"> - Ensure waste materials are disposed of on County and NEMA approved sites - Ensure re-use of materials that can be re-used - Use of the 3rs – Reduce, Re-use, Re-cycle 	Proponent Contractor	1,000,000	<ul style="list-style-type: none"> - Absence of Solid waste on the site
Energy Consumption	<ul style="list-style-type: none"> - Use electricity sparingly since high consumption of electricity negatively impacts on these natural resources and their sustainability - Use of Standby Generators 	Proponent Contractor	1,000,000	<ul style="list-style-type: none"> - Presence of KPLC power lines - Presence of Generators -
Excessive Water Use	<ul style="list-style-type: none"> - Excessive water use may negatively impact on the water source and its sustainability - Connection with NCWSCO - Consider drilling borehole to supplement NCWSCO supply 	Proponent Contractor	1,000,000	<ul style="list-style-type: none"> - Metering of NCWSC water
OCCUPATION PHASE				
Architectural incompatibility leading to distortion of neighborhood aesthetic image	<ul style="list-style-type: none"> - Harmonize building scale with existing developments in neighborhood. - Harmonize detail, material and finishes for roofs and walls with existing development in the neighborhood. 	Architect Proponent Contractor	Part of/Covered in the Project Cost	<ul style="list-style-type: none"> - Compatibility with the neighborhood
Solid Waste Generation and Management	<ul style="list-style-type: none"> - Regular inspection and maintenance of the waste disposal systems during operation phase - Establish a collective waste disposal and management system - Provide waste disposal bins to each suite well protected from adverse weather and animals - Ensure waste materials are disposed off on County approved sites - Engage a NEMA licensed waste handler to transport the waste - Use of the 3rs – Reduce, Re-use, Re-cycle 	Proponent Contractor	1,500,000	<ul style="list-style-type: none"> - Presence of NEMA registered waste management companies - Presence of waste handling bins - Absence of wastes
Liquid Waste Generation and Management	<ul style="list-style-type: none"> -Regular inspection and maintenance of the waste disposal systems during the operation phase - Proper connection to the waste water treatment plant 	Proponent Contractor	1,000,000	<ul style="list-style-type: none"> - Absence of liquid wastes

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	RESPONSIBILITY	COST (KES)	MONITORING MEASURES
Increased loading on Infrastructure services - Increased vehicular and/or pedestrian traffic - Increased demand on water, sanitation services	- Have paved private access road and walkway system - Have paved road drainage system - Encourage rainwater harvesting - Provision of increased water storage capacity - Provide adequate storm water drainage system - Construction of 6m road connecting the hotel	Contractor Proponent	1,000,000	- Absence of run-off - Presence of good roads - Pavements and drainage channels
Traffic	- Come up with traffic management plan - Provide adequate parking facilities within the project site - Construction of private access road	Contractor Proponent	Routine operation procedure	- Presence of ample parking in the premises
Increased social conflict	- Increased economic activities –employment generation and income earnings - Encourage good relation with the neighbors through neighborhood associations	Contractor Proponent		-Good relationship with neighbors -absence of conflicts
Storm Water impacts	- Provide roof gutters to collect and direct roof water to drains - Construct drains to standard specifications - Develop a storm water drainage system and linkage to natural drains - Leave 30 metres from the riparian	Proponent Contractor	900,000	Absence of Flooding and dampness in the hotel
Disruption of existing natural environment and modification of micro-climate: - Increased development density - Increased glare/solar reflection - Reduced natural ground cover/surface run-off - Obstruction of ventilating winds	- Development restricted to follow zoning policy/approved density – building line, plot coverage and plot ratio. - Careful layout and orientation of buildings to respect wind and sun direction. - Adequate provision of green and open space planted with grass, shrub and tree cover. - Minimum use of reflective building material and finishes for roof, wall and pavement. - The balcony’s should have garden	Project team (Contractor Proponent, Architect or Lead Consultant, etc)	2, 000,000	Proper orientation Planted trees/Landscaping

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	RESPONSIBILITY	COST (KES)	MONITORING MEASURES
Insecurity	<ul style="list-style-type: none"> - secure the premise with a perimeter wall and an electric fence - Installation of CCTV cameras at strategic points - Have a entry point that is manned 24 hours - Construction of gate house 	Contractor Proponent	2, 000,000	Presence of perimeter wall Presence of day and night security guards
DECOMMISSIONING PHASE				
Building Safety	Assess the condition of buildings to ascertain usefulness	Engineer Proponent	1,000,000	Engineer and Tests on the building
Land and Building use	Ascertain the Planning development policy	County Physical Planner	900,000	Consultants present
Accidents/Injuries	Securing the Site by fencing off	Contractor Proponent	1,000,000	Presence of perimeter fence
Un-disconnected Services e.g. Power, Water, telephone, sewer etc	Ensure disconnection of all services Remove all surface and underground cables and wiring	Contractor	2,000,000	Absence of cabling
Solid Waste Generation (demolition waste)	Ensure waste materials are disposed of on County and NEMA approved sites Ensure re-use of materials that can be re-used -Use of the 3rs – Reduce, Re-use, Re-cycle	Proponent/Contractor	2,000,000	Absence of Debris
Noise and Vibration	<ul style="list-style-type: none"> - Ensure use of serviced equipment - Switch off engines not in use - Demolition work to be confined to between 8am to 5pm - Ensure use of earmuffs by workers 	Proponent Contractor	900,000	Lack of complaints from the neighbors

CHAPTER NINE: PUBLIC PARTICIPATION

9.1 Public participation

Public participation basically involves engaging members of the public to express their views about a certain project. Public participation tries to ensure that due consideration will be given to public values, concerns and preferences when decisions are made. Public participation in this project was facilitated through interviews with the project proponent and neighbors of the facility.

Public involvement is a fundamental principle of the EIA process. Timely, well planned and appropriately implemented public involvement programs will contribute to EIA studies and to the successful design, implementation, operation and management of proposals. Specifically public involvement is a valuable source of information on key impacts, potential mitigation measures and the identification and selection of alternatives. It also ensures the EIA process is open, transparent and robust, characterized by defensible analysis.

Nearly all EIA systems make provision for some type of public involvement. This term includes public consultation (or dialogue) and public participation, which is a more interactive and intensive process of stakeholder engagement. Most EIA processes are undertaken through consultation rather than participation. At a minimum, public involvement must provide an opportunity for those directly affected by a proposal to express their views regarding the proposal and its environmental and social impacts. The purpose of public involvement is to:

- Inform the stakeholders about the proposal and its likely effects;
- Canvass their inputs, views and concerns; and
- Take account of the information and views of the public in the EIA and decision making.

The key objectives of public involvement are to:

- obtain local and traditional knowledge that may be useful for decision-making;
- facilitate consideration of alternatives, mitigation measures and tradeoffs;
- ensure that important impacts are not overlooked and benefits are maximized;
- reduce conflict through the early identification of contentious issues;
- provide an opportunity for the public to influence project design in a positive manner (thereby creating a sense of ownership of the proposal);
- improve transparency and accountability of decision-making; and

- Increase public confidence in the EIA process.

Experience indicates that public involvement in the EIA process can and does meet these aims and objectives. Many benefits are concrete, such as improvements to project design.

Canadian High Commission has been consulted and gave their input regarding the proposed development. (See attached copy). Further public consultation will be done to the immediate neighbors.

CHAPTER TEN: ENVIRONMENTAL HEALTH AND SAFETY (EHS)

10.1 EHS Management and Administration

The EHS is a broader and holistic aspect of protecting the worker, the workplace, the tools / equipments and the biotic environment. It is an essential tool in determining the EIA study. The objective of the EHS on the proposed project is to develop rules that will regulate environmentally instigated diseases and occupational safety measures during construction and the operation phases of the proposed project by:

- Avoidance of injuries
- Provision of safe and healthy working environment for workers comfort.
- Control of losses and damages to plants, machines, equipment and other products.
- Enhance environmental sustainability through developing sound conservation measures.

10.2 Policy, Administrative and Legislative Framework

It is the primary responsibility of the contractor to promote a safe and healthy environment at the workplace and within the neighborhood in which the proposed project will be constructed by implementing effective systems to prevent occupational diseases and ill-health, and to prevent damage to property. The EHS Management Plan when completed will be used as a tool and a checklist by the contracted engineers in planning and development of the construction of this project.

10.3 Organization and implementation of the EHS Management Plan

The contractor shall use the EHS plan at the proposed project site both during construction and operation. The engineer will use it during construction phase with the assistance of an EHS consultant.

10.4 The Guiding Principles to be adopted by the contractor

The company will be guided by the following principle: -

- It will be a conscious organization committed to promotion and maintenance of high standards of health and safety for its employees, the neighboring population and the public at large.
- Ensuring that EHS activities are implemented to protect the environment and prevent pollution.

- Management shall demonstrate commitment and exercise constant vigilance in order to provide employees, neighbors and the environment, with greatest safeguards relating to EHS.
- Employees will be expected to take personal responsibility for their safety, safety of colleagues and of the general public as it relates to the EHS management plan.

10.5 EHS management strategy to be adopted by the contractor

The following strategies will be adopted to achieve the above objectives

- Create an Environment Health and Safety Management committee and incorporate EHS as an effective structure at various levels and units to manage and oversee EHS programs in all construction and operation phases of the project
- Maintain an effective reporting procedure for all accidents.
- Provide appropriate tools and protective devices for the success of the project.
- Encourage, motivate and reward employees to take personal initiatives and commitment on EHS.

10.6 Safety Agenda for both the proponent and contractor

There will be a permanent EHS agenda during construction.

(a) Contractors

The EHS management plan code of practice shall be applicable to the contractors working in the premises, and shall be read and signed. This should also remind the contractor of his/her;

- Legal requirements.
- Statutory obligations.
- Obligation to lay-down a system for reporting accidents
- Responsibility to ensure that his/her employees are supplied with personal protective equipment
- Obligation to ensure that he obtains detail of jobs and areas where permit-to-work must be issued

(b) All residents' and workers' responsibility

- Know the location of all safety equipment, and learn to use them efficiently.

10.7 Safety requirement at the project site during construction and operation Period

(a) The contractor

The contractor will ensure that:

- Safe means of entry and exit at the proposed project site.
- Ensure adequate briefing of job at hand on the safe system before commencement of work.
- The EHS coordinator must be in attendance at all times throughout the duration of the project.
- The EHS consultant must maintain constant assessment of the risk involved
- A safety harness must be worn before entry into all confined spaces
- An EHS consultant must be posted at the entrance at the project site to monitor

(b) The Traffic / Drivers

Within the construction premises, the following traffic rules will be observed: -

- Observe speed limits and all other signs and obey traffic rules.
- Use the vehicle for the purpose to which it is intended only.

c) Fire hazard at the construction site,

Workers at the site shall ensure that: -

- Oxy-acetylene cylinders are not contaminated with grease or oil.
- Oxy-acetylene cylinders are not subjected to direct sunlight or heat.
- Oxy-acetylene cylinders are not to be used or stored standing in a vertical position.
- When in use, ensure the inclination should never be over 30° from the vertical.

10.8 Welding at the construction site

It is the responsibility of the contractor during construction to: -

- Ensure that welding clamp is fixed such that no current passes through any moving parts of any machine.
- Ensure that all welding clamps are in good operating condition
- Ensure that welding clamps are free from any contact with explosive vapors.
- Ensure that any slag or molten metal arising from welding activities does not start up fires by:

- ✓ Clearing combustible material to distance of at least 3 meters away from working area.
- ✓ Appropriate fire extinguisher is to be kept available for immediate use at all times

10.9 Emergency procedure during construction and operation

An emergency situation means:

- Unforeseen happening resulting in serious or fatal injury
- Fire or explosion.
- Natural catastrophe.

In the event of such an emergency during construction, the workers shall:

- Alert other persons exposed to danger.
- Inform the EHS coordinator.
- Do a quick assessment on the nature of emergency.
- Call for ambulance on standby.

CHAPTER TEN: DECOMMISSIONING

10.1 Introduction

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

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

The table below shows the proposed decommissioning plan:

Table 10.1. EMP for Decommissioning

Expected Negative Impacts	Recommended Measures	Responsible Party	Time Frame	Cost (KShs)
1. Construction Machinery/Structure & Wastes				
Scraps material and other debris	Use of an integrated solid waste management system i.e. through a hierarchy of options. Wastes generated as a result of facility decommissioning activities will be characterized in compliance with standard waste management procedures. The contractor will select disposal locations and the county based on the properties of the particular waste generated.	Project Manager & Contractor	During decommissioning	3,000,000
	All buildings, machinery, equipment, structures and partitions that will not be used for other purposes should be removed and reused or rather sold/given to scrap material dealers.	Project Manager & Contractor	During decommissioning	-
	Where recycling/reuse of the machinery, equipment, structures and other waste materials is not possible the materials should be taken to approved dumpsites.	Project Manager & Contractor	During decommissioning	-
Rehabilitation of project site				
Vegetation disturbance Land deformation: soil erosion, drainage	-Implement an appropriate re-vegetation program to restore the site to its original status. -During the vegetation period, appropriate surface water runoff controls will be taken to	Project Manager & Contractor	During decommissioning	4,000,000

problems	<p>prevent surface erosion;</p> <p>-Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences;</p> <p>-Fencing and signs restricting access will be posted to minimize disturbance to newly-vegetated areas;</p>			
Social- Economic impacts				
<p>-Loss of income</p> <p>-Loss of offices</p>	<p>The safety of the workers should surpass all other objectives in the decommissioning project.</p> <p>-Adapt a project – completion policy; identifying key issues to be considered.</p> <p>-Compensate and suitably recommend the workers to help in seeking opportunities elsewhere.</p> <p>-offer alternative housing facilities</p>	Project Manager & Contractor	During decommissioning	3,000,000

CHAPTER ELEVEN: CONCLUSION AND RECOMMENDATIONS

11.1 Overview

From the foregoing analysis, the social and economic rating for this project is highly positive. Evaluation of alternatives has already shown that options are limited and costly. Already the proponent has sunk a substantial amount of money in the project up to design stage. Further delay of the project is denying all stakeholders the anticipated benefits of the investment. However, redesigning or relocation will lead to loss of time and money that is already tied in the preliminary costs of the project. The project does not pose any serious and negative environmental impacts. Adequate mitigation measures have been proposed to address any of the negative impacts arising from the project. The project will provide recreational and accommodation services to middle class, create employment and improve income earnings.

During the preparation of this report for the proposed hotel block, it is observed and established that most of the negative impacts on the environment are rated low and short term with no significant effect. The positive impacts are highly rated and will benefit all stakeholders and the immediate neighbors. The project proponents have proposed to adhere to prudent implementation of the environmental management plan. They are obtaining all necessary permits and licenses from the relevant authorities and have qualified and adequate personnel to do the project as proposed. They have proposed adequate safety and health mitigation measures as part of the relevant statutory requirements

11.2 Conclusion

This study is recommendable and should be approved by NEMA for issuance of an EIA license subject to annual environmental audits after it has been completed and occupied. This will be in compliance with the Environmental Management and Coordination Act of 1999 and the Environmental Impact Assessment and Audit regulations, 2003. Above all the proponent should carry out Environmental Audit 12 months after the project is completed. They should therefore be licensed to implement this project subject to adherence to the environmental management plan proposed in this report and the statutory requirements.

References

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