

**THE ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT,
1999**

**ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE
PROPOSED GOLF COURSE HOTEL (K) LIMITED ALONG MKUNGU
CLOSE, WESTLANDS, NAIROBI.**



**For
GOLF COURSE HOTEL KENYA LTD,
P.O. Box 66795 – 00100
NAIROBI**

Prepared By, Ecohealth Company ltd, a firm of experts registered and licensed by NEMA.

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List of Acronyms

CAP – Chapter (of the Laws of Kenya)

CDE – County Director of Environment

EIA – Environmental Impact Assessment

EMCA - Environmental Management and Coordination Act

EMP – Environmental Management Plan

NCC –Nairobi County Council

KES – Kenya Shillings

NEAP - National Environmental Action Plan

NEMA – National Environment Management Authority

WRMA - Water Resources Management Authority

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CERTIFICATION

This Environmental impact assessment study report for the proposed Hotel Development in Westlands, Nairobi has been prepared by Ecohealth Company Ltd, who are registered and licensed as a firm of experts by NEMA. Reg No.2368.

This report has been done with reasonable skills, care and diligence in accordance with the Environmental Management and Coordination Act, 1999 and the Environmental Impact Assessment and Audit Regulations 2003.

The firm of experts on behalf of those involved in the EA process certifies that the particulars given in this report are correct to the best of our knowledge. The proponent agrees to abide by the recommendations of the report regarding conservation of the environment and shall implement the proposed Environmental Management Plan.

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POSITION :

Executive Summary

Project Description

The proposed project is a modern hotel consisting of twenty one floors. The ground floor has administrative offices, waiting lounges, reception, washrooms and a car park. On the first floor, there is a swimming pool, a coffee shop, a breakfast area, kitchen, restaurant, business center and a bar. Second floor consists of a gym, a waiting lounge, stores, a pantry and washrooms.

Fifth floor to Tenth floor comprises fifteen guest rooms on each floor. The Eleventh to 20TH floor consists of stairs while the Last floor is a revolving restaurant with a kitchen, sitting area and a smoking Zone.

The objective of this proposed hotel development is to provide top quality hotel services to clients.

a) Key findings and recommendations

According to this EIA study, the proposed development of Golf Course hotel Limited in Westlands will not have significant adverse impacts. The potential benefits are numerous and include employment, revenue and attraction of other development. The potential adverse impacts are manageable if the environmental management plan proposed in this report is implemented in full.

b) Environmental Impacts and Management Plan

Table one below gives a summary of the identified and predicted environmental and social impacts of the proposed hotel development and the suggested mitigation measures for each impact.

Fig(1): Summarized Environmental Management Plan	
Potential impact	Suggested mitigation measures
Destruction of vegetation	<ul style="list-style-type: none">• Minimal vegetation removal• Replanting of vegetation where removed and in all open spaces• Carry out landscaping and tree planting within the hotel compound and along perimeter fence
Disturbance of soil	<ul style="list-style-type: none">• Minimal digging (only where absolutely necessary)• Refilling of dug out areas with soil (backfilling)• Landscaping• Leveling of soil after earthworks• Planting of vegetation to hold soil together
Increased demand for water	<ul style="list-style-type: none">• Efficient use of water• Identify water saving opportunities• Create water saving awareness among guests and staff• Monitor water utilization in the hotel on a monthly basis

Use of energy	<ul style="list-style-type: none"> • Take advantage of natural lighting and ventilation as much as possible to minimize artificial lighting and ventilation • Consider installing solar energy harvesting facilities • Install energy saving devices including bulbs and other electrical appliances • Provide backup source of energy • Monitor energy consumption in the hotel • Establish targets for efficient energy usage • Create awareness among staff and visitors on energy saving
Generation of wastewater	<ul style="list-style-type: none"> • Consider a wastewater treatment and recycling system • Identify opportunities for re-use of wastewater
Generation of solid wastes	<ul style="list-style-type: none"> • Provide receptacles for solid waste disposal (such as bins) • Implement a waste segregation program • Identify opportunities for waste reuse • Adopt cleaner production technologies • Engage and NEMA-licensed waste disposal company for off-site waste disposal • Send wastes that can be recycled to licensed recycling companies (for paper, polythene, plastics etc) • Adherence to waste management regulations (under EMCA) • Sensitize construction workers and staff on proper waste disposal • Adhere to Nairobi City Council by laws on waste disposal
Occupational Health and Safety Impacts	<ul style="list-style-type: none"> • Creation of safety and health awareness among construction workers • Engagement of competent workers • Provision of suitable and adequate personal protective equipment to staff • Use of correct and well maintained tools, equipment and machinery • Provision of first aid kit at site • Periodic site safety inspections • Insurance cover for workers • Adherence to provisions of OSHA, 2007 • Record and report any accidents on site
Air pollution	<ul style="list-style-type: none"> • Use of low Sulphur diesel • Proper maintenance of vehicles and machinery • Ensure no open burning of wastes • Adhere with provisions of air quality regulations

Neighbourhood disturbance	<ul style="list-style-type: none"> • Ensure that all construction activities take place during the day • Do not allow noisy functions in the hotel
Fire risks	<ul style="list-style-type: none"> • Provide suitable and adequate fire fighting equipment • Train workers on fire fighting • Develop a fire emergency response procedure • Designate fire assembly point • Adhere with the provisions of the fire risk reduction rules, 2007 • Carry out periodic fire drills and fire safety audits • Ensure regular testing of electrical wiring • Ensure safe handling of fire • Designate smoking areas and provide ashtrays where smoking is allowed • Obtain fire clearance certificate from the Nairobi City Council
Presence of strangers in the area	<ul style="list-style-type: none"> • Ensure that contractor and worker are registered with local security units • Ensure workers are always supervised
Behavioral impact and HIV/AIDS	<ul style="list-style-type: none"> • Adhere to the hotel industry guidelines on admittance • Sensitize staff and guests on HIV/AIDS prevention

Introduction

Golf Course hotel Kenya Ltd intends to construct a hotel on its piece of land, plot No.1870/i/1/558 along Mkungu Close, Westlands, Nairobi. The proposed hotel is aimed at providing high quality accommodation for the clients. Architectural plans for the proposed hotel development have been submitted to the city council of Nairobi for approval.

In accordance with Section 58 (2) of the Environmental Management and Coordination Act of 1999 which requires that all proposed projects likely to have negative impact on the environment must be subjected to Environmental Impact Assessment and a report thereof submitted the National Environmental Management Authority (NEMA) for issuance of EIA licence, the project proponent has engaged the services of a firm of experts to undertake EIA Study for the proposed Hotel development and thereafter compile an EIA study report for submission to NEMA.

In the preparation of this EIA study report, the firm of experts has followed the guidelines contained in the EIA regulations under legal notice No. 101 of June 2003. In this EIA study, the firm of experts has concisely described the project location as the well as the baseline environment. Further, the objective of the project is expressly stated. The views and inputs of site neighbours, members of the public and the affected and interested parties have been sought and incorporated in this report. Various project alternatives have been analyzed and a justification made for the preferred alternative.

Moreover, this report has described the potentially affected environment and also identified, predicted and evaluated the environmental and social impacts associated with the proposed hotel development. Ultimately, this report has made recommendations for the mitigation of potential adverse environmental and socio-economic impacts and also generated an environmental management plan that will provide a framework for implementation of mitigation measures, a guide for environmental monitoring and a basis for future environmental audits.

Terms of Reference

The terms of reference for conducting EIA study for the proposed Hotel development were:

- a) To provide a concise description of the proposed hotel development project in terms of geographical location, project design, project implementation activities, the affected baseline environment and other aspects of the proposed project;
- b) To identify, predict and evaluate the environmental and socio-economic impacts of the proposed project and the mitigation measures to be taken during and after implementation of the project;
- c) To provide an analysis of the various project alternatives and seek justification for the preferred options
- d) To seek the concerns, views and inputs of the local community, project stakeholders and other interested and affected parties;
- e) To review the relevant national policy, legislative and regulatory framework applicable in the implementation of the proposed project
- f) To carry out a social and economic analysis of the proposed development.
- g) To provide a detailed Environmental Management Plan proposing measures for the mitigation of potential adverse environmental and social impacts and for environmental monitoring with regard to the management of the identified impacts

Project Location and Land Ownership

The proposed Hotel development project will be carried out on plot L R No.1870/I/1/558 along Mkungu Close, Westlands Nairobi. GPS 37 0255758, Plus Minus UTM 9860469. The parcel of land belongs to the Golf Course Hotel Kenya Ltd. (The Proponent) Copies of land ownership documents are appended to this report.

Objective of the Project

The objective of the proposed Hotel project is to provide high quality hotel services to visitors and residents of Nairobi hence generate income to the proponent.

Project Description and Implementation Activities

Project description

The proposed development is a high class hotel occupying twenty one floors.

The Project involves the construction of a hotel building consisting of Ground floor administration offices, waiting lounges, reception, washrooms and parking, 1st floor swimming pool, coffee shop & breakfast area, kitchen, restaurant and a bar, 2nd floor gym, waiting lounge, stores, pantry washrooms, 3rd floor banquet hall, lobby, meeting rooms, washrooms, store, bar, kitchen, 4th floor banquet hall, meeting rooms, stores, lobby, 5th floor 15 guest rooms, 6th floor 15 guest rooms, 7th floor 15 guest rooms, 8th floor 15 guest rooms, 9th floor 15 guest rooms, 10th floor 15 guest rooms. 11th floor to 20th floor are stairs, 21st floor revolving restaurant, kitchen, sitting, smoking zone. The design of the project has been executed with due consideration of the existing topography of the proposed project site. In addition, measures have been taken to ensure that the existing landmass, strata and vegetation is least disturbed during construction of the project. In general, the design of the project will optimize the use of best available technology to prevent or minimize potentially significant environmental impacts associated with the project and to incorporate efficient operational controls together with trained staff, to ensure high level business and environmental performances. The project will consist of the following components, namely, water reticulation system with a water pump, ground and overhead tanks, toilets, storm water drainage system, in and out ramp and electricity supply systems.

The selected property is in a fast developing area within Westlands, Nairobi. The building is ideally situated along Mkungu close, which is well served by public transport.

Infrastructure

The building will have a comprehensive and robust infrastructure including access roads, parking areas, water storage, electricity distribution and waste disposal.

Electrical system

There will be application for connection to the electricity main line of the Kenya power and lighting company, which will be used in all phases of the project. The various components of the electrical system shall comprise single and twin socket outlets, single and twin batten florescent fitting, security alarm panel outlet insulator switch. The necessary guidelines and precautionary measures relating to the use of electricity shall be adhered to.



Fig 2 Power line at proposed site.

Water Reticulation system

Water from the Nairobi Water and Sewerage Company (NW&SC) will be used during construction and operation phases. More so there will be water storage tanks to increase water capacity at the project site to the required amount. There will also be PVC tanks for the overhead tanks on both blocks. The changing rooms will also have PVC tanks, more so the guard house. The water tanks for each block will also have float switches and stop cock.

Waste / Sewerage

There is Nairobi City Council sewerage line running nearby the proponents plot that will be connected to the proposed project sewer line. Solid waste management will consist of dustbins in cubicles protected from rain and animals. The waste will then be collected by a Nairobi City Council or private waste management Companies and be composted, palletised or re-cycled depending on the waste management strategy to be adopted.

Storm water run-off

All storm water drainage will be run through the provided Nairobi Water and Sewerage Company drain pipes.

Waste Bins

Large waste bins cubicles will be provided at designated sites in the northern left hand side of the compound for temporarily holding domestic waste from the apartments before final disposal.

Greening

The site will be landscaped after construction, using plant species available locally. This will include establishment of flower gardens, common green area and lush grass lawns to improve the visual quality of the site.

Road works

The sections through the roads and pavements on site shall comprise of P.C paving slabs, sand bed on well compacted hardcore with pointed joints at the bottom.

Building

The technology used in the design and construction of the hotel will be based on international standards, which have been customized by various housing units in Kenya.

The building will be constructed as per the respective structural engineer's detail as provided for in the site plan presented in the Appendix. Basically, the building structure will consist of concrete appropriately reinforced with metal (steel and iron). The roof will consist of structural timber members and roofing tiles. Each block will be provided with a well-designed concrete staircase.

The building will be provided with facilities for drainage of storm water from the roof through drainage pipes into Nairobi Water and Sewerage system. Drainage pipes will be of the pvc type and will be laid under the buildings and the driveway encased in concrete. The building will be connected to the NCC sewerage system for discharge of sewage emanating from the project's operational activities.

The hotel will have adequate natural ventilation through provision of permanent vents in all habitable rooms; adequate natural and artificial light, piped water stored in above and underground water tanks.

Project Implementation Activities

The activities to be undertaken in the implementation of the proposed project include -

- a) Acquisition of necessary project approvals prior to commencement including NCC approval of plans, NEMA approval and other applicable approvals
- b) Site preparation including ground leveling Digging of toilet for construction workers
- c) Erection of a proper security perimeter fence
- d) Construction of water supply facilities including water storage tanks
- e) Excavation for foundation works and other substructures
- f) Construction of superstructures including glazing and roofing
- g) Plumbing and drainage works
- h) Supply of utilities including water and electricity
- i) Fitting of firefighting equipment
- j) Fixtures and fittings
- k) Paving and landscaping
- l) Purchase of equipment
- m) Furnishing the rooms, offices and other facilities
- n) Acquisition of occupation certificate from the local authority
- o) Recruitment of staff
- p) Acquisition of necessary operating licenses and permits from the local authorities, Hotel and Restaurants Authority, Public Health Department, Directorate of Occupational Health and Safety Services and other relevant authorities

Material Inputs, Products, By-products and Wastes

Material inputs at construction stage

Some of the materials to be used for the proposed “Golf Course Hotel Kenya Limited” project at the construction stage include:

- a) Ballast
- b) Water pipes
- c) Cement
- d) River sand
- e) Stones
- f) Ballast
- g) Gravel
- h) Glass
- i) Stainless steel
- j) Damp proof membrane
- k) Wood
- l) Water
- m) Paving slabs
- n) Bituminous membrane
- o) Roofing tiles
- p) Floor tiles
- q) Iron
- r) Aluminium
- s) Cloth – for curtains t) Paints, thinners

Material inputs at operation and maintenance stage

The material inputs to be used at the operation and maintenance phase include: -

- i) Water
- ii) Hotel consumables including foods and beverages
- iii) Cleaning detergents
- iv) Laundry detergents
- v) Repair and maintenance materials including paints, glass, metals
- vi) Pool maintenance and treatment items including chlorine
- vii) Air conditioning gas
- viii) Disinfectants
- ix) Toiletries
- x) Electricity
- xi) Cooking gas
- xii) Office, computers, printers, Paper and other stationery

A detailed project bill of quantities for the project has been made by the consultant project quantity surveyor.

Outputs

The outputs for the proposed project will include the twenty one storied hotel development , parking spaces and other facilities as per the project design

Wastes The wastes to be generated from the proposed hotel development at the construction, operation and maintenance and decommissioning phases will include:

a) Solid wastes - These will include

- Soil, gravel and stones from earthworks
- Construction materials left over wastes
- Food wastes from the restaurants/dining and kitchens
- Kitchen waste
- Plastic bottles
- Glass
- Office wastes
- Room wastes including spent tissues
- Human wastes
- Repair and maintenance wastes
- Chemicals containers
- Other solid wastes

b) Wastewater: This will come from

- Washrooms/bathrooms
- Laundry
- Kitchen
- Swimming pool
- Health club
- Wash hand sinks

Gaseous wastes (emissions) these will come from the standby generator, vehicles, machinery during construction and kitchen smoke.



Fig 3 Standby Generator at proposed site

d) Noise and vibrations Noise and dust will mainly come from construction activities and demolitions in case of project decommissioning.

ANALYSIS OF PROJECT ALTERNATIVES

This section analyses the project alternatives in terms of site, technology scale and waste management options.

The No Alternative Option

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to the landowner and the community as a whole. The landowner continues to pay rent on the plot while the property remains idle. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The economic status of the Kenyans and the local people would remain unchanged.
- The local skills would remain under utilized.

- Reduced visitation due to lack of accommodation in the Community that the project is proposed.
- Reduced interaction both at local, national and international levels.
- No employment opportunities will be created for hundreds of Kenyans who will work in the housing project area.
- Increased urban poverty and crime in Kenya.

From the analysis above, it becomes apparent that the No Project alternative is no alternative to the local people, Kenyans, and the government of Kenya.

Analysis of Alternative Construction Materials and Technology

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

Beautiful and durable tiles will be used because they are good in heat insulation as compared to the iron sheet roofs. Heavy use of timber during construction is discouraged because of destruction of forests. The exotic species would be preferred to indigenous species in the construction where need will arise.

Solid waste management alternatives

A lot of solid wastes will be generated from the proposed Project. An integrated solid waste management system is recommendable. First, the proponent will give priority to Reduction at Source of the materials. This option will demand a solid waste management awareness programme in the management and the residents. Secondly, Recycling, Reuse and composting of the waste will be the second alternative in priority. This will call for a source separation programme to be put in place. The waste will be sold to waste buyers within the area or be collected by a private waste management company. The third priority in the hierarchy of options is combustion of the waste that is not recyclable. Finally, sanitary land filling will be the last option for the proponent

BASELINE INFORMATION OF THE STUDY AREA

Introduction

Nairobi lies at an altitude of 1680m above sea level, which ranges from 1500m (to the east) to 2300m (to the West). It is located at longitude 36° 50' east and latitude 1° 18' South about 140 km South of the Equator and situated at an elevation of about 5,500 feet above sea level, placing its high affect for the cooler air to keep its temperatures moderate.

Nairobi City has experienced rapid growth both in terms of population and physical expansion. The physical area of Nairobi has been expanding tremendously from 3.84 Km² in 1900 to 684 Km² in 1963 which is the current official size of the City.

Nairobi City lies in the Athi River Drainage Basin. The major rivers that cross the City include Nairobi, Ruaraka, Ngong, Athi and Mathare River. All these drain from the West and flow towards the Eastern direction as dictated by the topographical features. As the rivers pass through the City, industrial effluents, municipal waste and siltation heavily pollute them.

Climate

Average Daily Temperatures

The average daily temperature throughout the year (**See Figure 4 below**) varies slightly from month to month with average temperatures of around 17 degrees Celsius during the months of July and August to about 20 degrees Celsius in March. But, the daily range is much higher, with the differences between maximum and minimum temperatures each day around 10 degrees in May and up to 15 degrees in February. Between the months of June to September, southeast winds prevail in the coastal parts of Kenya and last up to several days without a break. The clouds cause day temperatures to remain low and most times the maximum temperature stay below 18 degrees Celsius. The minimum temperatures also remain low during cloudy nights, usually hovering around 8 degrees Celsius and sometimes even reaching 6 degrees Celsius. Clear skies in January and February also bring colder nights. The highest temperature ever reached in Nairobi was 32.8 degrees Celsius and the lowest was 3.9 degrees Celsius.

	Mean Maximum	Mean Minimum	Mean Range
Months	°C	°C	°C
January	26.8	13.1	13.7
February	28.0	13.4	14.6
March	27.4	14.4	13.0
April	24.6	14.3	10.3
May	24.1	14.2	9.9
June	23.1	12.6	10.5
July	22.3	11.5	10.8
August	22.7	11.8	10.9
September	25.3	12.2	13.1
October	26.2	13.7	12.5

November	23.6	14.4	9.2
December	25.1	13.8	11.6
Year	24.9	13.3	11.6

Figure 4 Average Daily Temperatures in Nairobi City

Average Humidity Values

Because of Nairobi’s location just south of the equator in combination with humid air pumped in from the Indian Ocean, the humidity values for each day are generally on the higher end (See table 2).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
9.00 A.M	79	74	82	86	85	85	83	85	82	80	36	83
3.00 P.M	45	37	43	53	55	59	53	53	50	47	57	54

Figure 5 Mean Relative Humidity Values (%)

This is not to say that values are always high, since the easterly winds coming off the Indian Ocean tend to keep the temperatures standard throughout the country; therefore the “warm sticky” feeling is usually not associated with Nairobi as much as one would think. In the summer to autumn months of January to April, relative humidity values have been known to plummet to anywhere from 10% to 20%. The typical day, humidity-wise, starts off with nearly saturated in the morning hours, and steadily decreases throughout the remainder of the day.

Average Rain Amounts

With these routinely high relative humidity figures, it is not surprising that the Nairobi climate is one that produces much rain annually. In fact, from the past 50 years, the expected amount of rain could be anywhere in the range of 500 to 1500 mm, with the average ringing in at 900 mm. The majority of these rainfall figures crash down in Nairobi in one major and one minor monsoon seasons respectively. The major monsoon season occurs within the months of March to May, and is called the “Long Rains” by the locals. The minor monsoon seasons emerges within the October to December Months, and is called the “Short Rains” by the Nairobi citizens. That is what the meteorologists as a whole know about the monsoon seasons. What they do not know is exactly when these seasons will start. There is usually not an indication of when these rainy seasons will start, since it is difficult to determine when one starts and when the other finishes. Consequently, a person may think there is only one rainy season when looking at the annual rainfall amounts (See table 5).

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
48	48	115	195	137	42	15	21	24	52	114	77

Figure 6. The average rainfall (mm) for each month of the year, based on the records for 50 years

Average Winds

Winds along the surface are predominantly easterly throughout the entire year. They are shifted to northeast between October and April, and they are shifted southeast between May and September. Right before the “Long Rains” season, the strongest winds occur, reaching speeds of 20 to 25 miles

per hour. During the rest of the year, winds are usually at speeds of 10 to 15 miles per hour. During the night, the winds are calm.

Average Sunshine

Early mornings in Nairobi are often cloudy, but the sun peeks through by mid-morning. Throughout the year, there is an average of seven hours of sunshine per day. Thirty percent more sunlight reaches the ground during the afternoon than in the morning. Of course, there is more sunshine 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.

POTENTIAL ENVIRONMENTAL IMPACTS

Introduction

This chapter outlines the potential negative and positive impacts that will be associated with the proposed project. 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.

The impacts of the housing project during each its life cycle stages (construction, operation and decommissioning) can be categorized into: impacts on the biophysical environment; health and safety impacts; and socio-economic impacts.

Negative Environmental Impacts of Construction Activities

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 building, 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.

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 excavation and leveling 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.

Exhaust Emissions

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 gunning of vehicle engines, frequent vehicle turning and slow vehicle movement in the loading and offloading areas.

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 and the residents, passers-by and other persons in within the vicinity of the project site.

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.

Clearance of Vegetation

The proposed site currently contains some grass, trees and shrubs, most of which were planted by the land owner. Most of this vegetation will have to be cleared to pave way for construction.

Increased Soil Erosion

Clearance of land and excavation works will lead to increase soil erosion at the project site and release of sediments into the drainage systems. Uncontrolled soil erosion can have adverse effects on the local water bodies.

Solid Waste Generation

Large quantities of solid waste will be generated as a result of construction works on the proposed site and excavation of the 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 spoil, 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.

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 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.

Water Use

The construction activities will require large quantities of water that is supplied by NCW&SC. 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.

Positive Environmental Impacts of Construction Activities

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 Nairobi and the country at large.

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 in Nairobi and the surrounding areas. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

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.

Negative Environmental Impacts of Operational Activities

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.

Increased Storm Water Flow

The building roofs and pavements will lead to increased volume and velocity of storm water or run-off flowing across the area covered by the apartments. This will lead to increased amounts of storm

water entering the drainage systems, resulting in overflow and damage to such systems in addition to increased erosion or water logging in the neighboring areas.

Increased Demand for Sanitation

The project involves the construction of a twenty one floor hotel building. This will lead to increased demand for sanitation and sewage disposal.

Energy Consumption

During operation, the units will use a lot of electrical energy mainly for domestic purposes including 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. A stand by diesel run generator will also be used to supplement on the availability of electricity.

Water Use

The domestic activities during the operation phase of the project will involve the use of large quantities of water.

Positive Environmental Impacts of Operational Activities

Provision of Housing Facilities

The project will provide housing facilities to Nairobi residents. This impact will be significant since Nairobi is currently experiencing a shortage of such facilities.

Employment Opportunities

Some people will be employed by the project as management agents, caretakers, cleaners, security personnel and technicians.

Revenue to National and Local Governments

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

Improved Security

Security will be ensured around the apartments 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.

Negative Environmental Impacts of Decommissioning Activities

Solid Waste

Demolition of the project 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.

Dust

Large quantities of dust will be generated during demolition works. This will affect demolition staff as well as the neighboring residents.

Noise and Vibration

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

Positive Environmental Impacts of Decommissioning Activities

Rehabilitation

Upon decommissioning the project, rehabilitation of the project site will be carried out to restore the site to its original status. This will include replacement of topsoil and revegetation that will lead to improved visual quality of the area.

Employment Opportunities

Several employment opportunities will be created for demolition staff.

Institutional Framework

The National Environment Management Authority (NEMA)

This is the government authority charged with the general supervision and coordination of all environmental matters in the Kenya. NEMA is the principal instrument of the government in the implementation of all policies relating to the environment. The authority is a creature of the Environmental Management and Coordination Act (EMCA) that came into effect on the 14th of January, year 2000. Among others, the functions of NEMA are:

- a) To coordinate various environmental management activities undertaken by lead agencies;
- b) To promote the integration of environmental considerations into development actions with a view to ensuring proper management and rational utilization of environmental resources on a sustainable yield basis for the improvement of quality of life
- c) To advise the government on legislative and other measures for the management of the environment or the implementation of various international conventions, treaties and agreements in the field of environment;
- d) To identify development actions for which environmental audit and monitoring must be conducted under the Act;
- e) To assess and monitor activities to ensure that the environment is not degraded by such activities, that environmental management objectives are adhered to and adequate early warning on impending environmental emergencies is given;
- f) To cooperate with relevant lead agencies on environmental education and enhancement of public awareness on environmental protection;
- g) To prepare and issue an annual report on the state of the environment in Kenya

Under EMCA, NEMA may delegate any of its powers on the performance of any of its functions to Provincial and District Environment Committees; NEMA officers (such as DEOs and PDEs); its employees or agents. NEMA is headed by a Director General (DG) who is appointed by the president

Hotel and Restaurants Authority

Section 3 (l) of the Hotel and Restaurants Act establishes an authority known as the Hotels and Restaurants Authority, consisting of the following members –

- (a) A chairman appointed by the Minister;
- (b) Not less than seven and not more than nine persons appointed by the Minister, of whom –

- (i) At least one shall be appointed by reason of his knowledge of the hotel industry and international tourism;
- (ii) At least one shall be appointed to represent the interests of hotel keepers;
- (iii) At least one shall be appointed to represent the interests of restaurant keepers;
- (iv) At least one shall be appointed to represent the interests of hotel and restaurant employees; and

(c) The Permanent Secretary of the Ministry, or a person deputed by him in writing to take his place as a member of the Authority. According to Section 3 (2), before the Minister makes an appointment under this section, he shall require the person to be appointed to declare whether he has any, and if so what, financial interest in any hotel or restaurant.

According to Section (3) It shall be the duty of the Authority to keep under review the standards of hotels and restaurants and to advise the Minister on the improvement and development of hotels and restaurants and on any other matters which may be referred to it by the Minister. Section 3 (4) of the Hotels and Restaurants Act outlines the powers of the Authority as follows:

- (a) To issue licenses in accordance with section 5;
- (b) To investigate and determine complaints in accordance with section 7;
- (c) To vary, suspend and cancel licences in accordance with section 8;
- (d) no person shall exercise overall control over the day-to-day operation of the restaurant,

whether is the owner or the manager of the restaurant, unless he is the holder of the restaurant licence.

Under Section 3 (5), in the exercise of its functions under this Act, the Authority shall be guided by the consideration of promoting the well-being and development of the hotel and restaurant industries as a whole, as well as the interests of persons using hotels and restaurants.

Legislative and Regulatory Framework

The Environmental Management and Coordination Act (EMCA), 1999

EMCA is an Act of parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment. EMCA provides every person in Kenya with the right to a clean and healthy environment. The Act states that every person has the responsibility to protect and manage the environment. EMCA defines the role of Environmental Impact Assessment (EIA) as a tool to maintain environmental integrity. Under the Act, projects likely to impact negatively on the environment must be subjected to EIA. Section 58 (1) of the Act states that *“Notwithstanding any approval, permit or license granted under this Act or any other law in force in Kenya, any person, being a proponent of the project, shall, before financing, commencing, proceeding with, carrying out,*

executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the second schedule to this Act, submit a project report to the Authority [NEMA] in the prescribed form, giving the prescribed information and which shall be accompanied by the prescribed fee”.³¹

Part (2) of section 58 states *“the proponent of a project shall undertake or cause to be undertaken at his own expense an Environmental Impact Assessment study and prepare a report thereof where the authority, being satisfied after studying the project report submitted under subsection (1) that the intended project is likely to have or will have a significant impact on the environment, so directs”*. The second schedule of the Act details the types of projects for which an EIA must be carried out. Among others, the following must be subjected to the EIA process:

- a) Any activity that is out of character with the surrounding;
- b) Any structure that is not in keeping with its surroundings;
- c) Transportation including construction of roads, railways, sea ports, pipelines and water transport;
- d) urban development including establishment of urban centres, cities, towns, industrial estates, shopping centres, commercial and residential areas;
- e) Dams, rivers and water diversions, water transport between different catchments and drilling for underground water, flood control and geothermal;
- f) Aerial spraying;
- g) Electrical infrastructure including generation stations, transmission lines, and substations;
- h) Forestry related activities including timber harvesting, clearing of forest areas, afforestation and reforestation;
- i) Natural conservation areas including game reserves, buffer zones, wilderness areas, modification of forest management policies;
- j) Agricultural activities such as large scale farming, monoculture and irrigation.

The Environmental (Impact Assessment and Audit) Regulations 2003

These regulations were made by the Minister for Environment and Natural Resources in June 2003 in exercise of the powers conferred by section 147 of the Environmental Management and Coordination Act. The regulations apply to all policies, plans, programmes, projects and activities in Part IV, V and the Second Schedule of the Act. According to section 4 (1) of these regulations, no proponent shall implement a project likely to have a negative environmental impact or for which an Environmental Impact Assessment is required under the Act or under these Regulations unless an EIA has been concluded and approved in accordance with these regulations. According to these regulations, no licensing authority under any law in force in Kenya shall issue a trading, commercial or development

permit or licence for any project for which an environmental impact assessment is required under the Act unless the applicant produces to the licensing authority a licence of environmental impact assessment issued by the Authority (NEMA) under these regulations.

Section 6 of these regulations state that an application for an EIA license shall be in the form of a project report in Form 1 set out in the First Schedule to these regulations, and the applicant shall submit the application together with the prescribed fee to the Authority or the Authority's appointed agent in the District where the project is to be undertaken. Section 7 (2) states that in preparing a project report under this regulation, the proponent shall pay particular attention to the issues specified in the Second schedule to these regulations. Section (11) states that an environmental Impact Assessment study shall be conducted in accordance with the terms of reference developed during the scoping exercise by the proponent and approved by the Authority (NEMA). Section 13 requires that an environmental impact assessment shall be carried out by a lead expert qualified in accordance with the criteria of listing experts specified in the second schedule of the Act. Section 17 (1) of the regulations state that during the process of conducting an environmental impact assessment study under these regulations, the proponent shall, in consultation with the Authority, seek views of persons who may be affected by the project. According to section 23 of these regulations, NEMA shall give its decision on an EIA study report within three months of receiving the report. Section (24) follows that where the Authority approves an EIA study report under regulation (23), it shall issue an EIA licence in Form 3 set out in the First schedule to these regulations on such terms and conditions as it may deem necessary. Regulation (31) states that an environmental audit shall be undertaken for the following development activities which are likely to have adverse environmental impacts:

- (a) Ongoing projects commenced prior to coming into force of these regulations; or
- (b) New projects undertaken after completion of an environmental impact assessment study report

Section 2 of regulation 31 states that an environmental audit shall, unless if it is a self auditing study under regulation 34, be conducted by a qualified and authorized environmental auditor or environmental inspector who shall be an expert or a firm of experts registered in accordance with regulation 14.

The Environmental Management and Coordination (Waste Management) Regulations, 2006

These regulations were made by the Minister for Environment and Natural Resources on the 4th of September 2006 in exercise of the powers conferred by sections 92 and 147 of the Environmental Management and Coordination Act of 1999, and in consultation with relevant lead agencies. Under Regulation 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 public receptacle. Under Regulation 6, a waste generator shall segregate waste by separating hazardous waste from non-hazardous waste and shall dispose of such wastes in such facility as shall be provided by the relevant local authority. Under Regulation 14 (1), every trade or industrial undertaking shall install at its premises anti pollution equipment for the treatment of waste emanating from such trade or industrial undertaking. Under Regulation 18, every generator of hazardous waste shall ensure that every container or package for storing such waste is labelled in easily legible characters, written in both English and Kiswahili. The label shall contain the following information:

- a) The identity of hazardous waste;
- b) The name and address of the generator of waste;
- c) The net contents;
- d) The normal storage stability and methods of storage;
- e) The name and percentage of weight of active ingredients or half-life of radio active material;
- f) Warning of or caution statements which may include any of the following as appropriate –
 - (i) The words “WARNING” or “CAUTION”;
 - (ii) The word “POISON” (marked indelibly in red on a contrasting background); and
 - (iii) The words “DANGER! KEEP AWAY FROM UNAUTHORIZED PERSONS”;
- and
- (iv) A pictogram of a skull and crossbones
- g) A statement of first aid measures, including the antidote when waste is inhaled, ingested or dermal contact and a direction that a physician must be contacted immediately;

The 4th schedule of these regulations lists categories of wastes that are considered hazardous. The 3rd schedule gives the standard for the treatment and disposal of wastes including classification for incinerators and the standards, guidelines, criteria and procedure for installing and operating incinerators. Under Regulation (5) (1), a waste generator shall minimize waste generated by adopting the following cleaner production methods:

- a) Improvement of the production processes 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 product cycle from beginning to the end by:
 - (i) identifying and eliminating potential negative impacts of the product;
 - (ii) enabling the recovery and re-use of the product where possible; and

(iii) reclamation and recycling; and

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

The Environmental Management and Coordination (Water Quality) Regulations, 2006

These regulations were made by the Minister for Environment and Natural Resources on the 4th of September 2006 in exercise of the powers conferred by section 147 of the Environmental Management and Coordination Act of 1999, on the recommendation of NEMA and upon consultation with relevant lead agencies. These regulations apply to drinking water, water used for industrial purposes, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife and water used for any other purpose. Under Regulation 4 (1), every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and shall be immaterial whether or not the water resource was polluted before the enactment of these Regulations. Regulation 4 (2) states that no person shall throw or cause to flow into or near a resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution. In Regulation (5), all sources of domestic water shall comply with the standards set out in the First schedule to these Regulations. According to Regulation (6), no person shall –

a) discharge any effluent from sewage treatment works industry or any other point sources without a valid effluent discharge licence issued in accordance with the provisions of this Act;

b) abstract ground water or carry out any activity near any lakes, rivers, streams, springs and wells that is likely to have any adverse impact on the quantity and quality of the water, without an EIA licence issued in accordance with the provisions of this Act; or

c) Cultivate or undertake any development activity within full width of a river or a stream to a minimum of 6 meters and a maximum of 30 metres on either side based on the highest recorded flood level.

Under Regulation (11), no person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive waste or other pollutants or permit any person to dump or discharge such matter into the aquatic environment unless such discharge, poison, toxic, noxious or obstructing matter, radioactive waste or pollutant complies with the standards set out in the Third Schedule to these Regulations.

Under Regulation 24, no person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive wastes or other pollutants or permit any person to dump or discharge any such

matter into water meant for fisheries, wildlife, recreational purposes or any other uses. According to Regulations 25, no person shall use or allow to be used any natural water body for recreational purposes unless the water body meets the quality standards for recreational standards set out in the 10th Schedule to these regulations. According to Regulation 27, any person who contravenes any of these Regulations commits an offence and shall be liable to a fine not exceeding five hundred thousand shillings. The 1st Schedule of the Water Quality Regulations gives the quality standards for domestic water while the 3rd Schedule gives the standards for effluent discharge into the environment. The 5th Schedule gives the standards for effluent discharge into public sewers. The 9th and 10th Schedules give the quality standards for irrigation and recreation waters respectively.

The Public Health, CAP 242 Laws of Kenya

This Act of Parliament commenced on 6th September 2001 to make provision for securing and maintaining health. According to section 118, the following shall be deemed nuisances liable to be dealt with in the manner provided in this part:

- a) Any vessel, and nay railway carriage or any other conveyance in such a state or condition as to be injurious or dangerous to health;
- b) any dwelling or premises or part thereof which is or are of such construction or in such state or so situated or so dirty or so verminous as to be, in the opinion of a medical officer of health, injurious or dangerous to health, or which is or are liable to favour the spread of any infectious disease;
- c) any street, road or any part thereof, any stream, pool, ditch, gutter, watercourse, sink, water tank, cistern, water closet, earth closet, privy, urinal, cesspool, soakaway pit, septic tank, cesspit, soil pipe, waste pipe, drain, sewer, garbage receptacle, dustbin, dung pit, refuse pit, slop tank, ash pit, or manure heap so foul or in such a state or situated or constructed as in the opinion of the medical officer of health as to be offensive or injurious or dangerous to health;
- d) any well or other source of water supply or any cistern or other receptacle for water, whether public or private, the water from which is used or likely to be used by man for drinking or domestic purposes or in connation with the manufacture or preparation of any article of food intended for human consumption, which in the opinion of a medical officer of health is polluted or otherwise liable to render any such water injurious or dangerous to health;
- e) any noxious matter or waste water, flowing or discharged from any premises wherever situated, into any public street, or into any nullah, or watercourse, irrigation channel or bed thereof not approved for the reception of such drainage;
- f) any stable, cowshed or other building or premises used for keeping animals or birds, which is so constructed, situated, used or kept as to be offensive or which is injurious or dangerous to health;

- g) any animal so kept as to be a nuisance or injurious to health;
- h) any accumulation or deposit of refuse, offal, manure, or other matter whatsoever which is offensive or injurious to health;
- i) any accumulation of stones, timber or other material if in the opinion of a medical officer of health is likely to harbour rats or vermin;
- j) any premises in such a state or condition and any building so constructed as to be likely to harbour rats;
- k) any dwelling or premises which is so overcrowded as to be injurious or dangerous to health of the inmates, or so dilapidated or defective in lighting or ventilation, or is not provided with sanitary accommodation to the satisfaction of the medical officer of health;
- l) any public or other building which is so situated, constructed, used or kept as to be unsafe, injurious or dangerous to health;
- m) any occupied dwelling or for a proper sufficient and wholesome water supply is not available within a reasonable distance as under the circumstances it is possible to obtain;
- n) any factory or trade premises not kept in a cleanly state and free from offensive smell arising from any privy, water closet, earth closet or urinal or not ventilated so as to render harmless and inoffensive as far as practicable any gases, vapours, dust or other impurities generated or so badly lighted or ventilated as to be injurious or dangerous to the health of those employed therein;
- o) any factory or trade premises causing or giving rise to smells or effluvia which are offensive or which are injurious or dangerous to health;
- p) any area of land kept or permitted to remain in such a state as to be offensive, or liable to cause any infectious, communicable or preventive disease or injury or danger to health;
- q) any chimney sending forth smoke in such quantity or in such manner as to be offensive or injurious or dangerous to human health;
- r) any cemetery, burial place or place of sepulture so situated or so crowded or otherwise so conducted as to be offensive or dangerous to health;
- s) any act, omission, or thing which is, or may be, dangerous to life, or injurious to health. Section 116 of this Act empowers local authorities to maintain cleanliness and prevent nuisances. Part (x) provides for the protection of feedstuffs, including the construction and regulation of buildings used for the storage of feedstuffs. Section 128 prohibits the residing or sleeping in kitchens or feed stores.

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

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

- (a) time of the day;
- (b) proximity to residential area;
- (c) whether the noise is recurrent, intermittent or constant;
- (d) the level and intensity of the noise;
- (e) whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and,
- (f) whether the noise can be controlled without much effort or expense to the person making the noise.

Under Regulation 4.(1) except as otherwise provided in these Regulations, no person shall-

- (a) make or cause to be made excessive vibrations that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment;
- (b) cause to be made excessive vibrations that exceed 0.5 centimetres per second beyond any source, property boundary or 30 metres from any moving source. Under Regulation (5), no person shall 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. According to Regulation 8 (1) No person shall use or operate any radio or receiving set, musical instrument, phonograph, television set, any other machine or device for the producing or reproducing of sound or any other sound-amplifying equipment in a loud, annoying or offensive manner such that, noise from the device-
 - (a) interferes with the comfort, repose, health or safety of members of the public;
 - (b) creates a risk thereof, within any building or, outside of a building, at a distance of 30 meters or more from the source of such sound; or
 - (c) interferes with the conversation of members of the public who are 30 meters or more from the source of such sound. In accordance with Regulation 9 (1), any person in charge of a party or other social event that occurs on any private or public property shall ensure that the party or event does not

produce noise in a loud, annoying or offensive manner such that noise from the party interferes with the comfort, repose, health or safety of members of the public within any building or, outside of a building, or recklessly creates the risk thereof, at a distance of 30 meters or more from the source of such sound. According to Regulation 10 (1) No person shall:-

(a) preach, tout, advertise, promote or sell anything; or

(b) engage in any commercial activity; in any manner so as to emit noise by shouting within a Central Business District of any town, a residential area, a silent zone, or any other area declared as a silent zone by NEMA;

In line with Regulation 11 (1) any person wishing to- (a) operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device; or (b) engage in any commercial or industrial activity, that is likely to emit noise or excessive vibrations shall carry out the activity or activities within the relevant levels prescribed in the First Schedule to these Regulations. In accordance with Regulation 12 (1) no person shall operate a motor vehicle that (a) produces any loud and unusual sound; and (b) exceeds 84 dB (A) when accelerating. In addition, sub-Regulation (2) states that no person shall at any time sound the horn or other warning of a vehicle except when necessary to prevent an accident or an incident. Under Regulation 13 (1) except for the purposes specified in sub-Regulation (2) thereunder, during night time hours, 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. According to Regulation 16 (1) where a sound source is planned, installed or intended to be installed or modified by any person in a manner that such source will 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. In accordance with Regulation 19 (1), no person shall carry out activities such as fireworks, demolitions, firing ranges and specific heavy industry without a valid permit issued by the Authority.

Under Regulation (26), where there is continuous emission of noise or excessive vibration after the Environmental Inspector has issued an improvement notice, the Environmental Inspector may, with the approval of the Director General, and in consultation with the relevant lead agency, order the closure of an establishment or undertaking emitting such noise or excessive vibrations. According to Regulation (28), any person who contravenes any of the provisions of these Regulations, for which no penalty is stipulated, commits an offence and is liable upon conviction, to a fine of not more than three hundred and fifty thousand shillings or to imprisonment for a term of not more than eighteen months or to both such fine and imprisonment.

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. According to Section 3 (1), this legislation shall apply to all workplaces where any person is employed, whether permanently or temporarily. Under Section 3 (2), the purpose of this Act is to : -

- a) secure the safety, health and welfare of persons at work; and
- b) protect persons other than persons at work against risks to safety and health arising out of, or in connection with, the activities of persons at work.

Under Section 6 (1), every occupier shall ensure the safety, health and welfare at work of all persons working in his workplace. Under section 6 (3), every occupier shall carry out appropriate risk assessments in relation to the safety and health of persons employed, and on the basis of these results, adopt preventive and protective measures to ensure that under all conditions of their intended use, all chemicals, machinery, equipment, tools, and process under the control of the occupier are safe and without risk to health and comply with the requirements of the safety and health provisions in this Act. Under 6 (4), every occupier shall send a copy of a report of risk assessment carried out under this section to the area occupational safety and health officer. According to Section 6 (6), it is the duty of every occupier to register his workplace unless such workplace is exempted from registration under this Act. Under section 7 (1) except in such cases as may be prescribed, it is the duty of every occupier to: -

- a) prepare and, as often as may be appropriate, revise 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; and
- b) to bring the statement and any revision of it to the notice of all his employees.

Under section 9 (1), every occupier shall establish a safety and health committee at the workplace in accordance with regulations prescribed by the minister if –

- (a) there are twenty or more persons employed at the workplace; or
- (b) the Director (of Occupational Safety and Health) directs the establishment of such committee at any other workplace.

Section 11 (1) states that the occupier of a workplace shall cause a thorough safety and health audit of his workplace to be carried out at least once in every period of 12 months by a safety and health

advisor, who shall issue a report of such an audit containing the prescribed particulars to the occupier on payment of a prescribed fee and shall send a copy of the report to the Director of Occupational Safety and Health Services. According to Section 13 (1) (c), every employee shall at all times wear or use any protective equipment or clothing provided by the employer for the purpose of preventing risks to his safety and health. Under Section 16 (1), no person shall engage in any improper activity or behaviour at the workplace which might create or constitute a hazard to that person or any other person. In accordance with Section 21, an employer or self employed person shall notify the area occupational safety and health officer of any accident, dangerous occurrence or occupational poisoning which has occurred at the workplace. Where an accident in a workplace causes the death of a person therein, the employer or self employed person shall –

- a) inform the area occupational safety and health officer within 24 hours of the occurrence of the accident; and
- b) send a written notice of the accident in the prescribed form to the area occupational safety and health officer within 7 days of occurrence of the accident.

Under Section 22 (3), an occupier shall send a written notice of any disease specified in the second schedule of the Act occurring in the workplace to the Director. Under Section 47 (1), every workplace shall be kept in a clean state, and free from effluvia arising from any drain, sanitary convenience or nuisance. In accordance with section 52 (1), sufficient and suitable sanitary conveniences for the persons employed in the workplace shall be provided, maintained and kept clean, and effective provision shall be made for lighting the conveniences; and where persons of both sexes are or are intended to be employed (except in the case of workplaces where the only persons employed are members of the same family dwelling there), such conveniences shall afford proper separate accommodation for persons of each sex. Under section 78 (1), all stocks of highly inflammable substances shall be kept either in a fire resisting store or in a safe place outside any occupied building, provided that no such store shall be so situated as to endanger the means of escape from the workplace or from any other part thereof in the event of fire occurring in the store. Under Section 81 (1), in every workplace or workroom, there shall be –

- a) provided and maintained, and conspicuously displayed and free from any obstruction so as to be readily accessible, means for extinguishing fire, which shall be adequate and suitable having regard to the circumstances of each case; and
- b) present, persons trained in the correct use of such means of extinguishing fire during all working hours.

Under 81 (2), every workplace shall be provided with adequate means of escape, in case of fire, for persons employed therein, having regard to the circumstances of each case. Under 82 (1), every occupier of a workplace shall design evacuation procedures to be used during any emergency and have the procedures tested at regular intervals. Under Section 84 (3), every employer shall ensure the availability at the workplace of material safety data sheets for all chemicals and other hazardous substances in use at the premises of the employer, containing detailed essential information regarding the identity, supplier's classification of hazards, safety precautions and emergency procedures.

Hotels and Restaurants Act (Cap. 494 of the Laws of Kenya)

This is an Act of Parliament to make provision for the licensing of hotels, hotel managers, and restaurants; for the regulation of hotels and restaurants; for the imposition of a levy for training persons to be employed in hotels and restaurants; and for matters incidental to and connected with the foregoing. Section 3 of the Hotel and Restaurants Act has established an authority known as the Hotels and Restaurants Authority. Under Section 4 (c) no premises shall be used or kept as a restaurant unless there is in force a valid restaurant licence in respect of such premises. Under section 5 (1) any person desirous of obtaining a licence, or of obtaining any variation of a licence held by him, shall make application to the Authority in such form, accompanied by such information, as may be prescribed. Under 5 (2), an application for the grant of a licence which is in continuation of an existing licence shall be made at least two months before the expiry date of the existing licence. Under section 5 (4), the Authority shall not consider an application under this section for the grant of a hotel licence or a restaurant licence unless the application is accompanied by a certificate, signed by a medical officer of health as defined in the Public Health Act and dated not more than three months before the receipt by the Authority of the application, to the effect that - (a) where food will be supplied proper provision has been made of the sanitation of the premises in respect of which the application is made, for the storage, preparation, cooking and serving of food and drink on the premises, and for the health and comfort of persons using the premises; and (b) that the premises conform in all respects with the provisions of any written law relating to sanitation and public health which apply thereto.

Under Section 5 (5) after considering an application under this section and all matters appearing relevant thereto the Authority may, subject to the succeeding provisions of this section, grant to the applicant the licence or variation applied for or may refuse such grant, and may attach to any licence so granted such conditions as the authority may deem expedient. According to Section 5 (6), the Authority shall not grant a hotel licence or a restaurant licence unless it is satisfied that - (a) the

premises in respect of which the application is made are structurally suitable for the use proposed; and (b) either - (i) where no tariff order has been made which is applicable to the hotel or restaurant concerned the charges are reasonable having regard to the standards of accommodation, food and service, and to such other matters as the Authority considers relevant; or (ii) where such a tariff order has been made the charges are not in excess of those authorized by such order According to Section 11(1) of the Hotel and Restaurants Authority, every holder of a hotel licence shall keep a register in his hotel and shall enter or cause to be entered in the register the name and address of every guest who stays at the hotel and such other particulars as may be prescribed. Under 11 (2), every holder of a hotel licence shall enter or cause to be entered regularly in a book kept for the purpose all such particulars (other than particulars prescribed in respect of the register required by subsection (1) to be kept) as may be prescribed. Under Section 12 (2), without prejudice to any other liability incurred by him with respect thereto, the holder of a hotel licence shall not be liable to make good to a guest any loss of or damage to property brought to the hotel except where - (a) at the time the loss or damage occurred, sleeping accommodation at the hotel had been engaged for the guest; and (b) the loss or damage occurred between the midnight immediately preceding and the midnight immediately following a period during which the guest was entitled to use the accommodation so engaged. Under 11 (3), without prejudice to any other liability or right of his with respect thereto, the holder of a hotel licence shall not be liable to make good to a guest any loss of or damage to nor shall he have any lien upon, any vehicle, or any property left in a vehicle, or any live animal or its harness or other equipment

According to Section 11 (4), where the holder of a hotel licence is liable in the circumstances described in paragraphs (a) and (b) of sub-section (2) to make good any loss of or damage to property brought to the hotel, then, subject to section 13, his liability to any one guest shall not exceed five hundred shillings in respect of any one article or one thousand shillings in the aggregate, except where - (a) the property was stolen, lost or damaged through the default, neglect or wilful act of the licensee or a person in his employ; or (b) the property was deposited by or on behalf of the guest expressly for safe custody with the licensee or a person in his employ authorized, or appearing to be authorized, for the purpose and, if so required by the licensee or the person in his employ, in a container fastened or sealed by the depositor; or (c) at the time after the guest had arrived at the hotel, after the property in question was offered for deposit as aforesaid and the licensee or a person in his employ refused to receive it, or the guest or some other guest acting on his behalf wished so to offer the property in question but, through the default of the licensee or a person in his employ, was unable to do so. According to Section 11 (5), every holder of a hotel licence shall cause a notice in

the form in the Third Schedule, printed in plain type in Kiswahili, English, French, German, Italian and any other language which may be prescribed, to be displayed prominently at a place where it can conveniently be read by the guests at or near the hotel reception office or desk or where there is no reception office or desk, at or near the main entrance of the hotel; and he shall be entitled to the benefit of this section in respect of property brought to his hotel only while such notice is so displayed. Under Section 25 (1), any person authorized in writing by the Authority for the purpose, may, at all reasonable times - (a) enter without warrant any premises on which he has reasonable ground for believing that a hotel business or restaurant business is being carried on, to see whether this Act and any other written law is being complied with, and - (i) examine and take copies of any register, book, account or document found on the premises relating to or appearing to relate to any hotel or restaurant;

(ii) take possession of any register, book, account or document found on those premises which he has reasonable grounds for suspecting to be or to contain evidence of an offence under this Act or any other written law; (b) require any person who appears to be carrying on or employed in any hotel business or restaurant business on those premises to render such explanation and give such information relating to that business as he may reasonably require in the performance of his duties; (c) require any person who appears to be carrying on any hotel business or restaurant business on those premises by notice in writing to that person introduce to him, at a particular time and place, of the registers, books, accounts and documents relating or appearing to relate to that business:

Provided that nothing in this subsection shall authorize entry into any bedroom in a hotel without the prior permission of its current occupier.

The Food, Drugs and Chemical Substances (Food Hygiene) Regulations

This is a subsidiary legislation under the Food, Drugs and Chemical Substances Act, Cap 254 of the Laws of Kenya. Under Regulation 3 (1), no person shall use any premises or being the owner or occupier thereof permit or allow the premises to be used for the purposes of selling, preparing, packaging, storing, or displaying for sale any food unless that person is in possession of a licence issued under these Regulations. Under Regulation (4), every person desiring a licence in respect of any premises used or to be used for the purpose of selling, preparing, storing, or displaying for sale any food shall make application in Form A set out in the First Schedule to the health authority and shall, on request, supply any information which may be required by the health authority for the purposes of these Regulations. Under Regulation 5 (1) every licence issued under these Regulations shall be in Form B set out in the First Schedule, and shall expire on the 31st December next year following the date of issue. According to Regulation 5 (2), no person to whom a licence has been

issued under these Regulations shall lend, hire, sell, transfer or otherwise dispose of that licence to any person without the approval of the health authority which approval shall be endorsed on the licence. According to Regulation 7(1) every person who owns, operates or is in charge of a food plant shall keep the grounds surrounding the food plant free from conditions which may result in the contamination of food and more particularly he shall keep such grounds free from - (a) improperly stored equipment, litter, waste and refuse which may attract, harbour or constitute breeding places for rodents, insects and other pests; and (b) inadequately drained areas that may contribute to the contamination of food products through seepage or foot-borne filth and provide breeding places for insects or micro-organisms. Under Regulation 9 (1) the floors, walls and ceiling of a food plant shall be of such construction as to be adequately cleanable and maintained in a clean and good state of repair. According to Regulation 10 (1) all utensils and equipment used in a food plant shall be - (a) suitable for their intended use;

(b) so designed and of such materials and workmanship as to be adequately cleanable; and (c) properly maintained Under Regulation 11 (1), no person shall use any premises as a food plant unless - (a) adequate sanitary conveniences are provided for use by employees and every premises where food is prepared and served are provided with adequate separate sanitary conveniences for public use; (b) the water supply to the premises is derived from an adequate source, sufficient for the intended operations and potable; (c) running water at a suitable temperature is provided in all areas where the processing of food and the cleaning of equipment, utensils and containers are carried on; (d) the drainage of effluents is made through an adequate sewerage system or disposed of through other adequate and approved means; (e) the plumbing is of adequate size and design and so installed and maintained as to - (i) carry sufficient quantities of water to all areas where the water is required; (ii) properly convey sewage and liquid disposal waste; (iii) provide adequate floor drainage in all areas where the floors are subject to flooding type cleaning or where normal operations release or discharge water or other liquid waste on the floor; or (iv) constitute no source of contamination to food ingredients, food products and water supplies; (f) refuse and offal is conveyed and disposed of so as to minimize noxious odour, to prevent waste which might attract or harbour or provide a breeding place for vermin and to prevent the contamination of food, food contact surfaces, ground surfaces and water supplies. Under 11 (2), the sanitary conveniences provided under this regulation shall conform to the following conditions - (a) separate conveniences shall be provided for members of each sex and each shall be maintained in a sanitary condition and kept in conditions of good repair at all times;

(b) toilets shall be furnished with sufficient toilet tissue, clean towels and soap;

(c) doors to toilet rooms shall be self-closing and not open directly into areas where food is exposed to air-borne contaminants except where alternate means have been devised to prevent contamination of such food; and (d) signs shall be posted in appropriate places directing employees to wash their hands with soap after using the toilet. Under 11 (3), adequate and convenient facilities for hand-washing, and where applicable hand-sanitizing, shall be provided at each place where good hygiene practices require employees to wash or sanitize and dry their hands, and such facilities shall have running water at a suitable temperature for effective hand-washing and sanitizing preparation and include nail brushes, hygienic towel service or suitable drying devices and, where appropriate, cleanable waste receptacles. According to Regulation 12, notwithstanding any other provisions of these Regulations, every person who owns, operates or is in charge of a food plant shall ensure that the buildings, fixtures and other facilities of the plant are kept in a state of good repair and maintained in a hygienic condition. Under Regulation 15, (1) every person who owns, operates or is in charge of a food plant shall take all reasonable measures and precautions to ensure that - (a) no person suffering from any disease in a communicable form or having boils, sores or infected wounds works in a food plant in any capacity where there is a reasonable possibility of food ingredients becoming contaminated by such person or the disease being transmitted to the other employees; (b) thorough medical examination is carried out in a Government medical institution or by a medical officer of health on all employees prior to their employment and at regular intervals of not more than twelve months; and the health certificate and health records of each employee showing the dates and results of the health examination are kept at the food plant; (c) all persons while working in direct contact with food, food ingredients or food contact surfaces comply with requirements as to general cleanliness set out in Part B of the Second Schedule; (d) the personnel responsible for identifying sanitation failures or food contamination are properly trained to provide a level of competency necessary for the production of clean and safe food, and in the case of food handlers and supervisors, proper techniques and food protection principles are instituted to make them cognizant of the danger of poor personal hygiene and insanitary practices; and (e) proper supervision is provided so that responsibility for ensuring the compliance by all employees with the requirements of these Regulations (copies of which shall be prominently displayed in all appropriate places in the plant) is assigned to competent supervisory personnel. 47

According to 15 (2) (a), the owner, operator or the person in charge of a food plant shall, in pursuance of the provisions of paragraph (1) (b), apply to the health authority for a medical examination of all persons employed at the food plant.

Potentially Affected Environment

The following elements of the environment will be potentially affected by the proposed hotel development.

a) Lithosphere environment (Soil/land)

This lithosphere component of the environment will be affected mainly at the construction stage and during excavations for the earthworks. Earthworks will interfere with the integrity of the soil, which will predispose the soil to water or wind erosion.

b) Aquatic Environment

There is no direct impact of the proposed hotel development on the aquatic environment. Wastewater can contaminate ground water if not well managed.

c) Vegetation

The proposed hotel development will have impact on vegetation at the construction stage. The little vegetation that is in the plot will have to be cleared to pave way for the hotel development.

d) Socio-economic (Human) Environment

The local socio-economy will also be affected by the proposed hotel project, mainly positively as discussed in chapter 13 of this report.

Consultation and Public Participation (CPP)

As part of the EIA study process, the EIA lead expert carried out consultation and involvement of the neighbours, members of the public and other relevant stakeholders.

Methods

The following methods were used for consultation and public participation.

a) Meetings

Meetings were held with the project proponent, the consultant architect and some of the neighbours. During the meeting the stakeholders were informed about the proposed hotel development and its potential impacts. The views, concerns and inputs of the stakeholders were also obtained during the meetings.

a) Interviews and questionnaires

Interviews were held with the project neighbours and members of the public. Questionnaires were also used in seeking their views and inputs. Copies of the filled questionnaires are appended to this report.

Fig 6 Summary of views and inputs

Name	Organization	Comments
Jayanthal Suraj Shah	J.J SHAH & OTHERS	<ul style="list-style-type: none">The Venture will generate more

		<p>business in the area</p> <ul style="list-style-type: none"> • Find ways to contain noise and dust emissions • No construction at night
Moses Kinyua Karuru	CREATIVE INNOVATIONS	<ul style="list-style-type: none"> • Creative Innovations stands to benefit from project through supply of electricals. • Energy efficiency in all appliances should be prioritized • Creative innovations do not think that the proposed hotel development will have any adverse impacts on the environment.
Renuka Shah	Vintage Africa Limited	<ul style="list-style-type: none"> • Vintage Africa Limited do not think that the proposed hotel development will have any adverse impacts on the environment. • Ensure the environment is clean and has no debris • Ensure that drainage system is not tampered with.
Martin Otieno	PRESTINE APARTMENTS	<ul style="list-style-type: none"> • Prestine Apartments has no objection to the proposed development. • Security of area will be improved • Job creation opportunity.
Margarita Hawley	House Owner-Prestine Apartments.	<ul style="list-style-type: none"> • Does not think that the proposed hotel development will have any adverse impacts on the environment. • Will create job opportunities and security will be enhanced • Plant trees and flowers • Finish the road and make it cleaner.

Cornelius Makau	Curio Shop Owner- Westlands Triangle Market	<ul style="list-style-type: none"> • There will be dust pollution and traffic Congestion as a result of the proposed development. • The proposed development will increase customers to the Curio Market. • Dust and exhaust emissions should be contained. • It's a viable project
Patrick Nyoike	9 West Building	<ul style="list-style-type: none"> • Does not think that the proposed hotel development will have any adverse impacts on the environment. • Safety equipments and gadgets should be made available on site. • Noise and dust pollution should be contained.

Completed stakeholder involvement and consultation questionnaires are appended to this report.

Potential Environmental and Social Impacts

The potential environmental and social impacts of the proposed hotel development by Golf Course Kenya Ltd are discussed below at the construction, operation and decommissioning stages.

Impacts at Construction Phase

The potential environmental and socio-economic impacts of the proposed project at the construction phase are positive and negative:

Positive Impacts

a) Creation of employment The proposed development will create employment at the construction phase to various persons. There will be employment of site security guards, casual workers and even to the building contractor. This will boost income levels for the persons employed.

b) Business opportunities The proposed development will generate business opportunities for local people. Some of the businesses that will benefit from the proposed hotel at the construction stage include material transporters, food suppliers, local landlords and local petrol stations among others.

c) Enhancement of security The proposed development will help improve security in the area during the construction phase as the site will be guarded.

Negative Impacts

a) Disturbance of soil

The proposed development will lead to disturbance of the soil at the construction stage. This will be due to excavation of the soil for substructures and for foundations. Soil disturbance will affect soil properties such as drainage, aeration, texture and also predispose it to potential erosion. However, this will not be a significant impact.

b) Destruction of vegetation

The little vegetation covering the soil at the site will be cleared to pave way for the hotel development in the marked area. Destruction of vegetation destroys habitat for the resident fauna, exposes soil to erosion agents and has negative aesthetic impact.

c) Occupational health and safety impacts

Construction activities will have various occupational health and safety impacts as a result of dust, noisy machinery, carrying of heavy materials, use of moving machinery and sharp tools among others.

d) Solid waste generation

There will be generation of solid waste at the construction stage from dug out soil, left over materials, packaging waste and other wastes. This waste can cause potential pollution if not well disposed of.

e) Neighbourhood disturbance

At the construction stage, there is potential for neighbourhood disturbance from activities such as excavation, use of machinery, generation of noise and dust.

f) Strangers in the area

At the construction phase there will be strangers in the area who will come in as construction personnel.

g) Use of water

Water will be used as construction input. This will increase demand for water in this water scarce area.

h) Traffic impacts

Trucks and other vehicles delivering construction materials to the site will cause adverse traffic impacts. However, this is a short-term impact that will not be significant since this is a low traffic town.

i) Air pollution

There will be some level of air pollution at the construction stage. This will come from vehicle emissions as well as exhaust emissions from machinery that will be used at the site. Any open burning of wastes at the site will also potentially cause air pollution.

Impacts at Operation and Maintenance Phase

The potential environmental and socio-economic impacts of the proposed “Golf Course Hotel Kenya Limited” at the operation and maintenance phase will also be both positive and negative:

Positive Impacts

a) Creation of employment

b) The proposed hotel will create employment for many people. There will be employment opportunities for waiters, laundry staff, security, cleaners, room attendants, managers, cashiers and other personnel.

c) Market for local goods

The proposed “Golf Course Hotel Kenya Limited” will provide market for local suppliers including food suppliers, transporters, security companies, fuel suppliers, cleaning material suppliers and suppliers for other inputs and consumables. This will have significant positive contribution to the growth of the local economy.

d) Availability of quality hotel services

The proposed “Golf Course Hotel Kenya Limited” will provide quality hotel services, which have high demand in Nairobi. These include quality accommodation with recreational services and adequate security, conference and meeting facilities among others.

e) Contribution to growth of tourism

The proposed “Golf Course Hotel Kenya Limited” Hotel will contribute to growth of tourism in Nairobi area since accommodation is a key ingredient for tourism industry growth.

f) Enhancement of security

The presence of the hotel in the area will help enhance physical security in the area as the hotel will be adequately guarded.

g) Aesthetic impact

The proposed hotel will help enhance aesthetic impacts in the area. The proposed hotel will be well designed with significant greenery as part of landscaping.

h) Attraction of other developments

j) Generation of revenue

The proposed hotel will generate revenue to the proponent and to government authorities from licences.

Negative Impacts

a) Increased demand for water

Water will be one of the key inputs in the hotel. The hotel will thus increase demand for water in this water scarce area. However, a borehole has been proposed to provide water to the hotel.

b) Use of energy

The hotel will use energy as one of the inputs. This includes electricity, fossil fuel and cooking gas. This will cumulatively increase demand for energy in the area.

c) Generation of solid waste

There will be generation of various types of solid wastes including organic wastes (such as left over foods) and inorganic wastes such as plastics, polythenes, glass, rubber and others. These can be potential pollutants if not well disposed of.

d) Generation of wastewater

The hotel will generate wastewater at the operation and maintenance phase. The sources of wastewater include laundry, bathrooms, pool and washrooms. This water can cause pollution of ground water and also have adverse public health impacts if not well managed.

e) Fire risks

Fire will be important input at the operation stage. If not well handled, fire can have disastrous effects including damage to property, loss of lives and environmental pollution.

f) Behavioural impacts

Hotels can be centres of deviant behaviour including immorality, which can lead to spread of HIV/AIDS. This will necessitate stringent rules on admittance.

Impacts at Decommissioning Phase

Although there are no plans to decommission the hotel project, it might become necessary at some point for the project to be actually decommissioned at the end of its life cycle or earlier. The following would be the potential impacts of the project in case of decommissioning.

a) Generation of waste

Decommissioning, if done through demolition would generate solid waste from demolition rubble and equipment. This can have adverse environmental impacts if not well disposed of.

b) Loss of employment and revenue

Decommissioning of the hotel would lead to loss of employment and revenue.

c) Health and safety impacts

There will be potential adverse health and safety impacts at project decommissioning phase from noise, dust, vibration and other hazards.

Statement of Impact

This EIA study has found that the proposed hotel development has SIGNIFICANT ADVERSE

ENVIRONMENTAL OR SOCIO-ECONOMIC IMPACTS.

On a cost benefit analysis, the potential positive impacts outweigh the potential adverse impacts by far. The potential adverse

Impacts are manageable if mitigation measures are undertaken at all phases of the project cycle.

IMPACTS MITIGATION AND MONITORING

Introduction

This chapter highlights the necessary mitigation measures that will be adopted to prevent or minimize significant negative environmental, health and safety impacts associated with the activities the 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)

Mitigation of Construction Phase Impacts

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

Minimization of Vegetation Disturbance

Partial clearance of vegetation at the project site to pave way for construction will be inevitable. However, the proponent will ensure proper demarcation of the project area to be affected by the construction works. This will be aimed at ensuring that any disturbance to flora and fauna is restricted to the actual project area and avoid spill over effects on the neighbouring areas. In the same vein, there will be strict control of construction vehicles to ensure that they operate only within the area to be disturbed by access routes and other works.

Another important measure aimed at reducing disturbance of vegetation in the project area will be preservation of individual trees within the site. In addition, the proponent has committed itself to revegetation of some of the disturbed areas through implementation of a well-designed landscaping programme. It is recommended that part of the topsoil excavated from the construction site be re-spread in areas to be landscaped to enhance plant health.

Minimization of Run-off and Soil Erosion

The proponent will put in place some measures aimed at minimizing soil erosion and associated sediment release from the project site during construction. These measures will include terracing and leveling 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.

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 of as waste are diverted for productive uses. 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. Purchase of perishable construction materials such as paints incrementally to ensure reduced spoilage of unused materials
- iv. Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste
- v. Use of construction materials containing recycled content when possible and in accordance with accepted standards.

Reduction of Dust Generation and Emission

Dust emission during construction will be minimized through strict enforcement of on site 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 weather; and traffic routes on site be sprinkled with water regularly to reduce amount of dust generated by the construction trucks.

Minimization of Exhaust Emissions

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

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 churches, residential areas and hospitals. In addition, 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.

Reduction of Risks of Accidents and Injuries to Workers

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, as well as ensuring a safe and healthy environment for construction workers as outlined in the EMP.

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.

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.

Mitigation of Operation Phase Impacts

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 puts in place measures to ensure that the occupants of the apartments manage their waste efficiently through recycling, reuse and proper disposal procedures.

Minimization of Sewage Release

The proponent will ensure that there are adequate means for handling the large quantities of sewage generated at the apartments. It will also be important to ensure that sewage pipes are not blocked or damaged since such vices can lead to release of the effluent, resulting in land and water contamination. Such blockages or damages will be fixed expeditiously.

Ensure Efficient Energy Consumption

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

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 occupants of the apartments will be sensitized to use water efficiently.

Mitigation of Decommissioning Phase Impacts

Efficient Solid Waste Management

Solid waste resulting from demolition or dismantling works will be managed

Reduction of Dust Concentration

High levels of dust concentration resulting from demolition or dismantling works will be minimized

Minimization of Noise and Vibration

Significant impacts on the acoustic environment will be mitigated

ENVIRONMENTAL MANAGEMENT/MONITORING PLAN

Introduction

The proposed Development project shall realize that its activities will have some impacts on the biophysical environment, health and safety of its employees and members of the public, and socio economic well being of the local residents. Thus, its main aim focuses on reducing the negative impacts and maximizing the positive impacts associated with its activities through a program of continuous improvement.

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

Tables 4 and 5 are the core of this EMP for the construction, operational and decommissioning phases of this project. Hence the Tables outline the potential safety, health and environmental risks associated with the project and detail all the necessary mitigation measures, their financial costs, as well as the persons responsible for their implementation and monitoring. The EMP will be used as checklist in future annual environmental audits.

Construction and operational Phase EMP

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the construction and operational phases the housing project are outlined in figure 4 below

TIME SCHEDULE FOR EXECUTING EIA

IMPACT	MITIGATION MEASURES	TIME FRAME	RESPONSIBLE PERSONS	BUDGET (KSH)
Soil Erosion	<ul style="list-style-type: none"> ▪ Site excavation works to be planned such that a section is completed and rehabilitated while another section begins. ▪ Construction of soil-galleys on sloppy sections. 	Continuous	Estate Manager	300,000
Storm Water	<ul style="list-style-type: none"> ▪ Open drains connected will be provided on site. ▪ Construction of water storage tanks to collect storm water for domestic uses. 	Continuous	Site Foreman	700,000
Noise Pollution	<ul style="list-style-type: none"> ▪ The noisy construction works will entirely be planned to be during day time when most of the neighbours will be at work. ▪ Trees around the site will provide some buffer against noise propagation. 	Continuous	<ul style="list-style-type: none"> • Site Foreman • Proponent 	400,000
Excavation Soil	<ul style="list-style-type: none"> ▪ Excavation material will be loaded into trucks and be 	Continuous	Site Manager	500,000

	<p>transported to designated disposal sites.</p> <ul style="list-style-type: none"> ▪ Reuse of the top soil in landscaping. 			
Recommended Mitigation Measures		Responsible Party	Time Frame	Cost (Ksh)
1. Demolition waste management				
1. All buildings, machinery, equipment, structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible		Contractor, Proponent	One-off	300000
2. All foundations must be removed and recycled, reused or disposed of at a licensed disposal site		Contractor, Proponent		950000
3. Where recycling/reuse of the machinery, equipment, implements, structures, partitions and other demolition waste is not possible, the materials should taken to a licensed waste disposal site		Contractor, Proponent	One-off	400000
4. Donate reusable demolition waste to charitable organizations, individuals and institutions		Contractor Proponent	One-off	
2. Rehabilitation of project site				
1. Implement an appropriate revegetation programme to restore the site to its original status		Contractor, Proponent	One-off	300000
2. Consider use of indigenous plant species in revegetation		Contractor, Proponent	One-off	400000
3. Trees should be planted at suitable locations so as to interrupt sight lines (screen planting), between the adjacent residential area and the development		Contractor, Proponent	One-off	500000

Fig 7

EIA challenges and Assumptions

In the process of conducting EIA study for the proposed “Golf Course (K) Hotel Limited, and the subsequent compiling of the EIA study report, the following challenges and limitations were encountered.

Absent neighbours

A significant number of neighbours to the site are business premises hence the owners are very busy businessmen. The absent neighbours were thus not easily available to give their views.

Assumptions

This EIA has assumed that all the information obtained from people in the area as well as literature reference is factual and verifiable.

Project Budget

The estimated overall cost of this project is **KES 200,000,000**. A grand summary of the project cost is appended to this report. A detailed project costing is contained in the project bill of quantities which is available for perusal.

Conclusion and Recommendation

According to this EIA study, the proposed development of the “Golf Course (K) Hotel Limited” in Westlands has significant adverse impacts. The potential benefits are numerous and include employment, revenue, attraction of other developments and most notably, contribution to Kenya’s Economy. The potential adverse impacts are manageable if the environmental management plan proposed in this report is implemented in full.

References

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Appendices

- 1) Project architectural drawings
- 2) Copy of land ownership documents
- 3) Copy of stakeholder consultation questionnaires