ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR

PROPOSED MIXED DEVELOPMENT PROJECT
OFF HAILE SELASSIE ROAD, UPPER HILL, NAIROBI COUNTY
PLOT L.R. No. 209/8760

PROPONENT
GREENFIELD DEVELOPERS LIMITED
P.O Box 43170 – 00100,
Nairobi, Kenya.

Report By:
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DECLARATION

FIRM OF EXPERTS

Stalin Environment on behalf of the Proponent, submit the following Environmental Impact Assessment Study Report, for the Proposed Mixed Use Development Project on L.R. No. 209/8760 located along Haile Selassie Road, Upper Hill, Nairobi. The Environmental Impact Assessment Study has been carried out according to the Environmental Management and Coordination Act, 1999 and Environmental (Impact Assessment and Audit) Regulations, 2003.

Signed on........ March 2016.

Mr. Eric Moses Omondi

Signature .................................................................
Designation: Firm of Experts NEMA Reg. No. 1689

PROPONENT

I, .................................................................on behalf of Greenfield Developers Limited submit the following Environmental Impact Assessment Study Report, for the Proposed Mixed Use Development Project on L.R. No. 209/8760 located along Haile Selassie Road, Upper Hill, Nairobi.

Signed on........ March 2016.

Signature .................................................................
## ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGs</td>
<td>Diesel Generators</td>
</tr>
<tr>
<td>EA</td>
<td>Environmental Audit</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EMCA</td>
<td>Environmental Management Coordination Act</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management System</td>
</tr>
<tr>
<td>Ha</td>
<td>Hectare</td>
</tr>
<tr>
<td>HFCs</td>
<td>Hydro fluorocarbons</td>
</tr>
<tr>
<td>ICs</td>
<td>Inspection Chambers</td>
</tr>
<tr>
<td>ICT</td>
<td>Information Communication Technology</td>
</tr>
<tr>
<td>IEA</td>
<td>Initial Environmental Audit</td>
</tr>
<tr>
<td>KPLC</td>
<td>Kenya Power and Lighting Company</td>
</tr>
<tr>
<td>KRA</td>
<td>Kenya Revenue Authority</td>
</tr>
<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NCC</td>
<td>Nairobi City County</td>
</tr>
<tr>
<td>NEAP</td>
<td>National Environment Action Plan</td>
</tr>
<tr>
<td>NEC</td>
<td>National Environment Council</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Environment Management Authority</td>
</tr>
<tr>
<td>NPEP</td>
<td>National Poverty Eradication Plan</td>
</tr>
<tr>
<td>NW&amp;SC0</td>
<td>Nairobi Water &amp; Sewerage Company</td>
</tr>
<tr>
<td>PVC</td>
<td>Polyvinyl Chloride</td>
</tr>
<tr>
<td>SHE</td>
<td>Safety, Health and Environment</td>
</tr>
<tr>
<td>TOR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>WRMA</td>
<td>Water Resources Management Authority</td>
</tr>
<tr>
<td>WSB</td>
<td>Water Services Board</td>
</tr>
<tr>
<td>WSRB</td>
<td>Water Services Regulatory Board</td>
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EXECUTIVE SUMMARY

Introduction
Stalin Environment which is a NEMA registered firm of experts was contracted by the proponent (Greenfield Developers Limited) to carry out an Environmental Impact Assessment for a Proposed Mixed Use Development located in Upper Hill, Nairobi. This was to comply with the Legal requirement stipulated in the Environmental Management and Coordination Act 1999 and the subsequent Legal supplement of 2003.

The proponent is proposing to construct a thirty five storey mixed use development on plot L.R No 209/8760 located in Upper Hill off Haile Selassie Road. The proposed development will mainly comprise of Office space, Retail space, Apartments, Serviced Apartments, a Hotel, Retail Parking and associated ancillary facilities within the proposed plot.

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

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

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

The scope of the assessment covered construction works of the proposed development which includes ground preparation, masonry works and installation of service lines as well as the
utilities required by the development. The output of this work was a comprehensive Environmental Impact Assessment Study Report for the purposes of applying for an EIA license.

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

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

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

**Methodology outline**

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

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

**Impacts and Mitigation Measures**
Adequate environmental management systems will be incorporated during the entire planning, construction and operating stages of the project to minimize any adverse environmental impacts and assure sustainable development of the area. A Summary of major impacts and mitigation measures is presented in the Table below.

<table>
<thead>
<tr>
<th>Positive impacts</th>
<th>Impact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment opportunities</td>
<td>The construction and operation of the proposed Project are expected to offer employment opportunities; These range from unskilled, casual workers, semi skilled and formal employees.</td>
</tr>
<tr>
<td>Impacts on local and national economy</td>
<td>Gains in the local economy will result from the utilization of locally available materials including: building stones, iron sheets, timber, bricks, paint, electrical cables, water storage equipments, water pipes, steel, glasses, fencing posts, sand, cement, fuels, etc. and paying of taxes to the government.</td>
</tr>
<tr>
<td>Optimal land use</td>
<td>Change in land use from underutilized land to land on which a modern high-rise development stands will optimize land use in the area.</td>
</tr>
<tr>
<td>Improved infrastructure</td>
<td>The operation of the proposed Project may induce improvements in infrastructure around the facility e.g.: improved roads, electricity connection, regular maintenance of roads, storm water drainages and power lines around the building and environs</td>
</tr>
<tr>
<td>Negative Impacts</td>
<td>Mitigation Measures</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tbody>
</table>
| **Noise and vibrations generation** | • Comply with maximum permissible noise levels for construction sites as per Second Schedule of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009  
• Apply for a License from NEMA whereby maximum permissible noise levels are to be exceeded  
• Prescribe noise reduction measures e.g. restricted working hours, transportation hours and noise buffering;  
• Install portable barriers to shield compressors and stationary equipment where necessary and locate stationary noise sources as far from existing sensitive receptors as possible;  
• Use quiet equipment (i.e. equipment designed with noise control elements such as mufflers) |
| **Air pollution (dust and exhaust emissions)** | • Provide 2.4 meter high hoarding along site boundary  
• Provide effective dust screen, sheeting or netting where a scaffolding is erected around the perimeter of a building under construction, from the ground floor level of the building, or if a canopy is provided at the first floor level, from the first floor level, up to the highest level of the scaffolding  
• Any skip hoist for material transport shall be totally enclosed by impervious sheeting  
• Water all active construction areas when necessary  
• Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard;  
• Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction site;  
• Down wash of trucks (especially tyres) prior to departure from site  
• Use of electrically operated construction machinery to avoid externalities produced by diesel engines |
<table>
<thead>
<tr>
<th>Negative Impacts</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and safety risks</td>
<td>• Security shall be enhanced by ensuring security guards are always posted within and around the project site and strategic placement of security lights around the site.</td>
</tr>
<tr>
<td></td>
<td>• A roster of all construction workers shall be kept while measures shall be put in place to ensure that loitering by itinerant workers is discouraged.</td>
</tr>
<tr>
<td></td>
<td>• Unattended public access to the construction site shall be restricted and only one entry/exit point shall be used.</td>
</tr>
<tr>
<td></td>
<td>• Appropriate health and safety measures shall be implemented as per the OSHA Act 2007.</td>
</tr>
<tr>
<td></td>
<td>• Warning signs should be placed in appropriate places.</td>
</tr>
<tr>
<td></td>
<td>• Safety education and training of the construction workers should be undertaken.</td>
</tr>
<tr>
<td></td>
<td>• Appropriate Personal Protective Gear shall be worn at all times by all within the construction site including visitors.</td>
</tr>
<tr>
<td></td>
<td>• Install appropriate fire management equipment.</td>
</tr>
<tr>
<td>Deep trenching/excavation risks</td>
<td>• A barricade at least 3 feet high must be erected around a trench that is 1 meter or more deep.</td>
</tr>
<tr>
<td></td>
<td>• Excavated material should not be placed less than 4 feet from the edge of a trench to minimize risk of collapse due to the weight of the spoil.</td>
</tr>
<tr>
<td></td>
<td>• Where a possibility of collapse or cave of an excavation exists, it should be shored, shielded, benched or battered to prevent the collapse or cave-in.</td>
</tr>
<tr>
<td></td>
<td>• Ladders must be provided no more than 20 meters apart in the area where excavation works are being carried out.</td>
</tr>
<tr>
<td>Soil erosion and water logging</td>
<td>• Terrace, level and rip off compacted areas of the project site to reduce run-off velocity and increase infiltration of storm water into the soil.</td>
</tr>
<tr>
<td></td>
<td>• Dig trenches and cut off drains to channel runoff into existing peripheral storm water drains.</td>
</tr>
<tr>
<td></td>
<td>• Surface runoff should be harvested where applicable for reuse during construction works.</td>
</tr>
<tr>
<td>Waste generation</td>
<td>• Use durable, long-lasting materials that will not need to be replaced often, thereby reducing the amount of construction waste generated over time;</td>
</tr>
<tr>
<td></td>
<td>• Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or theft.</td>
</tr>
<tr>
<td>Negative Impacts</td>
<td>Mitigation Measures</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• Exposure to the elements; • Use building materials that have minimal packaging to avoid the generation of excessive packaging waste; • Use construction materials containing recycled content when possible and in accordance with accepted standards • Ensure adequate collection and storage of waste on site and safe transportation to licensed disposal sites by licensed waste handlers</td>
</tr>
<tr>
<td>Increased traffic</td>
<td>• Any work that disturbs normal traffic signal operations shall be coordinated with the relevant authorities • Ensure that the Entry/Exit to the project site is located where it will cause minimal traffic along Haile Selassie and Lower Hill Roads • Ensure all construction vehicles to and from the construction site use the designated Entry/Exit to the project site • All transportation of construction raw materials and excavated materials are to be conducted at traffic off peak hours only • Cover all trucks hauling soil, sand and other loose materials to avoid spillage and dust emissions that may interfere with smooth motoring • &quot;NO PARKING&quot; signs will be posted around the building where Parking is prohibited and likely to cause obstruction as well as other necessary traffic signs • Traffic management/parking personnel shall be provided to monitor parking and ensure smooth motoring along the buildings adjacent roads</td>
</tr>
<tr>
<td>Increased water demand</td>
<td>• Promote awareness on water conservation and reducing water wastage • Reduce water delivery in taps, through the installation of low flow devices or aerators on taps • Press action taps, flush valves and urinal sensors shall be used to minimize water wastage in public washrooms • Install water efficient plumbing.</td>
</tr>
<tr>
<td>Increased Energy demand</td>
<td>• Improve lighting efficiency by efficient window placement during project design (day-lighting) • Identify and use equipment/systems having minimum energy consumption • Audit energy use occasionally • Use alternative energy sources such as solar power</td>
</tr>
<tr>
<td>Negative Impacts</td>
<td>Mitigation Measures</td>
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<tr>
<td>-----------------</td>
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<tr>
<td></td>
<td>Other mitigation measures are outlined within the report</td>
</tr>
</tbody>
</table>

**Conclusion**

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

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

1.1 Background and rationale for an Environmental Impact Assessment (EIA)
Greenfield Developers Limited is proposing to construct a thirty five storey mixed use development on plot L.R No 209/8760 located in Upper Hill off Haile Selassie Road. The proposed development will mainly comprise of Office space, Retail space, Apartments, Serviced Apartments, a Hotel, Retail Parking and associated ancillary facilities within the proposed plot.

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

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

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

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

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

1.4 **Methodology of the environmental impact assessment**

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

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

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

1.4.4 **EIA public consultation**
To ensure adequate public consultation in the EIA process, the Consultant prepared questionnaires which were administered to the sites neighbours within a one Kilometer radius and the information gathered was subsequently synthesized and incorporated into the EIA Study Report. The appendices contain random sample copies of the
completed questionnaires that were administered and the public meeting attendance register.

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

The Study Report outline is as follows:
- Executive Summary
- Chapter 1: Introduction
- Chapter 2: Description of the Project
- Chapter 3: Baseline Information of the Study Area
- Chapter 4: Relevant Legislative and Regulatory Frameworks
- Chapter 5: Public Participation
- Chapter 6: Analysis of Project Alternatives
- Chapter 7: Assessment of Environmental Impacts
- Chapter 8: Impacts Mitigation and Monitoring
- Chapter 9: Environmental Management Plan
- Chapter 10: Conclusion and Recommendations.
- References
- Appendices

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

2.1 Project brief
Greenfield Developers Limited is proposing to construct a thirty five storey mixed use development on plot L.R No 209/8760 located in Upper Hill off Haile Selassie Road. The proposed development will mainly comprise of Office space, Retail space, Apartments, Serviced Apartments, a Hotel, Retail Parking and associated ancillary facilities within the proposed plot. The actual design components of the project include:-
- Construction of a thirty five storey building with 6 lower ground levels
- Construction of a driveways, sidewalks and parking bays
- Development utilities (water, drainage, electricity, health and safety systems, IT systems and security)
- Site landscaping/beautification

2.2 Location and size of the project
The proposed project site is located in a Land Parcel identified as L. R. No. 209/8760 and covers a total area of One Decimal Four Three One (1.431) Hectares (approx. 3.57 Acres). The proposed project site GPS coordinates are 1°17'39.4"S - 36°48'59.4"E and it is situated within Upper Hill area in Nairobi County. The projects plot is located at the Haile Selassie and Lower Hill Road Junction and can be accessed by any of the two roads.

Map 1: Location of the proposed project
Table 1: Project description and details

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proponent</td>
</tr>
<tr>
<td>2</td>
<td>Proposed mixed use development</td>
</tr>
<tr>
<td>3</td>
<td>Office space, Retail space, Apartments, Serviced Apartments, Hotel and零售 parking</td>
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<tr>
<td>4</td>
<td>35 storeys (for the tallest tower)</td>
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<tr>
<td>5</td>
<td>Ksh. 5,528,096,137</td>
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<tr>
<td>6</td>
<td>209/8760</td>
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<tr>
<td>7</td>
<td>1.431 Hectares</td>
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<tr>
<td>8</td>
<td>Haile Selassie Road and Upper Hill Road</td>
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<tr>
<td>9</td>
<td>Upper Hill, Nairobi County</td>
</tr>
<tr>
<td>10</td>
<td>Latitude 1°17'39.4&quot;S Longitdue 36°48'59.4&quot;E</td>
</tr>
<tr>
<td>11</td>
<td>500 M</td>
</tr>
<tr>
<td>12</td>
<td>Kenya Railways Golf Club 50 M</td>
</tr>
<tr>
<td>13</td>
<td>British Council/British High Commission 50 M</td>
</tr>
<tr>
<td>14</td>
<td>Capitol Towers 80 M</td>
</tr>
<tr>
<td>15</td>
<td>Trees within various parts of the compound (including numerous mature Eucalyptus spp amongst others)</td>
</tr>
</tbody>
</table>

2.3 Existing Structures

As indicated in Table 1 above the proposed project site is currently occupied by several permanent structures which include a three storey building and three single storey buildings. The project plot is surrounded by an electric fence and a natural hedge fence which fall within the plot i.e. parts of the project site extend outside the erected fences. The project plot borders Haile Selassie Road to the North, Lower Hill Road to the Western and Southern Borders and Railway Golf Club to the East. Parts of the compound are occupied by tall Eucalyptus trees which surround the project site. The area is served by NW&SCo piped water and sewer line connection as well as KPLC electricity power.
Plate 1: Existing buildings within the proposed project site

Plate 2: A view showing the site surrounded by eucalyptus trees
2.4 Character of surrounding environment
Upper Hill area and the surrounding area consist mainly of multiple storey commercial premises and is an upcoming business district in the city of Nairobi. Currently the area is dominated by multi-storey commercial and mixed use buildings similar to the proposed project. Similar buildings near the proposed project site include Rahimtulla Tower, Capitol Tower, Blue Shield Towers and Britam Towers amongst others. The proposed development will thus fit in with the existing type of buildings in the surrounding neighbourhood.

Plate 3: Capitol Tower and Rahimtulla Tower as seen from the project site

2.5 Building particulars
The Design of the building incorporated a ‘whole building approach’ in line with the design requirements of high-performance buildings. This approach generally involves the integration of all building components and systems and determines how they best work together to save energy and water and also reduce environmental impact.

In general, the design of the project will essentially optimize the use of best available technology to prevent or minimize potentially significant environmental impacts associated with the project and to incorporate efficient operational controls together with trained staff, to ensure high level business and environmental performances.

Specific details of the proposed development are outlined in the proposed projects Architectural Drawings containing the site plan, layouts, sections, elevation and other plans that illustrate the development in more detail attached within the appendices.

The proposed buildings design proposes 35 storey structure with six lower basement levels mainly to serve as the buildings parking bays. The buildings will have the following main components:-
1. Office space
2. Retail space
3. Apartments
4. Serviced Apartments
5. Hotel
6. Parking
7. Service areas/rooms

Table 2 below indicates on which floor each of the above components shall be located in and the gross area to be occupied by each in total.
Table 2: Gross area schedule summary

<table>
<thead>
<tr>
<th>Function/Use</th>
<th>Residential &amp; Office Parking</th>
<th>Retail Parking</th>
<th>Offices</th>
<th>Retail</th>
<th>External seating Piazza</th>
<th>Apartments</th>
<th>Serviced Apartments</th>
<th>Hotel</th>
<th>Service areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floors</td>
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<td>Basement -4 to -6</td>
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<tr>
<td>Basement -1 to -3</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Ground floor</td>
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<td>√</td>
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<td></td>
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<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; floor</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt; floor</td>
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<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; – 13&lt;sup&gt;th&lt;/sup&gt; floor</td>
<td>√</td>
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<tr>
<td>14&lt;sup&gt;th&lt;/sup&gt; floor</td>
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<tr>
<td>15&lt;sup&gt;th&lt;/sup&gt; - 16&lt;sup&gt;th&lt;/sup&gt; floor</td>
<td>√</td>
<td>√</td>
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</tr>
<tr>
<td>17&lt;sup&gt;th&lt;/sup&gt; – 18&lt;sup&gt;th&lt;/sup&gt; floor</td>
<td>√</td>
<td>√</td>
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<td>19&lt;sup&gt;th&lt;/sup&gt; floor</td>
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<tr>
<td>20&lt;sup&gt;th&lt;/sup&gt; – 24&lt;sup&gt;th&lt;/sup&gt; floor</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>25&lt;sup&gt;th&lt;/sup&gt; – 33&lt;sup&gt;rd&lt;/sup&gt; floor</td>
<td>√</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>34&lt;sup&gt;th&lt;/sup&gt; – 35&lt;sup&gt;th&lt;/sup&gt; floor</td>
<td>√</td>
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<tr>
<td>Gross Area SQM</td>
<td>24,099</td>
<td>20,850</td>
<td>14,222</td>
<td>18,159</td>
<td>1,820</td>
<td>26,893</td>
<td>14,408</td>
<td>16,146</td>
<td>8,828</td>
</tr>
</tbody>
</table>
2.5.1 Parking area and driveway
Six lower ground floors (basement) which are part of the project design will be designated mainly as vehicle car park. Basement 1 to 3 which will mainly be retail parking spaces will each have 205 parking bays making a total of 615. Basement 4 to 6 which will mainly be residential and office parking spaces will each have 230 parking bays making a total of 690. The ground floor will have 15 parking bays making a total of 1320 parking bays within the project.

All parking areas and driveways will be concrete screed or paved using cabro paving blocks while entry/exit ramps will be made of concrete. The driveways and entry/exit ramps will measure 6 meters and will be spacious such as to allow easy turning and passage of vehicles and will provided with adequate road signs and markings to ensure smooth traffic flow. A gate house will also be provided at the building entry/exit for sentries to control and monitor the in and outflow of vehicles.

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

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

2.5.4 Health and Safety systems
Several health and safety implements will be incorporated into the project design so as to boost the emergency response and preparedness index of the building. Emergency staircases shall be incorporated from the topmost floor to the ground floor while hose reels shall be located at several strategic points of each floor.

Portable fire extinguishers and smoke detectors shall be incorporated at strategic points in all floors including the basement floors. Emergency response and “Emergency Exit” notices will also be posted where applicable and appropriate.
2.5.5 Water reticulation system
Water from the Nairobi Water & Sewerage Company will be used during the construction phase of the project. It has been proposed that a borehole will be dug within the project site; if this is done water supply from NW&SCo shall be augmented by borehole water during the operational phases of the project. Underground water reservoir tanks shall be built on site while overhead (rooftop) water tanks shall also be used to increase water storage capacity within the project. Necessary pumps shall be installed to facilitate water pumping into overhead tanks.

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

2.5.7 Waste water/Sewerage
Foul water drainage from the building block will be connected to the Nairobi Water & Sewerage Company (NW&SCo) main sewer line running along Lower Hill Road Close. All sanitary works will be up to M.O.H standards.

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

2.6 Description of the project’s construction activities

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

2.6.2 Site set up and management
This involves activities such as screening, fencing the project site, setting up temporary offices, construction of temporary roads, car parks, storage areas etc.
2.6.3 Demolition works and site clearance
Site clearance process entails any obstruction on the way of the intended construction activity. This entails demolition of any existing structures on site and clearing of obstructions including vegetation that may lie within the proposed project path.

In this case there are several permanent structures on the project site hence demolition works are anticipated. Clearance of existing vegetation including trees and grasses will also be inevitable if the design of the buildings is taken into account. Site clearance will result in significant generation of solid waste generation which should be disposed by using appropriate methods to be identified within this report.

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

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

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

2.6.7 Mechanical and electrical installations and associated trades
Electrical work during construction of the buildings will include installation of electrical gadgets and appliances including transformers, generators, meters, electrical cables, lighting apparatus, sockets etc. In addition, there will be other construction activities involving the use of electricity such as welding, metal cutting, running electrical gadgets etc.

Plumbing will entail the installation of pipe-work for water supply and distribution will be carried out within the building and associated facilities. In addition, pipe-work will be done to connect the building into the existing sewer system and for drainage of storm
water from the rooftops and driveways into the peripheral storm water drainage system.

Other associated trades include as joinery, painting, window placement and plastering. These activities will include metal, wood, glass, plastic and ceramic tiles cutting, the use of adhesives, metal grinding and wall drilling among other activities.

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

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

2.7 Description of the project’s operational activities

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

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

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

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

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

3.1 Background information on the project area
Nairobi city is located at 1°17′S 36°49′E / 1.283°S 36.817°E / -1.283; 36.817 and occupies 684 square kilometres. Nairobi is situated between the cities of Kampala and Mombasa. As Nairobi is adjacent to the eastern edge of the Rift Valley, minor earthquakes and tremors occasionally occur. The Ngong hills, located to the west of the city, are the most prominent geographical feature of the Nairobi Area. Mount Kenya is situated north of Nairobi and Mount Kilimanjaro is towards the south-east. Both mountains are visible from Nairobi on a clear day.

The Nairobi River and its tributaries traverse through the Nairobi County. Nairobi’s western suburbs stretch all the way from the Kenyatta National Hospital in the south to the UN headquarters and Gigiri in the north, a distance of about 20 kilometres. The city is centred on the City Square, which is located in the Central Business District. The Kenyan Parliament buildings, the Holy Family Cathedral, Nairobi City Hall, Nairobi Law Courts and the Kenyatta Conference Centre all surround the square.

3.2 Constituencies
Nairobi is divided into seventeen constituencies; these are Westlands, Dagoretti North, Dagoretti South, Langata, Kibra, Roysambu, Kasarani, Ruaraka, Embakasi South, Embakasi North, Embakasi Central, Embakasi East, Embakasi West, Makadara, Kamkunji, Starehe and Mathare. Most of the upmarket suburbs are situated to the west of Nairobi; these include Karen, Langata, Lavington and Highridge, although Kangemi and Dagoretti are lower income areas. Most low and lower-middle income estates are located in eastern Nairobi and they include Kariokor, Dandora, Kariobangi, Embakasi and Huruma.

3.3 Infrastructure
The city is well served, with good communication and transport network such as air, road, and railway. It is centrally located to serve the Eastern African countries. Bus and train stations are within an easy walk of the City Centre. The main railway line runs from Mombasa to Malaba though Nairobi City. This network facilitates transportation of agricultural products from western Kenya to the coast. The city is a hub of road transport connecting other major towns in the country. On air transport Jomo Kenyatta International airport makes it easy to transport goods from all over the world into the country and vice versa.

3.4 Population
Nairobi has experienced some of the highest growth rates of any city in Africa. Since its foundation in 1899, Nairobi has grown to become the largest city in East Africa, despite being the youngest large city in the region. The growth rate of Nairobi is currently 6.9%. It is estimated that Nairobi’s day population will reach 5 million in 2015. Nairobi’s current day
population is estimated at about 3 million. According to the 1999 Census, in the administrative area of Nairobi, 2,143,254 inhabitants lived within 696 km². Nairobi is currently the 13th largest city in Africa.

3.5 Climate
At 1,795 metres (5,889 ft) above sea level, Nairobi enjoys a moderate climate. The altitude makes for some chilly evenings, especially in the June/July season when the temperature can drop to 10°C. The sunniest and warmest part of the year are from December to March, when temperatures average the mid-twenties during the day. The mean maximum temperature for this period is 24°C.

There are two rainy seasons but rainfall can be moderate. The cloudiest part of the year is just after the first rainy season, when, until September, conditions are usually overcast with drizzle. As Nairobi is situated close to the equator, the differences between the seasons are minimal. The seasons are referred to as the wet season and dry season. The timing of sunrise and sunset varies little throughout the year, due to Nairobi’s close proximity to the equator.

3.5.1 Average daily temperatures
The average daily temperature throughout the year (See Table 3 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.

3.5.2 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 3)

Table 3: Nairobi’s average temperature and Precipitation

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average high °C (*F)</td>
<td>24.5 (76)</td>
<td>25.6 (78)</td>
<td>25.6 (78)</td>
<td>24.1 (75)</td>
<td>22.6 (73)</td>
<td>21.5 (71)</td>
<td>20.6 (69)</td>
<td>21.4 (71)</td>
<td>23.7 (75)</td>
<td>24.7 (76)</td>
<td>23.1 (74)</td>
<td>23.4 (74)</td>
</tr>
<tr>
<td>Average low °C (*F)</td>
<td>11.5 (53)</td>
<td>11.6 (53)</td>
<td>13.1 (56)</td>
<td>14.0 (57)</td>
<td>13.2 (56)</td>
<td>11.0 (52)</td>
<td>10.1 (50)</td>
<td>10.2 (50)</td>
<td>10.5 (51)</td>
<td>12.5 (55)</td>
<td>13.1 (56)</td>
<td>12.6 (55)</td>
</tr>
<tr>
<td>Precipitation mm (inches)</td>
<td>64.1 (2.52)</td>
<td>56.5 (2.22)</td>
<td>92.8 (3.65)</td>
<td>219.4 (8.64)</td>
<td>176.6 (6.95)</td>
<td>35.0 (1.38)</td>
<td>17.5 (0.69)</td>
<td>23.5 (0.93)</td>
<td>28.3 (1.11)</td>
<td>55.3 (2.18)</td>
<td>154.2 (6.07)</td>
<td>101.0 (3.98)</td>
</tr>
</tbody>
</table>


3.6 Economic activities

The major economic activities in Nairobi include businesses in informal and formal lines. Some of the investments in the city are industries, farming and office complexes. The city also is a home of a number of international UN organisations for example United Nations Environmental Programme (UNEP) Agency. Due to its population, Nairobi provides numerous opportunities for trade at various scales.

Because of these characteristics, it is considered the commercial centre for Kenya and even East Africa. Owing to its huge economic potential, Nairobi was once the headquarters of the East African Community (EAC). Economic Activities within the proposed project site are Insurance brokers, Media consultancy, Estate holdings and Academic Institutions.

3.7 Water resources and quality

Nairobi area is supplied by water by the Nairobi Water and Sewerage Company (NW&SC) a major supplier of water to most business enterprises and household. The water is sourced from rivers flowing from the Mt. Kenya regions in central province. Various Nairobi enterprise owners and residents have however ventured into the sinking of boreholes within their premises or compounds so as to supplement the water supply whenever there is a shortage or for other credible reasons.

3.8 Environment

Nairobi is well endowed with a pleasant environment that preserves much of its pristine natural beauty. Ponds, seasonal springs, rivers, flooded grasslands, and swamps abound. Unlike other major cities, Nairobi is not situated on a large river or near the sea. Nevertheless, several streams criss-cross the city. Streams running from the Ngong Hills to the south and the ridges to the north become the Athi and Nairobi Rivers.
Other important sources of water for Nairobi are the Chania and Thika Rivers. There is also the manmade Thika dam, which was constructed as a water reservoir. Natural springs feed a number of small swamps in secluded hollows. In addition, temporary wetlands are created with the coming of each rainy season. The planting of eucalyptus trees, however, has drained most of these springs. Nairobi National Park is another preservation of natural environment. It is covered by a highland forest of hardwoods. A spectrum of birds and animals find their home in the park. The park itself was established in 1948 as an effort by the government to preserve the remaining natural beauty of Nairobi.

Nairobi has a bustling population growth. Rapid urbanization and industrialization consume a lot of natural resources, causing alarming environmental degradation. Construction places a very heavy burden on natural resources. Sand is an important construction material; thus, all rivers in Nairobi have been extensively excavated in search of sand. The result has been serious soil erosion. Timber is also used in construction, causing depletion of forests surrounding the city. Additionally, Nairobi attracts hundreds of new immigrants daily. This has an impact on the environment as service struggles to keep pace with rapid population growth. The city's sewage system frequently breaks down, adversely affecting the environment.
4 RELEVANT LEGISLATIVE AND REGULATORY FRAMEWORK

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

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

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

4.3.1 National Environmental Management Authority (NEMA)
The object and purpose for which NEMA is established is to exercise general supervision and co-ordinate over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment.

4.4 Environmental Legal Framework
Environmental Management and Co-ordination Act No. 8 of 1999, provide a legal and institutional framework for the management of the environmental related matters. It is the framework law on environment, which was enacted on the 14th of January 1999 and commenced in January 2002. Topmost in the administration of EMCA is National
Environment Council (NEC), which formulates policies, set goals, and promotes environmental protection programmes. The implementing organ is National Environment Management Authority (NEMA). EMCA comprises of the parts covering all aspects of the environment.

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

4.4.1 Environmental Management and Coordination Act (EMCA), 1999

Environmental Management and Co-ordination Act No. 8 of 1999, provides a legal and institutional framework for the management of the environmental related matters. It is the framework law on environment, which was enacted on the 14th of January 1999 and commenced in January 2002. Topmost in the administration of EMCA is National Environment Council (NEC), which formulates policies, set goals, and promotes environmental protection programmes. The implementing organ is National Environment Management Authority (NEMA). EMCA comprises of the parts covering all aspects of the environment.

The Second Schedule to the Act specifies the projects for which an EIA and environmental audit must be carried out. According to the Act, Section 68, all projects listed in the Second Schedule of the Act must undertake an Environmental Impact Assessment, keep accurate records and make annual reports to NEMA or as NEMA may, in writing, require. The Environmental (Impact Assessment and Audit) Regulations, 2003, provide the basis for procedures for carrying out Environmental Impact Assessments (EIAs) and Environmental Audits (EAs).

The main objectives of the Act are to:

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

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

The Environmental (Impact Assessment and Audit) Regulations, 2003 state in Regulation 3 that “the Regulations shall apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Act”. Regulation 4(1) further states that:
“...no proponent shall implement a project:
  a) likely to have a negative environmental impact; or
  b) for which an environmental impact assessment is required under the Act or these Regulations;
unless an environmental impact assessment has been concluded and approved in accordance with these Regulations...”

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

4.4.3 Waste Management Regulations, 2006
Part II of the Waste Management Regulations 4 (1) states that no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated receptacle. Regulation 4 (2) further states that a waste generator shall collect, segregate and dispose such waste in the manner provided for under the regulations.

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

4.4.4 Noise and Excessive Vibrations
Part II of the Noise and Excessive Vibrations regulations, regulation 3 (1) states that Except as otherwise provided in these Regulations, no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

Regulation 4 of the Noise and Excessive vibrations: - states that except as otherwise provided in the Regulations, no person shall-
  (a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or
  (b) cause to be made excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source;
Regulation 11 on Machinery: - states that any person wishing to
  (a) operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device; or
(b) Engage in any commercial or industrial activity, which is likely to emit noise or excessive vibrations shall carry out the activity or activities within the relevant levels prescribed in the First Schedule to the Regulations as shown in the Table 4 below

Table 4: Maximum permissible noise levels

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

Compliance

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

4.4.5 Water Quality Regulations, 2006

Part II of the Water Quality Regulations 4 (1) states that every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act. Regulation 4 (2) further states no person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution.

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

Compliance

- The proponent undertakes to safeguard any natural water bodies within or near the project site.
4.4.6 Water Act, 2002
Section 25 (1) of this Act states that a permit shall be required for any of the following purposes:

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

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

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

4.4.7 The Energy Act, 2006
The Act establishes an Energy Regulatory Commission mandated to perform all function that pertains to energy production, transmission, setting and enforcing of energy policies, Public education and enforcing energy conservation strategies, prescribing the energy licensing process and issuing of licenses that pertain to energy sector in Kenya. Section 30 of the Act provides the factors that shall be taken into consideration prior to issuance of license.

It states the need and expression of an entity to conserve and protect the environment and natural resources in accordance to the Environmental and Coordination Act of 1999 (No. 8 of 1999), moreover, the Act gives provisions for the need to protect health and safety of users of energy by providing an enabling environment of operation that protects the health and safety of users of the service for which the license or permit is required and other members of the public affected by the undertaking.

4.4.8 The Occupational Safety and Health Act, 2007
This is an Act of Parliament to make provision for health, safety and welfare of persons employed in factories and other places, and for matters incidental thereto and connected therewith.

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

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

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

Health Requirements
Sanitary accommodation | Sufficient and suitable sanitary conveniences must be available for persons employed. These must be kept clean and well lit.

Miscellaneous Requirements
Prohibition of deduction from wages | The occupier must not make a deduction from wages in respect of anything he has to do or provide in pursuance of the Factories Act or permit any person in his employment to receive payment from other employees for such services.
Duties of persons employed | An employee must not willfully interfere with or misuse any means, appliance, convenience or other thing provided in pursuance of the Act for securing health, safety or welfare provided for his use under the Act. He must not willfully and without reasonable cause do anything likely to endanger himself or others.
Inspection | The Occupational Health and Safety Officer has the power to inspect every part of the premises by day or by night. He may require the production of registers, certificates and other papers. May examine any person alone or in the presence of any other person as he thinks fit and may require him to sign a declaration of truth of the matters about which he is examined. Every person obstructing an Occupational Health and Safety Officer is liable to a penalty.

4.4.9 Public Health Act (Cap. 242)
Part IX, section 115, of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health.

Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drainers or refuse pits in such state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into the public street or into the gutter or side channel or watercourse, irrigation channel, or bed not approved for discharge is also deemed as nuisance. Other nuisances are accumulation of materials or
refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.

**Compliance**

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

**4.4.10 Physical Planning Act, 1999**

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

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

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

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

**Compliance**

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

**4.4.11 Building Code 2000**

Section 194 requires that where sewer exists, the occupants of the nearby premises shall apply to the Local Authority for a permit to connect to the sewer line and all the wastewater must be discharged into sewers.
4.4.12 **Urban and Cities Act No 13 of 2011**
The Act came into function with regard to Article 184 of the Constitution providing regulations on the classification, governance and management of urban areas and cities and further providing the criteria of establishing urban areas. Part III of the Act gives the regulations and functions of every city or municipality with regard to integrated development plans, which shall include but not limited to environmental plans and disaster preparedness, within the area of jurisdiction in achieving objects of devolved governments under section 174 of the constitution while maintaining the socio-economic rights of the people.

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

4.4.13 **Public Roads and Roads of Access Act (Cap. 399)**
Sections 8 and 9 of the Act provides for the dedication, conversion or alignment of public travel lines including construction of access roads adjacent lands from the nearest part of a public road. Section 10 and 11 allows for notices to be served on the adjacent land owners seeking permission to construct the respective roads.

4.4.14 **The Environment and Land Court Act, 2011**
This Act is in place to give effect to Article 162(2) (b) of the Constitution; to establish a superior court to hear and determine disputes relating to the environment and the use and occupation of, and title to, land, and to make provision for its jurisdiction functions and powers, and for connected purposes.

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

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

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

5.1 Sources of Information
This chapter describes the process of the public consultation/participation followed to identify the key issues and impacts of the proposed mixed use development in Upperhill. Views from the general public, local leaders, surrounding institutions and development partners who in one way or the other would be affected by the proposed project were sought through oral interviews, administering of questionnaires and meetings between 1st and 7th March 2016 and the findings were comprehensively analyzed. The various concerns and proposed mitigation measures suggested by the public, neighbours and other stakeholders have been integrated in the report.

The exercise was conducted by a team experienced registered environmental experts. The objective of the consultation and public participation was to:-

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

The Consultation and Public Participation (CPP) Process is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by EMCA 1999 section 58, on Environmental Impact Assessment for the purpose of achieving the fundamental principles of sustainable development.

List of members of the public consulted

<table>
<thead>
<tr>
<th>S/N</th>
<th>NAME</th>
<th>DESIGNATION</th>
<th>CONTACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A. E Collins</td>
<td>Rahimtullah Towers - Representative</td>
<td>Tel: 0722 200566</td>
</tr>
<tr>
<td>2</td>
<td>Nishida Wataru</td>
<td>General Affairs/ Political Section</td>
<td>Tel: 020 2898 000</td>
</tr>
<tr>
<td>3</td>
<td>John Kitala</td>
<td>Administrative Secretary - AIC Kenya</td>
<td>Tel: 0722 889901</td>
</tr>
<tr>
<td>4</td>
<td>Kennedy Wafula</td>
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<td>Tel: 0726 644392</td>
</tr>
<tr>
<td>5</td>
<td>George Mokaya</td>
<td>General Manager – Railway Golf Club</td>
<td>Tel: 0720 998258</td>
</tr>
<tr>
<td>6</td>
<td>E.K. Wesangula</td>
<td>General Manager – Railway Club</td>
<td>Tel: 020 2718690</td>
</tr>
<tr>
<td>7</td>
<td>Evans Makori</td>
<td>Railway club employee</td>
<td>Tel: 0700 034498</td>
</tr>
<tr>
<td>8</td>
<td>Rachel W. Njoroge</td>
<td>Property Manager – NHIF Building</td>
<td>Tel: 0721 779934</td>
</tr>
<tr>
<td>9</td>
<td>Jones Musembi</td>
<td>Caretaker AIC building</td>
<td>Tel: 0720 328614</td>
</tr>
<tr>
<td>S/N</td>
<td>NAME</td>
<td>DESIGNATION</td>
<td>CONTACT</td>
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</tr>
<tr>
<td>10</td>
<td>John K. Chege</td>
<td>NHIF employee</td>
<td>Tel: 0715 910704</td>
</tr>
<tr>
<td>11</td>
<td>A. Obat</td>
<td>Property Manager - Capitol Hill Building</td>
<td>Tel: 0725 988142</td>
</tr>
<tr>
<td>12</td>
<td>L. Kemunto Munene</td>
<td>Security – Highrise Flats</td>
<td>Tel: 0700 379049</td>
</tr>
<tr>
<td>13</td>
<td>T. Bowman</td>
<td>Project architect</td>
<td>Tel: 020 4183118</td>
</tr>
<tr>
<td>14</td>
<td>Farhanna Hassanali</td>
<td>Property developer</td>
<td>Tel: 020 4446914</td>
</tr>
<tr>
<td>15</td>
<td>Taib Taib</td>
<td>Property developer</td>
<td>Tel: 020 4446914</td>
</tr>
<tr>
<td>16</td>
<td>Christine</td>
<td>Axis Real Estate</td>
<td>Tel:</td>
</tr>
<tr>
<td>17</td>
<td>Chrisanthus Wanyonyi</td>
<td>Security Railway Club</td>
<td>Tel: 0719 881789</td>
</tr>
<tr>
<td>18</td>
<td>Nicholas Kiilu</td>
<td>Local resident</td>
<td>Tel: 0720 325820</td>
</tr>
<tr>
<td>19</td>
<td>Stanley juma Muli</td>
<td>Ministry of Lands and Housing employee</td>
<td>Tel: 0726 855017</td>
</tr>
<tr>
<td>20</td>
<td>Lionel Muriu</td>
<td>Ministry of Lands and Housing employee</td>
<td>Tel: 0727 962118</td>
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5.2 Issues raised
This Sub-Section covers the views and opinions of the key stake holders (local leaders, surrounding, institutions/organizations, interested persons or groups). It highlights both positive and negative socio-economic and environmental impacts anticipated during the construction and operational phases of the project. This is followed by suggested mitigation measures that the developer should incorporate to minimize environmental degradation and promote sustainable development.

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

- The project shall lead to the creation of employment during both the construction and operational phases both directly and indirectly
- The currently idle land (unoccupied) shall be used optimally through the implementation of the project
- The construction shall create demand for construction material and other electronic installations
- Increased business opportunities due to the mixed use nature of the building
- Security will improve since the area between the project plot and the road is used as a hideout for muggers at night. The construction will secure the huge storm drain running parallel to the road and remove the shrubs used by muggers to hide and prey on pedestrians at night as well as install security lighting and cameras
5.4 Negative concerns

5.4.1 Noise and Dust emissions
Noise and Dust emissions will be generated at the project site during construction which if unmitigated can interfere with neighbours comfort and health.

5.4.2 Obstruction and traffic increase
Obstruction by construction transport vehicles during the construction phase and increased number of vehicles coming to and from the project during the operational phase will lead to increase in traffic at Haile Selassie Road and Lower Hill Road. If entry and exit access routes to the building are not planned well traffic flow along these roads shall be also be disrupted.

5.4.3 Dilapidation of existing roads
Heavy trucks transporting excavated materials and raw materials to and from the project site may lead to dilapidation of existing roads and also cause spillage of these materials on roads hence interfering with smooth motoring. It was suggested that transportation trucks should not use Lower Hill Road which is a narrow road not fit for heavy commercial trucks.

5.4.4 Insecurity
The proposed project may cause an increase in insecurity during the construction phase due to the increased number of transient workers and suppliers within and around the project site.

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

5.4.6 Storm water drainage
Concern was raised by Railways Golf Club representative in regard to the channeling of large volumes of storm water to the end of project plot boundaries without taking consideration of the effects on neighbouring establishments. It was suggested that planning should incorporate neighbouring institutions especially those through which these storm drains are channeled through such that cases of flooding during rainy season and destruction of property are curbed.

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

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

5.5 Suggestions and recommendations
- Conduct an Traffic Assessment Survey so as to aid in appropriate planning of traffic flow within and around the project site and adjacent roads
- Consult all relevant service providers and relevant authorities (i.e. KURA, KPLC, NCC, NW&SCo, NEMA amongst others) so as to harmonize the projects infrastructural and socio-economic developments with existing facilities
- Ensure an elaborate landscaping program is put in place as the construction phase is being concluded so as to replenish vegetation around the project site by planting trees, flowers and lawns where applicable
- Increase security during construction and operational phases by ensuring security guards are always posted within and around the project site and strategic placement of security lights around the site
- Adhere to all relevant construction, occupational, health and safety regulations and any other relevant law.
- It was also suggested that renewable energy should be used where applicable
6 ANALYSIS OF PROJECT ALTERNATIVES

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

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

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

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

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

The time wasted on these deliberations would cause delays that the proponent and our economy can ill afford. This would also lead to a situation like No Project Alternative option. The other consequence of this is that it would be a discouragement for private/local investors especially in the commercial development sector. In consideration of the above concerns and assessment of the current proposed site, relocation of the project is not a viable option.
6.3 Carrying on with the proposed development alternative

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

6.4 Analysis of alternative construction materials and technology

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

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

6.5 Domestic waste water management alternatives

Three suitable technologies are discussed below:

6.5.1 Alternative one: Connection to the sewer system

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

6.5.2 Alternative two: Construction of a treatment plant

This involves the construction of a treatment plant. A Net Work of Plant Effluent Drains, Aeration Pits, Tanks etc., It is very expensive to construct and not suitable for the domestic waste water to be generated from the building and in a town setup. Centralized treatment plants can cause a nuisance of bad odour to tenants near the plant and are usually neglected after a few years leading to breakdowns and malfunctions which may also lead to other environmental problems such as emission of raw effluent to the environment This option is thus not suitable.

6.5.3 Alternative three: Use of septic tanks

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

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

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

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

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

This Chapter therefore describes the anticipated positive and negative impacts of the proposed project due to project location and during construction, operation and decommissioning phases.

7.2 Negative impacts during construction phase
The following negative impacts are also associated with the construction of the proposed project.

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

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

7.2.3 Noise pollution and vibration
Significant increases in noise and vibration levels may be expected during construction of the proposed project. Such noise and vibrations may be generated from excavators, movement; loaders; concrete mixer trucks; concrete pumps; concrete vibrators; dump trucks; hammering; vibrators; compactors, diesel generators (DGs); water pumps and even construction workers.
The impact of noise and vibrations on the surrounding community depends upon:
- Characteristics of the noise and vibrations source (instantaneous, intermittent, or continuous in nature);
- Time of day at which noise and vibrations occur; and
- Location of noise and vibrations source with respect to sensitive receptor.

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

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

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

Potential impacts on the air quality during the construction stage will be due to the fugitive dust and the exhaust gases generated in and around the construction site. The sources of air emission can be grouped into three categories of point, area and line sources:
- A point source is a single source of emission with an identified location, such as an industry;
- An area source is when the sources of emission are many widely distributed point sources having relatively comparable significance; and
- A line source is when the sources of emission from a number of fixed or moving facilities have relatively comparable significance, such as roads.

Fugitive dust (depending on the timing of construction) and vehicular emissions are the major components of air pollution. The following construction related activities are generally associated with these emissions:
- Site clearance, excavation and use of heavy vehicles and machinery/equipment at construction site;
- Transportation of construction materials such as sand, cement, steel, masonry stone to the construction site; and
- Operating of construction machinery and equipments

During the period of maximum construction activity, the fuel consumption is expected to rise significantly and the background concentrations of suspended particulate matter (SPM), respirable particulate matter (RPM), sulphur dioxide (SO₂), nitrogen dioxide (NO₂) and both carbon monoxide (CO) and lead (Pb) are also expected to rise.
These emissions if not appropriately mitigated can have significant respiratory and cardio-pulmonary effects on the local population, the health effects may range from subtle biochemical and physiological changes to difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac conditions. The impacts of such emissions can be greater in areas where the materials are sourced and at the construction site as a result of frequent gunning of vehicle engines, activities associated with site clearance, excavations, spreading of the topsoil during construction, frequent and fast vehicle movement in the loading and offloading areas. Because large quantities of building materials are required, some of which are sourced outside far from the project site, such emissions can be enormous and may affect a wider geographical area.

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

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

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

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

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

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

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

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

7.2.11 Increased traffic
Obstruction by construction transport vehicles and construction activities adjacent to the nearby roads during the construction phase may lead to the increase in traffic along Haile Sellasie and Lower Hill Roads. This may be exacerbated if these activities time/schedule coincide with Peak Traffic hours.
7.2.12 Workers accidents and public safety
In any civil works, public as well as construction staff safety risks can arise from various construction activities such as:-
- Deep excavations;
- Operation and movement of heavy equipment and vehicles;
- Injuries from falling objects; and
- Injuries from hand tools.

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

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

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

7.3.2 Provision of market for supply of building materials
The proposed project will require supply of large quantities of building materials most of which will be sourced locally in the surrounding areas. Producers and suppliers of materials such as: masonry stone, iron sheets, timber, paint, electrical cables, water storage equipments, water pipes, steel, glass, sand, cement, fuel, will thus get a ready market for their merchandise.

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

7.4 Negative impacts during operation phase
The following negative impacts are associated with the proposed project during its operation phase.
7.4.1 Increased traffic
It is expected that the number of vehicles around the project site shall increase hence leading to the possibility of commensurate increase in traffic around Haile Selassie Road and Lower Hill Road. This shall be dependent on the location of the buildings car park entry/exit, traffic control measures in place, number of tenants/visitors to the building, the nature of businesses within the building amongst other factors.

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

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

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

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

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

7.5 Positive impacts during operation phase
Just as in the construction phase, there are positive impacts associated with the proposed project during operation phase. These positive impacts are discussed below.
7.5.1 Employment opportunities
Employment opportunities are one of the long-term major impacts of the proposed project. A number of people will be employed in various capacities in different professional and non-professional areas at the building.

7.5.2 Increase in revenue to national and local governments
The commissioning of the proposed project will result in positive gains for numerous authorities - Kenya Revenue Authority (KRA), KPLC, and Nairobi City Council through payment of relevant taxes, rates and fees to the respective institutions.

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

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

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

7.6.2 Air quality
Dust will be generated during demolition works of the proposed project from the demolition activities. This will mainly affect demolition workers. In addition, soil will be used in rehabilitation and re-instatement to pre-project status, this will add to the amount of dust that will be generated during rehabilitation. However, it will be minimal.

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

7.6.3 Solid waste generation
Demolition of the proposed project will result in large quantities of solid waste. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, sulphate and ammonia which may be released as a result of leaching of demolition waste, are known to lead to degradation of groundwater quality.
7.6.4 Health and safety
Risk of accidents and ill health as a result of the demolition activities is likely to be experienced. This could be as a result of accidents involving construction equipment.

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

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

7.7.2 Employment opportunities
For demolition to take place properly and in good time, several people will be involved. As a result, large number of jobs will be created in various positions both in supervisory and non-supervisory positions.
8 IMPACTS MITIGATION AND MONITORING

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

8.2 Mitigation of construction phase impacts

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

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

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

In addition to the above measures, the Proponent shall consider reuse of building materials and use of recycled building materials where applicable. This will lead to
reduction in the amount of raw materials extracted from natural resources as well as reducing impacts at the extraction sites.

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

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

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

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

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

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

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

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

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

The following measures shall be implemented during construction:-
• The engine size of the construction equipment shall be the minimum practical size;
• The number of construction equipment operating simultaneously shall be minimized through efficient management practices;
• To ensure that the smallest practical number is operating at any one time;
• Construction equipment shall be maintained in tune per the manufactures specifications;
• Idling of heavy duty diesel trucks during loading and unloading shall be minimized; and
• Alternatively fuelled construction equipment shall be used where feasible.

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

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

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

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

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

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

8.2.6 Minimization of insecurity

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

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

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

8.2.8 Minimization of surface and groundwater contamination
Several measures shall be put in place to mitigate the impacts that are likely to lead to surface and groundwater quality degradation. The Proponent will prepare a hazardous substance control systems and emergency response plans that will include preparations for quick and safe cleanup of accidental spills. It will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response programme to ensure quick and safe cleanup of accidental spills. The plan will identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted.

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

8.2.10 Minimization of energy consumption
The Proponent shall ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. In addition, proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. Complementary to these measures, the Proponent shall monitor energy use during construction and set targets for reduction of energy use.
8.2.11 Minimization of construction related traffic
The following measures shall be put in place so as to manage traffic along surrounding roads during construction:-

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

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

8.3 Mitigation of operation phase impacts

8.3.1 Traffic management
The following measures shall be put in place so as to manage traffic along surrounding roads during operational phase of the project:-

- "NO PARKING" signs will be posted around the building where Parking is prohibited and likely to cause obstruction as well as other necessary traffic signs
- Traffic management/parking personnel shall be provided to monitor parking and ensure smooth motoring along the buildings adjacent roads
- Access to driveways will be maintained at all times
- Any work that disturbs normal traffic signal operations shall be coordinated with the relevant authorities
8.3.2 Ensure efficient water use
The Proponent should install water-conserving automatic taps and toilets. Moreover, any water leaks through damaged pipes and faulty taps will be fixed promptly by qualified staff. In addition, the occupants will be sensitized to use water efficiently. The following water saving investments should be taken into consideration:-

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

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

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

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

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

Since the proposed project will be generating a substantial amount of waste, an integrated solid waste management system is recommended. First, the Proponent will give priority to reduction at source of the materials. This option will demand a solid waste management awareness programme in the management and the employed staff.
Secondly, recycling, reuse and composting of the waste will be the second alternative in priority. This will call for a source separation programme to be put in place. The third priority in the hierarchy of options is combustion of the waste that is not recyclable in order to produce energy. Finally, sanitary land filling will be the last option for the Proponent to consider.

In order to achieve the above three recommendations the following will be done.

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

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

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

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

**8.4 Mitigation of decommissioning phase impacts**

**8.4.1 Efficient solid waste management**
Solid waste resulting from demolition or dismantling works will be managed as described in Section 7.2.4.

**8.4.2 Reduction of dust concentration**
High levels of dust concentration resulting from demolition or dismantling works will be minimized as described in Section 7.2.3.
8.4.3 Minimization of noise and vibration
Significant impacts on the acoustic environment will be mitigated as described in Section 7.2.2.

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

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

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

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

9.1.1 Construction Phase EMP
The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the construction phase of the project are outlined in Table 6 below.
### Table 6: Environmental management plan for the construction phase of the proposed project

<table>
<thead>
<tr>
<th>Expected Impacts</th>
<th>Negative Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High demand of raw material</strong></td>
<td>1. Minimize extraction site impacts and ensure efficient use of raw materials in construction</td>
<td>1. Source building materials from local suppliers who use environmentally friendly processes in their operations.</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered.</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Ensure that damage or loss of materials at the construction site is kept minimal through proper storage.</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>200,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Use at least 5%-10% recycled, refurbished or salvaged materials to reduce the use of raw materials and divert material from landfills</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>0</td>
</tr>
<tr>
<td><strong>Vegetation disturbance</strong></td>
<td>1. Minimize vegetation disturbance at and or around construction site</td>
<td>1. Ensure proper demarcation and delineation of the project area to be affected by construction works.</td>
<td>Contractor, Civil engineer &amp; Project Manager</td>
<td>3 Days</td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Specify locations for trailers, cranes &amp; equipment, &amp; areas of the site which should be kept free of traffic, equipment, and storage.</td>
<td></td>
<td>10 Days</td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Designate access routes and parking within the site.</td>
<td></td>
<td>5 Days</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Introduction of vegetation (trees, shrubs and grass) on open spaces and around the project site and their maintenance.</td>
<td>Architect &amp; Landscape specialist</td>
<td>Monthly to Annually</td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Design and implement an appropriate landscaping programme to help in re-vegetation of part of the project area after construction.</td>
<td>Architect &amp; Landscape specialist</td>
<td>2 months</td>
<td>150,000</td>
</tr>
<tr>
<td><strong>Avoid encroaching on road reserves</strong></td>
<td>1. Avoid encroaching on road reserves</td>
<td>1. Comply with the Public Roads and Roads of Access Act (Cap. 399) by ensuring no development is within the 30 meter Upperhill Road Reserve running along the plot boundary</td>
<td>Project proponent, architect &amp; Contractor</td>
<td>During planning and throughout construction period</td>
<td></td>
</tr>
</tbody>
</table>
### Environmental Impact Assessment Study Report, 2016

#### Expected Negative Impacts

**4. Reduce storm-water, runoff and soil erosion**

<table>
<thead>
<tr>
<th>Negative Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
</table>
| Increased storm water, runoff and soil erosion | 1. Surface runoff and roof water shall be harvested and stored in underground reservoir tanks for reuse.  
2. A storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structure will be designed.  
3. Apply soil erosion control measures such as leveling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil.  
4. Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the project site.  
5. Ensure that any compacted areas are ripped to reduce run-off.  
6. Site excavation works to be planned such that a section is completed and rehabilitated before another section begins.  
7. Open drains all interconnected will be provided on site.  
8. Roof catchments will be used to collect the storm water for some other uses.  
9. Construction of water storage tanks to collect storm water for construction use. | The Civil Engineer, Mechanical Engineer and Project Manager | 2 months         |             |
|                 | 10,000 per unit                                                                                                                                                                                                                                                                                                                                                   |                  | 1 month        |             |
|                 | 1 months                                                                                                                                                                                                                                                                                                                                                 |                  |                |             |
|                 | 1 month                                                                                                                                                                                                                                                                                      |                  |                |             |
|                 | 2 months                                                                                                                                                                                                                         |                  |                |             |
|                 | Throughout construction period                                                                                                                                                                                                   |                  |                |             |
|                 | 5,000 per unit                                                                                                                                                                                                                    |                  |                |             |
|                 | 5,000 per unit                                                                                                                                                                                                                    |                  |                |             |
|                 | Throughout construction period                                                                                                                                                                                                    |                  |                |             |

#### 5. Minimize deep trenching and excavation hazards

<table>
<thead>
<tr>
<th>Persons falling</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A barricade at least 900mm high must be erected around a trench that is 1 meter or more deep unless it is not possible only workers involved in the trench will be in the area; or another form of barrier exists (such as excavated materials near the trench).</td>
<td>The Civil Engineer and Project Manager</td>
<td>Throughout excavation works period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected Impacts</td>
<td>Negative Impacts</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Time Frame</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------</td>
<td>---------------------------------</td>
<td>-------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Trench collapse or cave-in</td>
<td>1. Excavated material should not be placed less than 600mm from the edge of a trench to minimize risk of collapse due to the weight of the spoil.</td>
<td>The Civil Engineer and Project Manager</td>
<td>Throughout excavation works period</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. An excavation where a possibility of collapse or cave-in exists should be shored, shielded, benched or battered to prevent the collapse or cave-in.</td>
<td>The Civil Engineer and Project Manager</td>
<td>Throughout excavation works period</td>
<td></td>
</tr>
<tr>
<td>Safe access and exit</td>
<td>Ladders must be provided no more than 9 meters apart in the area where work will be carried out</td>
<td>The Civil Engineer and Project Manager</td>
<td>Throughout excavation works</td>
<td>20,000</td>
</tr>
</tbody>
</table>

6. Minimize solid waste generation and ensure efficient solid waste management during construction

<p>| Increased solid waste generation | 1. Use of an integrated solid waste management system i.e. through a hierarchy of options including: Source reduction, Recycling, Reuse, Combustion and Sanitary land filling. | Project Manager &amp; Contractor | Throughout construction period | 300,000 |
|                                 | 2. Through accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed | Project Manager &amp; Contractor | One-off | 0 |
|                                 | 3. Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of. | Project Manager &amp; Contractor | One-off | 0 |
|                                 | 4. Ensure that damaged or wasted construction materials will be recovered for refurbishing and use in other projects. | Project Manager &amp; Contractor | One-off | - |
|                                 | 5. Donate recyclable/reusable or residual materials to other users where applicable | Project Manager &amp; Contractor | One-off | 0 |
|                                 | 6. Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time | Project Manager &amp; Contractor | Throughout construction period | - |</p>
<table>
<thead>
<tr>
<th>Expected Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7. Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>8. Use building materials that have minimal or no packaging to avoid packaging waste</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>9. Use construction materials containing recycled content when possible and in accordance with accepted standards.</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10. Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at the site</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>11. Dispose waste more responsibly by dumping at designated dumping sites or landfills only.</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>50,000/month</td>
</tr>
<tr>
<td></td>
<td>12. Waste collection bins to be provided at designated points on site</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>4,000 per truckload</td>
</tr>
<tr>
<td></td>
<td>13. Private waste disposal company to be contracted to transport and dispose the solid waste from site</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>0</td>
</tr>
</tbody>
</table>

**7. Reduce dust emissions**

<table>
<thead>
<tr>
<th>Dust emission</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Provide 2.4 m high hoarding along site boundary</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>2. Provide effective dust screen, sheeting or netting where scaffolding is erected around the perimeter of a building</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction of building envelope</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Water all active construction areas when necessary;</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>4. Cover all trucks hauling soil, sand and other loose materials</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>0</td>
</tr>
</tbody>
</table>
### Environmental Impact Assessment

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#### Proposed Mixed Use Development, Upper Hill.

<table>
<thead>
<tr>
<th>Expected Impacts</th>
<th>Negative Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction site</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>20,000</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites;</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Down wash of trucks (especially tyres) prior to departure from site;</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Post signs that limit vehicle speeds onto unpaved roads and over disturbed soils;</td>
<td>Project Manager &amp; Contractor</td>
<td>One off</td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Use of electrically operated construction machinery to avoid externalities produced by diesel engines</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Personal Protective equipment to be worn by all staff members</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>100,000</td>
<td></td>
</tr>
</tbody>
</table>

#### 8. Minimization of exhaust emissions

<table>
<thead>
<tr>
<th>Exhaust emission</th>
<th>Measured parameter</th>
<th>Recommended Action</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vehicle idling time shall be minimized</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Alternatively fuelled construction equipment shall be used where feasible equipment shall be properly tuned and maintained</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas, and to switch off or keep vehicle engines at these points</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

#### 9. Minimization of noise and vibration

<table>
<thead>
<tr>
<th>Noise and vibration</th>
<th>Measured parameter</th>
<th>Recommended Action</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>1,000</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>Use quiet equipment (i.e. equipment designed with noise control elements such as mufflers);</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td></td>
</tr>
</tbody>
</table>
### Environmental Impact Assessment

#### Study Report, 2016

**Proposed Mixed Use Development, Upper Hill.**

<table>
<thead>
<tr>
<th>Expected Impacts</th>
<th>Negative Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.</strong></td>
<td>Install portable barriers to shield compressors and other small stationary equipment where necessary and locate stationary noise sources as far from existing sensitive receptors as possible;</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4.</strong></td>
<td>Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, residential areas and schools</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>1,000</td>
<td></td>
</tr>
<tr>
<td><strong>5.</strong></td>
<td>Ensure that construction machinery are kept in good condition to reduce noise generation</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>25,000</td>
<td></td>
</tr>
<tr>
<td><strong>6.</strong></td>
<td>Ensure that all generators and heavy duty equipment are insulated or placed in enclosures to minimize ambient noise levels.</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>15,000</td>
<td></td>
</tr>
<tr>
<td><strong>7.</strong></td>
<td>Trees to be planted around the site to provide some buffer against noise propagation</td>
<td>Project Manager &amp; site foreman</td>
<td>Throughout construction period</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td><strong>8.</strong></td>
<td>Prescribe noise reduction measures if appropriate e.g. restricted working hours and transport hours and noise buffering;</td>
<td>Project Manager &amp; site foreman</td>
<td>Throughout construction period</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

#### 10. Minimization of energy consumption

| Increased energy consumption | 1. Ensure electrical equipment, machinery and lights are switched off when not being used | Project Manager & Contractor | Throughout construction period | 0 |
|  | 2. Install energy saving fluorescent tubes at all lighting points instead of bulbs which consume higher electric energy | Project Manager & Contractor | Throughout construction period | 5,000 |
|  | 3. Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts | Project Manager & Contractor | Throughout construction period | 10,000 |
|  | 4. Monitor energy use during construction and set targets for reduction of energy use | Project Manager & Contractor | Throughout construction period | 5,000 |

#### 11. Minimize water consumption and ensure more efficient and safe water use

| High water demand | 1. Connect to the existing NW&SCo main supply | Mechanical Engineer and Project Manager | One-off | 50,000 |
### Environmental Impact Assessment

#### Study Report, 2016

<table>
<thead>
<tr>
<th>Expected Impacts</th>
<th>Negative Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2. Harness rainwater for construction activities usage</td>
<td>Mechanical Engineer and Project Manager</td>
<td>Throughout construction period</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Install water conserving taps that turn-off automatically when water is not being used</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>10-40 % higher than price of ordinary taps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Promote recycling and reuse of water as much as possible</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Install a discharge meter at all water outlets to determine and monitor total water usage</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>2,000 per unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Promptly detect and repair of water pipe and tank leaks</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>1,000 per month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Ensure taps are not running when not in use</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>1,000</td>
</tr>
</tbody>
</table>

#### 12. Minimize release of liquid effluent

<table>
<thead>
<tr>
<th>Generation of wastewater</th>
<th>1. Provide means for handling sewage generated by construction workers, e.g. mobile toilets</th>
<th>Mechanical Engineer &amp; Project Manager</th>
<th>One-off</th>
<th>40,000 per month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Conduct regular checks for sewage pipe blockages or damages</td>
<td>Mechanical Engineer &amp; Project Manager</td>
<td>Throughout construction period</td>
<td>2,000/month</td>
</tr>
</tbody>
</table>

#### 13. Ensure the general safety and security of the construction site and surrounding

| Safety and security | Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the construction site. | Project Manager & Contractor | Continuous | 50,000/month |

#### 14. Minimize hydrology and water quality degradation

<p>| Surface and groundwater contamination | 1. Hazardous substance control and emergency response plan that will include preparations for quick and safe clean up of accidental spills. | The Mechanical Engineer, Project Manager, Contractor &amp; the Developer | Continuous | 30,000 |</p>
<table>
<thead>
<tr>
<th>Expected Impacts</th>
<th>Negative Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Hazardous-materials handling procedures to reduce the potential for a spill during construction to be prescribed</td>
<td></td>
<td>The Mechanical Engineer</td>
<td>Continuous</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>3. Identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted</td>
<td></td>
<td>The Mechanical Engineer</td>
<td>Continuous</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4. Ground water, will be collected during construction contained and disposed of in accordance with all applicable regulations</td>
<td></td>
<td>The Mechanical Engineer</td>
<td>Continuous</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. Increased pressure on infrastructure

<table>
<thead>
<tr>
<th>Dilapidation of existing infrastructure</th>
<th>1. Coordinate relevant service providers and authorities (i.e. KPLC, NCC, NW&amp;SCo, NEMA amongst others) so as to harmonize the projects infrastructural and socio-economic developments with existing facilities</th>
<th>Architect, Project Manager, Contact or and the Developer</th>
<th>Continuous</th>
<th>200,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Upgrade existing infrastructure and services, if and where feasible.</td>
<td></td>
<td>Architect, Project Manager, Contact and the Developer</td>
<td>Continuous</td>
<td>300,000</td>
</tr>
</tbody>
</table>

16. Minimize traffic around the project site and adjacent roads

<table>
<thead>
<tr>
<th>Increased traffic, traffic, obstruction</th>
<th>1. Ensure all construction vehicles to and from the construction site use the designated Entry/Exit to the project site</th>
<th>Project Manager and Site Foreman</th>
<th>Throughout construction period</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. All transportation of construction raw materials and excavated materials are to be conducted at traffic off peak hours only</td>
<td></td>
<td>Project Manager and Contactor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td>3. Sensitize truck drivers to avoid unnecessary road obstruction</td>
<td></td>
<td>Project Manager, Contactor &amp; site foreman</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td>4. Cover all trucks hauling soil, sand and other loose materials to avoid spillage and dust emissions that may interfere with smooth motoring</td>
<td></td>
<td>Project Manager, Contactor &amp; site foreman</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
</tbody>
</table>
### Expected Negative Impacts

<table>
<thead>
<tr>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Work hours shall be restricted to the period between 8:30 a.m. and 3:30 p.m., Monday through Friday, unless approved otherwise.</td>
<td>Project Manager, Contactor &amp; site foreman</td>
<td>Throughout construction period</td>
<td></td>
</tr>
<tr>
<td>6. Access to driveways will be maintained at all times unless other arrangements are made</td>
<td>Project Manager, Contactor &amp; site foreman</td>
<td>Throughout construction period</td>
<td></td>
</tr>
</tbody>
</table>

#### 17. Minimize occupational health and safety risks

<table>
<thead>
<tr>
<th>Approval of building plans</th>
<th>Ensure that all building plans are approved by the Local Authority and the Local Occupational Health and Safety Office</th>
<th>Developer</th>
<th>One-off</th>
<th>50,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration of the premises</td>
<td>Registration of the project under the Occupational Safety and Health Act, 2007 Laws of Kenya is mandatory</td>
<td>Developer</td>
<td>One-off</td>
<td>5,000</td>
</tr>
<tr>
<td>General register</td>
<td>A general register should be kept within the facility as stipulated in Occupational Safety and Health Act, 2007.</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>1,000</td>
</tr>
<tr>
<td>Incidents, accidents and dangerous occurrences.</td>
<td>1. Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the local Occupational Health and Safety Office (OHSO) are in place.</td>
<td>Project Manager, Developer &amp; Contractor</td>
<td>Continuous</td>
<td>500/month</td>
</tr>
<tr>
<td></td>
<td>2. Enforcing adherence to safety procedures and preparing contingency plan for accident response in addition safety education and training shall be emphasized.</td>
<td>The Contractor, Project Manager &amp; Site Safety Officer</td>
<td>Continuous</td>
<td>20,000</td>
</tr>
<tr>
<td>Insurance</td>
<td>Ensure that the premises are insured as per statutory requirements (third party and workman’s compensation)</td>
<td>Developer</td>
<td>Annually</td>
<td>-</td>
</tr>
<tr>
<td>Site organization</td>
<td>Develop a clear site organization plan and construction schedule</td>
<td>The Contractor, Project Manager &amp; Site Safety Officer</td>
<td>Continuous</td>
<td>5,000</td>
</tr>
<tr>
<td>Expected Impacts</td>
<td>Negative Impacts</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Time Frame</td>
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<td></td>
<td></td>
<td>Deliver and store materials at appropriate locations</td>
<td>The Contractor, Project Manager &amp; Site Safety Officer</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hire the right number of workers with clear work schedule and appropriate dress gear</td>
<td>The Contractor, Project Manager &amp; Site Safety Officer</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td>Safety, health and environment (SHE) policy</td>
<td>Develop, document and display prominently an appropriate SHE policy for construction works</td>
<td>Project Manager, Developer &amp; Contractor</td>
<td>One-off</td>
</tr>
<tr>
<td>Health and safety committee</td>
<td>Provisions must be put in place for the formation of a Health and Safety Committee, in which the employer and the workers are represented</td>
<td>Project Manager</td>
<td>One-off</td>
<td>10,000</td>
</tr>
<tr>
<td>Sanitary conveniences</td>
<td>1. Suitable, efficient, clean, well-lit and adequate sanitary conveniences should be provided for construction workers</td>
<td>Project Manager</td>
<td>One-off</td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td>2. Mobile toilets, changed regularly, to be provided on site or latrines</td>
<td>Project Manager</td>
<td>Throughout construction period</td>
<td>10,000-30,000 per unit</td>
</tr>
<tr>
<td>Medical examination</td>
<td>Arrangements must be in place for the medical examination of all construction workers before, during and after termination of employment</td>
<td>Project Manager, Developer &amp; Contractor</td>
<td>Continuous</td>
<td>1,000 per examination</td>
</tr>
<tr>
<td>Machinery/equipment safety</td>
<td>1. Ensure that machinery, equipment, personal protective equipment, appliances and hand tools used in construction do comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded</td>
<td>Project Manager, Developer &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2. Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain</td>
<td>Project Manager, Developer &amp; Contractor</td>
<td>Continuous</td>
<td>0</td>
</tr>
</tbody>
</table>
### Environmental Impact Assessment Study Report, 2016

#### Proposed Mixed Use Development, Upper Hill.

<table>
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<th>Expected Impacts</th>
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<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage of materials</td>
<td>1. Ensure that materials are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse</td>
<td>Project Manager</td>
<td>Continuous</td>
<td>15,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Ensure that items are not stored/stacked against weak walls and partitions</td>
<td>Project Manager</td>
<td>Continuous</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Safe means of access and safe place of employment</td>
<td>1. All floors, steps, stairs and passages of must be of sound construction and properly maintained</td>
<td>Project Manager &amp; Contractor</td>
<td>Continuous</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Securely fence or cover all openings in floors</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>-</td>
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<tr>
<td></td>
<td>3. Provide all staircases within the building with suitable handrails on both sides</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Ensure that construction workers are not locked up such that they would not escape in case of an emergency</td>
<td>Project Manager &amp; Contractor</td>
<td>Continuous</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. All ladders used in construction works must be of good construction and sound material of adequate strength and be properly maintained</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. All of scaffolds and work platforms shall be erected, altered and dismantled by competent persons</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Expected Impacts</strong></td>
<td><strong>Negative Impacts</strong></td>
<td><strong>Recommended Mitigation Measures</strong></td>
<td><strong>Responsible Party</strong></td>
<td><strong>Time Frame</strong></td>
<td><strong>Cost (Ksh)</strong></td>
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<td></td>
<td><strong>7.</strong> All uprights must be provided with base plates (and, where necessary, timber sole plates) or prevented in some other way from slipping or sinking</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>8.</strong> All scaffolds must be secured to the building in enough places to prevent collapse</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>9.</strong> Guard rails or equivalent protection to be in place to stop falls from open edges on scaffolds, mobile elevating work platforms, buildings, gangways, excavations, etc</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>10.</strong> Enough barriers must be erected at rooftop edges to protect workers or materials falling from roofs</td>
<td>Project Manager &amp; Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td><strong>Emergency preparedness and evacuation procedures</strong></td>
<td></td>
<td><strong>1.</strong> Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>2.</strong> Such procedures must be tested at regular intervals</td>
<td>Project Manager &amp; Contractor</td>
<td>Every 3 months</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>3.</strong> Ensure that adequate provisions are in place to immediately stop any operations where there in an imminent and serious danger to health and safety and to evacuate workers</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>10,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>4.</strong> Ensure that the most current emergency telephone numbers posters are prominently and strategically displayed within the construction site</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>1,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>5.</strong> Provide measures to deal with emergencies and accidents including adequate first aid arrangements</td>
<td>Project Manager &amp; Contractor</td>
<td>Continuous</td>
<td>5,000</td>
</tr>
<tr>
<td><strong>First Aid</strong></td>
<td></td>
<td><strong>1.</strong> Well stocked first aid box which is easily available and accessible should be provided within the construction site</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>2.</strong> Provision must be made for persons to be trained in first aid, with a certificate issued by a recognized body.</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>10,000</td>
</tr>
<tr>
<td>Expected Impacts</td>
<td>Negative Impacts</td>
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<td>Time Frame</td>
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</tr>
<tr>
<td>Fire protection</td>
<td>1. Firefighting equipment such as fire extinguishers should be provided at strategic locations such as stores and construction areas.</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>30,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Regular inspection and servicing of the equipment must be undertaken by a reputable service provider and records of such inspections maintained</td>
<td>Project Manager &amp; Contractor</td>
<td>Every 3 months</td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Signs such as “NO SMOKING” must be prominently displayed within the construction site, especially in parts where inflammable materials are stored</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>Ventilation</td>
<td>Enough space must be provided within the premises to allow for adequate natural ventilation through circulation of fresh air</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td>There must be adequate provision for artificial or natural lighting in all parts the super structure in which persons are working or passing</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Electrical Safety</td>
<td>1. Circuits must not be overloaded</td>
<td>Project Manager &amp; Contractor</td>
<td>Continuous</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Distribution board switches must be clearly marked to indicate respective circuits and pumps</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. There should be no live exposed connections</td>
<td>Project Manager &amp; Contractor</td>
<td>Continuous</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Electrical fittings near all potential sources of ignition should be flame proof</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. All electrical equipment must be earthed</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Chemical Safety</td>
<td>1. Develop a suitable system for the safe collection, recycling and disposal of chemical wastes, obsolete chemicals and empty chemical containers to avoid their reuse for other purposes and to eliminate or minimize the risks to safety, health and environment</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>Expected Impacts</td>
<td>Negative Impacts</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
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<td>Cost (Ksh)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>2. Ensure that all chemicals used in construction are appropriately labeled or marked and that material safety data sheets containing essential information regarding their identity, suppliers classification of hazards, safety precautions and emergency procedures are provided and are made available to employees and their representatives</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Keep a record of all hazardous chemicals used at the site, cross-referenced to the appropriate chemical safety data sheets</td>
<td>Project Manager &amp; Contractor</td>
<td>Continuous</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. There should be no eating or drinking in areas where chemicals are stored or used</td>
<td>Project Manager &amp; Contractor</td>
<td>Continuous</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Provide workers in areas with elevated noise and vibration levels, with suitable ear protection equipment such as ear masks</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>5,000</td>
</tr>
<tr>
<td>Supply of clean drinking water</td>
<td></td>
<td>Ensure that construction workers are provided with an adequate supply of wholesome drinking water which should be maintained at suitable and accessible points.</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>5,000/month</td>
</tr>
<tr>
<td>Washing facilities</td>
<td></td>
<td>Ensure that conveniently accessible, clean, orderly, adequate and suitable washing facilities are provided and maintained within the site</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>5,000</td>
</tr>
<tr>
<td>Ergonomics</td>
<td></td>
<td>1. Provision for repairing and maintaining of hand tools must be in place</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Hand tools must be of appropriate size and shape for easy and safe use</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Height of equipment, controls or work surfaces should be positioned to reduce bending posture for standing workers</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
</tr>
</tbody>
</table>
9.1.2 Operational Phase EMP
The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the operational phase of the project are outlined in Table 7.
### Environmental management plan for the operation phase of the proposed project

<table>
<thead>
<tr>
<th>Expected Negative impact</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Minimization of solid waste generation and ensuring more efficient solid waste management</td>
<td>1. Provide solid waste handling facilities such as waste bins and skips</td>
<td>Proponent/Building management</td>
<td>One-off</td>
<td>10,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>2. Ensure that solid waste generated at the building is regularly disposed of appropriately at authorized dumping sites</td>
<td>Proponent/Building management</td>
<td>Continuous</td>
<td>50,000/month</td>
</tr>
<tr>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>3. Ensure that building occupants manage their waste efficiently through recycling, reuse and proper disposal procedures.</td>
<td>Proponent/Building management</td>
<td>Continuous</td>
<td>–</td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>3. Donate redundant but serviceable equipment to charities and institutions</td>
<td>Proponent/Building management</td>
<td>Continuous</td>
<td>0</td>
</tr>
<tr>
<td>2. Minimize risks of sewage release into environment</td>
<td>1. Provide adequate and safe means of handling sewage generated (i.e. NW&amp;SCo sewer mains)</td>
<td>Building management</td>
<td>One-off</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>2. Conduct regular inspections for sewage pipe blockages or damages and fix appropriately</td>
<td>Building management</td>
<td>Continuous</td>
<td>500 per inspection</td>
</tr>
<tr>
<td>3. Minimize energy consumption</td>
<td>1. Switch off electrical equipment, appliances and lights when not being used</td>
<td>Staffs/ Building management</td>
<td>Continuous</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>2. Install occupation sensing lighting at various locations such as storage areas which are not in use all the time</td>
<td>Building management</td>
<td>One-off</td>
<td>10-40 % higher than ordinary lighting</td>
</tr>
<tr>
<td>Expected Negative Impact</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Time Frame</td>
<td>Cost (Ksh)</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>3. Install energy saving fluorescent tubes at all lighting points within the building instead of bulbs which consume higher electric energy</td>
<td>Building management</td>
<td>One-off</td>
<td>10-40 % higher than ordinary lighting</td>
</tr>
<tr>
<td></td>
<td>4. Monitor energy use during the operation of the project and set targets for efficient energy use</td>
<td>Building management</td>
<td>Continuous</td>
<td>2,000/month</td>
</tr>
<tr>
<td></td>
<td>5. Sensitize tenants &amp; employees to use energy efficiently</td>
<td>Building management/Staffs</td>
<td>Continuous</td>
<td>500/month</td>
</tr>
<tr>
<td></td>
<td><strong>4. Minimize water consumption and ensure more efficient and safe water use</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water consumption</td>
<td>1. Promptly detect and repair water pipe and tank leaks</td>
<td>Building management</td>
<td>Continuous</td>
<td>2,000/month</td>
</tr>
<tr>
<td></td>
<td>2. Encourage tenants and staffs to conserve water</td>
<td>Building management/Staffs</td>
<td>Continuous</td>
<td>500/month</td>
</tr>
<tr>
<td></td>
<td>3. Ensure taps are not running when not in use</td>
<td>Building management/Staffs</td>
<td>Continuous</td>
<td>500/month</td>
</tr>
<tr>
<td></td>
<td>4. Install water conserving taps that turn-off automatically when water is not being used</td>
<td>Building management</td>
<td>One-off</td>
<td>10-40 % higher than ordinary taps</td>
</tr>
<tr>
<td></td>
<td>5. Install a discharge meter at water outlets to determine and monitor total water usage</td>
<td>Building management</td>
<td>One-off</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td><strong>6. Minimize Traffic around adjacent road</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic generation</td>
<td>1. &quot;NO PARKING&quot; signs will be posted around the building where Parking is prohibited and likely to cause obstruction as well as other necessary traffic signs</td>
<td>Building Management &amp; Traffic/Parking Attendant</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>2. Traffic management/parking personnel shall be provided to monitor parking and ensure smooth motoring along the buildings adjacent roads</td>
<td>Building Management</td>
<td>Continuous</td>
<td>15,000/month</td>
</tr>
</tbody>
</table>
Environmental Impact Assessment

### Proposed Mixed Use Development, Upper Hill.

#### Expected Negative Impact

<table>
<thead>
<tr>
<th>Expected Negative Impact</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3. Access to driveways will be maintained at all times</td>
<td>Traffic/Parking Attendant</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>4. Any work that disturbs normal traffic signal operations shall be coordinated with the relevant authorities</td>
<td>Building Management &amp; Traffic/Parking Attendant</td>
<td>Continuous</td>
<td>-</td>
</tr>
</tbody>
</table>

#### 5. Minimization of health and safety impacts

1. Implement all necessary measures to ensure health and safety of the workers and the general public during operation of the project as stipulated in Occupational Safety and Health Act, 2007

   Responsible Party: Proponent
   Time Frame: Continuous

#### 6. Ensure the general safety and security of the premises and surrounding areas

1. Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.

   Responsible Party: Proponent
   Time Frame: Continuous
   Cost: 50,000-100,000/month

#### 7. Environmental monitoring of the project

The Firm of Experts (Stalin Environment) will undertake continuous environmental monitoring of the project in liaison to the National Environment Management Authority and the Proponent. This will ensure that environmental concerns are integrated into the project at every stage of implementation.

An Initial Environmental Audit will be conducted in the first year of operation/occupation to confirm the efficacy and adequacy of the EMP and to propose a comprehensive operational Phase EMP in harmony with the buildings custom fittings

   Responsible Party: Proponent, Firm of Experts and NEMA
   Time Frame: Continuous
   Cost: -
9.1.3 Decommissioning Phase EMP

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

<table>
<thead>
<tr>
<th>Expected Negative Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. All buildings, machinery, equipment, structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3. All foundations must be removed and recycled, reused or disposed of at a licensed disposal site</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>4. Where recycling/reuse of the machinery, equipment, implements, structures, partitions and other demolition waste is not possible, the materials should be taken to a licensed waste disposal site</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5. Donate reusable demolition waste to charitable organizations, individuals and institutions</td>
<td>Project Manager &amp; Contractor</td>
<td>One-off</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6. Rehabilitate accordingly</td>
<td>Architect, Project Manager</td>
<td>One-off</td>
<td></td>
</tr>
</tbody>
</table>
10 CONCLUSION AND RECOMMENDATION

Recommendations

- Consult all relevant service providers and authorities (i.e. Nairobi County County Planning Department, Kenya Urban Roads Department, KPLC, NW&SCo, NEMA, amongst others) to harmonize the projects infrastructural and socio-economic developments with existing facilities.
- Adhere to all relevant construction, occupational, health and safety regulations and any other relevant law.
- Ensure Water and Energy Management Systems are put in place as outlined within the report and incorporate rain water harvesting facilities.
- Solid waste management during construction and operational phases of the project must adhere to the Environmental Management and Coordination (Waste Management) Regulations, 2006.
- Ensure an elaborate landscaping program is put in place as the construction phase is being concluded so as to replenish vegetation around the project site by planting trees, flowers and lawns where applicable.

Conclusion

The Proponent of the proposed project shall be committed to putting in place several measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the project identified within this report.

It is recommended that in addition to this commitment, the proponent shall focus on implementing the measures outlined in the EMP as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects.

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

- Kenya gazette supplement Acts Land Planning Act (Cap. 303). Government printer, Nairobi
- Kenya gazette supplement Acts Local Authority Act (Cap. 265). Government printer, Nairobi
- Kenya gazette supplement Acts Public Health Act (Cap. 242). Government printer, Nairobi