ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY FOR PROPOSED (INTEGRATED MASTER PLAN; TOWN HOUSES, SERVICED VILLAS, SHOPPING CENTRE, NURSERY SCHOOL AND RECREATIONAL AND CONFERENCE CENTRE) ON L.R NO. 5954/2 AND L.R NO. 5830/7 (AMALGAMATED) ALONG NGONG ROAD, KAREN, IN NAIROBI COUNTY

Environmental Authority
The County Director of Environment
Nairobi County

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MARCH 2016
DOCUMENT AUTHENTICATION

This Environmental Impact Assessment study has been prepared by the Environmental consultant stated herein. I the undersigned, certify that the particulars in this study are correct to the best of my knowledge.

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Date ........................................ Date ........................................
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EIA Study report for proposed Comprehensive development on plot L.R No.5954/2 and 5830/7(Amalgamated)
along Ngong Road, Nairobi County
**Acronyms and Abbreviations Used in this Report**

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<thead>
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<th>Acronym</th>
<th>Description</th>
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<tr>
<td>CBD</td>
<td>Central Business District</td>
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<td>CPP</td>
<td>Consultation and Public Participation</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>EMP</td>
<td>Environmental Management Plan</td>
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<tr>
<td>EMCA</td>
<td>Environmental Management And Coordination Act</td>
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<td>NEMA</td>
<td>National Environment Management Authority</td>
</tr>
<tr>
<td>SOx</td>
<td>Sulphur Oxides</td>
</tr>
<tr>
<td>NOx</td>
<td>Nitrogen Oxides</td>
</tr>
<tr>
<td>PVC</td>
<td>Poly Vinyl Chloride</td>
</tr>
<tr>
<td>RC</td>
<td>Reinforced Concrete</td>
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EXECUTIVE SUMMARY

Proposed Integrated Master plan; Town houses, Serviced villas, Shopping Centre, Clinic, Nursery School and Recreational and Conference Centre on Plots L.R NO. 5954/2 and L.R NO. 5830/7 (AMALGAMATED) in Karen, Nairobi County.

1. Overview

The primary objective of the proposed project is the construction of an integrated master plan which includes town houses, serviced villas, shopping center, clinic, nursery school and recreational and conference center on Plot L.R NO. 5954/2 and L.R NO. 5830/7 (AMALGAMATED).

The project activities will entail clearing the site, excavation, building works, plumbing works, external works and finishes.

The project site occupies 29.4 acres of land.

The consultant on behalf of the proponent conducted the EIA by incorporating (but not limited to) the following Terms of Reference:

- The study of the location of the proposed development and availability of support infrastructure
- A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
- The technology, procedures and processes to be used in the implementation of the project.
- The materials to be used in the construction and implementation of the project.
- The products, by-products and waste to be generated by the project.
- A description of the potentially affected environment.
- The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
- The specific environmentally sound and affordable wastewater management system.
- Provision of alternative technologies and processes available and reasons for preferring the chosen technology and processes.
- Analysis of alternatives including project site, design and technologies.
- An environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.
- Provide an action plan for the prevention and management of the foreseeable accidents and hazardous activities in the course of carrying out development activities
- Propose measures to prevent health hazards and to ensure security in the working environment for the employees and the management in case of emergencies.
- An identification of gaps in knowledge and uncertainties which were encountered in compiling the information.
- An economic and social analysis of the project.

2. Methodology

The study incorporated the following methodology:

- Environment screening, in which the project was identified as among those requiring environmental and social impact assessment under schedule 2 of EMCA, 1999.
- Environmental scoping that provided the key environmental issues.
- Desktop studies and interviews.
- Physical inspection of the site and surrounding areas.
- Photography and data collection on the key elements constituting the environmental resources (land, soil, water, flora and fauna) within the study area.
- EIA Public Participation via the use of questionnaires and interviews
- Reporting involving the drafting of the EIA study report, consultation with the project proponent followed by submission to NEMA.

3. Potential Environmental Impacts and Mitigation Measures

The potential negative environmental impacts of the proposed development and their possible mitigation measures are summarized below.

Table 1: Potential negative impacts and possible mitigation measures.

<table>
<thead>
<tr>
<th>Potential Negative Impacts</th>
<th>Possible Mitigation Measures</th>
</tr>
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</table>
| Medical Waste (Pharmaceutical waste) | Pharmaceutical waste will be placed in pharmaceutical waste containers labeled “incineration only” so that they can be visible from any lateral direction. The containers should also be color coded to differentiate the pharmaceutical waste from the hazardous pharmaceutical waste. 
- Pharmaceutical waste including syringes will be placed into a sharps container or chemo container at the point of generation, stored in a utility room and then transported to a central holding area.
- Pharmaceutical waste will be managed and disposed of by the pharmacy according to procedures specific to the medication type.
- A permitted contractor will transport and incinerate the hazardous pharmaceutical waste generated by the clinic. |
| Noise pollution | - Sound-attenuated equipment will be used as much as possible |
| Construction Safety | - Minimize idling time for pick-up trucks and other small machinery should be ensured  
- Provide appropriate PPE for all workers operating in noisy areas or with noisy machines  
- As this is predominantly a residential area, no construction should be allowed at night |
|---------------------|------------------------------------------------------------------------------------------------|
| Construction Debris | - Construction of adequate hoarding around the project site prior to commencement of any works  
- Clear placement of signage to warn surrounding users of threat of falling debris |
| Fire and safety      | - Provide and regularly maintain adequate firefighting equipment  
- All site staff to be trained on fire safety procedures, emergency response and the proper use of firefighting equipment.  
- Establish fire assembly points  
- Install a fire alarm |
| Worker Safety        | - Prepare comprehensive Accident Response Plan prior to commencement of construction  
- All workers should be trained on proper accident response procedure prior to commencement of construction  
- Strictly enforce adherence to on-site safety procedures  
- All workers to wear appropriate PPE while on site |
| Solid Waste          | - Construction waste will be disposed of at approved County Government of Nairobi dumpsites and by registered private contractors.  
- Waste to be sorted and disposed of in accordance to Legal Notice 120 of 2006, Waste Regulations.  
- Waste generated during the project operational phase will be collected by a private contractor for final disposal  
- Provide covered receptacles for waste disposal and storage throughout the project site  
- All persons involved in waste collection and disposal shall be in appropriate PPE |
| Traffic Management                                      | - Provide adequate on-site parking  
|                                                     | - Construction vehicles shall be under strict instructions to minimize unnecessary trips  
| - Transportation of construction material to and from the project site | - Traffic speeds for construction and other vehicles coming to and from the project site shall be restricted to 15 mph |
| Habitat Destruction                                   | - Reuse of excavated soil for landscaping and planting trees and flowers to restore part of the biodiversity within the site  
| - Excavation of land                                  |
CHAPTER 1: INTRODUCTION AND BACKGROUND INFORMATION

1-0 Introduction

1-1 Background and Rationale for an Environmental Impact Assessment (EIA)

The project proponents propose to develop 50 Serviced Villas, Nursery School, Clinic, and Conference centers and a Recreational Centre which consists of 15 cottages, a club and playgrounds on Plots L.R No.5954/2 and 5830/7 (Amalgamated). The project activities will entail clearing the site, excavation, building works, plumbing works, external works and finishes.

Environmental concerns need to be an integral part of the planning and development process, and not just an afterthought. To avoid land use conflicts with the surrounding area, the proponent undertook this EIA study and incorporated environmental concerns as advised by the authority. The objective of the EIA study is to identify potential and significant environmental impacts that are likely to occur if the project is implemented. Specifically, the scope of the study is to identify impacts likely to be caused to the environment, public health and socio-economic well-being. The benefits of conducting an EIA include:

- Screening out projects that are not environmentally sound
- Proposing modified designs to reduce negative environmental impacts
- Identifying feasible site and technology alternatives
- Predicting significant adverse impacts
- Identifying mitigation measures to reduce, offset, or eliminate major impacts
- Engaging and informing potentially affected communities and individuals
- Influencing decision-making and the development of terms and conditions

1-2 Scope

The Kenya Government policy on all new projects, programs or activities requires that an Environmental Impact Assessment is carried out at the planning stages of the proposed undertaking to ensure that significant environmental impacts are taken into consideration during the design, construction, operation and decommissioning phases of the project. The scope of this Environmental Impact Assessment was informed by the Environmental Impact Assessment and Audit regulations 2003 and in particular part II S 7[1] a-k. The EIA study will therefore cover the following:
- Nature of 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 design of the project.
- The materials to be used, products and by-product including waste to be generated by the project and the methods of disposal.
- The potential environmental impacts of the project and mitigation measures to be taken during and after the implementation of the project.
- An action plan for prevention and management of possible accidents during the project cycle
- A plan to ensure the health and safety of workers and the neighboring communities.
- The economic, social and cultural impacts to the local community and the nation in general
- The project budget
- Any other information that the proponent may be requested to provide by NEMA.

All these aspects will be considered accordingly. This study report also seeks to ensure that all the potential environmental impacts are identified and that adequate mitigation measures are suggested for adoption by the project managers.

1-3 Property Location

The property is located along Ngong Road in Karen. It is approximately 2.5 km from the road junction. The property boundary to the east is the center line of Mbagathi River.

The land gently slopes towards Mbagathi River and has a river frontage of 400m. The riparian reserve for Mbagathi River ranges from a minimum of 6 m to a maximum of 30 m. Attached is the Location map. Appendix 1

1-4 Project Proponent/Developer

Keith Howard Osmond and Valerie Mary Limb of P.O. BOX 48970, NAIROBI are the owners and developers of the above mentioned property situated in Karen within Nairobi County.

1-5 Land Tenure and Ownership

The Plots L.R No. 5954/2 and 5830/7 (Amalgamated) are registered under The Registered Land Act (cap 300) and is held on Freehold basis. The registered owners are Keith Howard Osmond and Valerie Mary Limb. A copy of the Ownership document is attached. Appendix 2
1-6 Plot Size

The property is on a site covering 11.897 hectares or thereabouts of land, which translates to approximately 29.4 acres.

1-7 Site Conditions

The property is currently vacant as shown on Plate 4-2. The ground is gently sloping towards the slopes towards Mbagathi River shown on plate 4-3 and has a river frontage of 400m.

1-8 Methodology

The scope of this assessment was guided by the requirements of the Environmental Management and Coordination Act No 8 of 1999 and in particular the Environmental Impact assessment and Audit Regulations of 2003. A wide range of methods were used in the various stages of the assessment.

They included methods used by the various specialists for: Stakeholder analysis; Scoping of key issues; Consultation and public participation; carrying out the various baseline studies; definition of the project’s sphere of influence, and; impact analysis. An intensive survey provided an overview of the general implications of the proposed project.

This involved the following steps:
- Environment screening, in which the project was identified as among those requiring environmental and social impact assessment under schedule 2 of EMCA, 1999.
- Environmental scoping that provided the key environmental issues.
- Desktop studies and interviews.
- Physical inspection of the site and surrounding areas.
- Photography and data collection on the key elements constituting the environmental resources (land, soil, water, flora and fauna) within the study area.
- EIA Public Participation via the use of questionnaires and interviews
- Drafting of the EIA study report, consultation with the project proponent, followed by submission of the EIA report to NEMA.

1-8.1 Environmental Screening

This step was adopted in order to determine whether an Environmental Impact Assessment study was required for this project, and what level of assessment was necessary. This was done in reference to requirements of the EMCA, 1999, and specifically the second schedule. Issues considered included the physical location, sensitive issues and the nature of anticipated impacts.
1-8.2 Environmental Scoping

The scoping process helped the consultants narrow down onto the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, ecological, social, economic and cultural aspects.

1-8.3 Desktop Study

This included documentary review on the nature of the proposed activities, project documents, design policy and legislative framework as well as the environmental setting of the area among others. It also included discussions with key stakeholders, managers and design engineers, as well as interviews with neighbors.

1-8.4 Site Assessment and Public Participation

Field visits were meant for physical inspections of the site characteristics and the environmental status of the surrounding areas in order to determine the anticipated impacts. To ensure adequate public participation in the EIA process, structured questionnaires were administered and interviews carried out. The information gathered was subsequently synthesized and incorporated into the EIA report.

1-8.5 Reporting

In addition to constant briefing by the client and the project managers, this Environmental Impact Assessment report was prepared at this stage. The contents herein are submitted to NEMA as required by law.
CHAPTER 2: LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK

2-1 International Conventions and Treaties

2-2.1 The World Commission on Environment and Development

The commission commonly referred to as “the Brundtland Commission” focused on the environmental aspects of development, particularly the emphasis on sustainable development that produces no lasting damage to the biosphere or to particular ecosystems. In addition, it also defined the concept of environmental sustainability, components of which include economic and social sustainability. Economically sustainable development is development for which progress towards environmental and social sustainability occurs within available financial resources. On the other hand, socially sustainable development maintains the cohesion of a society and its ability to help its members work together to achieve common goals, while at the same time meeting individual needs for health and well-being, adequate nutrition, and shelter, cultural expression and political involvement.

The proposals of this commission set the tone for environmental planning and management activities today. The focus on environmental and socio-economic sustainability is more apparent than ever, especially in the national policy and institutional frameworks. As such, an emphasis on sustainable development forms the basis for this study.

2-2.2 The Rio Declaration on Environment and Development

The Rio Declaration on Environment and Development, or Agenda 21 – a program of action for sustainable development worldwide – was adopted by more than 178 governments at the United Nations Conference on Environment and Development, also known as the Earth Summit, held in Rio de Janeiro, Brazil from 3rd to 14th June 1992. Principle No. 10 of the declaration underscores that environmental issues are best handled with the participation of all concerned citizens at all relevant levels. At the national level, each individual shall have appropriate access to information concerning environment that is held by public authorities. All states shall encourage and facilitate public participation by making such information widely available. Effective access to judicial and administrative proceedings, including redress and remedy shall also be provided.

The foregoing discussion is relevant to the proposed development because EMCA demands that the public must be involved before any development project that is likely to have adverse impacts to the environment is initiated by a proponent.
The Act has further established Public Complaints Committee (PCC) where the issues raised by
the public in regard to any proposed development can be addressed.

2-2 National Policies and Legislation

Kenya’s environmental policy and legislation are scattered in a multiplicity of resource and sector
specific laws and policy papers. The institutions and departments that deal with environmental
issues are equally numerous.
Sector specific laws are deficient in that they are characterized by fragmented and uncoordinated
sectorial legal regimes that are developed to facilitate resource allocation and to deal with
environmentally adverse effects of resource exploitation.

2-2.1 The Physical Planning Act (Cap. 286)

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

- Section 24(3): the Director may prepare a local physical development plan for the general
  purpose of guiding and coordinating development of infrastructure facilities and services for
  an area referred to in subsection (1), and for the specific control of the use and development of
  land or for the provision of any land in such area for public purpose.
- Section 25(b): a local physical development plan shall consist of such maps and description as
  may be necessary to indicate the manner in which the land in the area may be used.

According to Section 33 of the Physical Planning (Building and Development Control)
Regulations, the Director of Physical Planning shall refuse to recommend any new building or
proposed development, or alteration or addition to any existing building if:

- The proposal is not in conformity with approved development plan
- Such plan discloses a contravention of the physical planning (Building and
  Development) rules.
- The plans are not correctly drawn or omit to show information required.
- On such being required, a separate application accompanied by sets of plans has not
  been lodged in respect of buildings on separate plots or subplots
- The land or the proposed building or structure is not used for any purpose which might
  be calculated to depreciate the value of neighboring property or interfere with
  convenience or comfort of neighboring occupants
- The proposed building or land use is unsuitable, injurious to amenities or detrimental in respect of appearance or dignity or fails to comply with physical planning requirements in regard to siting, design, height, elevation, size, shape, structure or appearance
- The building is likely to become objectionable on environmental grounds
- Roads of access, parking bays, vehicular and pedestrian circulation spaces or other services to the plot or premises are inadequate
- The building is not sited in a satisfactory position
- The system of drainage, including soil, waste and surface water of the plot, or subplot upon which the building is to or stand, is not satisfactory
- Provision has not been made for adequate natural light and ventilation, or
- Any other physical planning issue

Section 36 of the Act (Cap. 286) further compels that if in connection with a development application, a local authority is of the opinion that proposals for industrial location, or any other development activities (such as building developments) will have injurious impacts on the environment, the applicant will be required to submit together with the application an Environmental Impact Assessment report.

The above provision compares well to Section 29 (a), which confers upon local authorities the powers to prohibit or control the use and development of land and buildings in the interests of proper and orderly development of its area.

2.2.2 The Public Health Act (Cap. 242)

This Act aims at achieving a clean environment free of any nuisance so as to promote public health and safety. For the interpretation of the Act, Section 15 (IX) indicates that any noxious matter or wastewater discharged from any premise – such as a building – constitutes nuisance.

It equally stresses that no person shall cause a nuisance to exist on any land or premise occupied by him. Because of the above, the Act acknowledges that it shall be the duty of all local authorities to take all lawful measures for maintaining its area of jurisdiction at all times in a clean and sanitary condition for remedy of any nuisance or condition liable to be injurious to health.

To safeguard against this, Part X of the Public Health Act states that, where in the opinion of the Medical Officer of Health that food stuffs within a warehouse or a building are insufficiently protected, the owner shall be compelled to observe the required regulations, else he shall be guilty of an offense.
2-2.3   The Building Code

This gives general guidelines for the construction of buildings and attendant safety measures such as installation of firefighting appliances, fire escapes etc. It equally recognizes local authorities as lead planning agencies and thus requires every developer to submit building plans to the relevant local authority for approval. The local authorities are in turn empowered to disapprove any plan submitted if it is not correctly drawn or does not provide sufficient information that complies with the relevant by-laws. Any developer who intends to erect a building, such as a residential block, must also give the concerned local authority a notice of inspection before the erection of the proposed structure.

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

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

2-2.4   The Penal Code (Cap. 63)

Enacted in 1930, the chapter on “Offences against Health and Conveniences” of the Penal Code strictly prohibits the release of foul air which affects the health of other persons into the environment. Any person who voluntarily violates the atmosphere at any place, to make it noxious to the health of persons in general dwelling or carrying out business in the neighborhood or passing along public ways is guilty of misdemeanor, i.e. imprisonment not exceeding two years with no option of fine.

2-2.5   The Environmental Management and Coordination Act No. 8 of 1999.

The Environmental Management and Coordination Act (EMCA) of 1999, and its attendant Environmental (Impact Assessment and Audit) Regulations of 2003 provides for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya.
Section 58 (I) has underscored that any person being a proponent of a project shall before financing, commencing or proceeding with construction submit an EIA report to the National Environment Management Authority (NEMA) of Kenya.

Section 68 (I) gives NEMA the mandate to carry out environmental audits of all activities that are likely to have significant impacts on the environment. It authorizes environmental inspectors, as appointed by NEMA, to enter in any premise and determine how far the activities carried out conform to statements in the EIA study.

2-2.6 The National Environmental Action Plan (NEAP)

The NEAP for Kenya was prepared in 1994. It was a deliberate policy to integrate environmental considerations into the country’s social and economic development process. The integration was achieved through a multi-sectorial approach to develop a comprehensive framework that ensures that environmental management and conservation of natural resources is an integral part of our societal decision-making process.

2-2.7 The Factories and Other Places of Work Act (Cap. 514)

The Act aims at making provision for the health, safety and welfare of persons employed in factories and other places of work. Section 13 states that every factory shall be kept in a clean state and free from effluvia, arising from any drain, sanitary convenience or nuisance. Effective and suitable provisions are also proposed for ensuring proper ventilation, such as maintaining the circulation of fresh air in each workroom. Section 36 provides for precautions with respect to explosive inflammable dust or gas. The Section is specific that where in any building, if dust that could escape to work man’s room and explode by ignition, steps must be taken to prevent such an explosion.

Section 41 compels that in every factory, there shall be maintained fire extinguishers, which shall be adequate and suitable in case of fire out-breaks. Similarly, it mandates every factory to provide adequate means of escape in case of fire outbreak for the employees. The Act further requires that if a factory worker is employed in any process involving exposure to wet or to any injurious or offensive substance, suitable protective clothing must be provided by the employer.

2-2.8 The National Shelter Strategy to the Year 2000

This strategy followed the international year of shelter for the homeless in 1987 and was formulated to advocate a change in policy in order to allow other actors to come in and assist the government in providing housing. The government was to simply facilitate other actors, such as the proposed housing developers, to invest in shelter.
2.2.9 **The Water Bill 2014**

This is an act of parliament that gives provisions on the regulation, management and development of water resources, water and sewerage services and for other connected purposes.

The fourth schedule of this act has effect with respect to abstraction of ground water and respective works. It states that a person shall not construct or begin to construct a borehole or well without having first given the authority notice of his or her intention to do so. It further explains that the person shall apply to the authority for a permit and shall comply with the requirements as may be imposed by the authority.

This act also gives guidelines under the fourth schedule on the proper conservation of ground water from contamination and pollution. It therefore states that the disposal of effluents or drainage from any household, stable factory, trade premises or oilier premises should be in such a manner that will prevent any such effluent or drainage from reaching the ground water.

**2.3 Institutional Framework**

The Environmental Impact Assessment for the proposed development is bound to be influenced by the operational interests of several lead agencies, whether exclusively or concurrently. These include, but not limited to the following key institutions:

2-3.1 **National Environmental Management Authority (NEMA)**

NEMA is the supreme regulatory and advisory body on environmental management in Kenya. NEMA is required to coordinate and supervise the various environmental management activities being undertaken by statutory organs with a view of promoting their integration into development policies, programs, plans and projects that provide sustainable development and a safe and healthy environment for all Kenyans. NEMA is equally mandated by the Environmental Management and Coordination Act to assess Environmental Impact Assessment reports and Environmental Audits and issue licenses of compliance/approval.

The key functions of NEMA through the National Environment Council include:

- Responsibility for policy formulation and direction for the purposes of the Act;
- Setting national goals and objectives and determining policies and priorities for the protection of the environment;
- Promotion of cooperation among public departments, local authorities, the private sector, non-governmental organizations and such other organizations engaged in environmental protection programs, and;
- Performing any such other functions as are assigned by the Act.
NEMA will remain in charge of coordinating all activities related to environmental management in the project area, such as enforcement of environmental impact assessments, as well as ensuring the preparation of environmental audits.

2-3.2 County Government of Nairobi

The County Government of Nairobi is the principle lead agency in all matters pertaining to physical development and development control within Nairobi County. County Government of Nairobi is empowered by the County Governments Act (2012) to carry out physical planning and development control within its area of jurisdiction.

2-3.3 Director of Physical Planning

The Physical Planning Act (Cap 286) established the office of the Director of Physical Planning, and defines the mandate of this institution. Of relevance to this study is that it acknowledges the establishment of the office of the Director of Physical Planning, who shall:

- Formulate national, regional and local physical development policies, guidelines and strategies;
- Be responsible for the preparation of all national, regional and local physical development plans;
- From time to time, initiate, undertake or direct studies and research into matters concerning physical planning;
- Advise the Commissioner of Lands and local authorities on the most appropriate use of land including land management such as change of user, extension of user, extension of leases, subdivision of land, and amalgamation of land, and;
- Require local authorities to ensure proper execution of physical development control and preservation orders.

2-4 Conclusion

The proposed project will be undertaken in adherence to the aforementioned relevant Laws and Legislations. The institutions guided by relevant policies and legislations must regulate urban development and planning projects. The above expression is envisioned as a basic principle component of coordinated and harmonious development in urban areas, and is one of the core pillars for attaining sustainable development. These provisions will therefore guide the proposed project.
CHAPTER 3: BASELINE INFORMATION

3-1 Project Location

The property is located along Ngong Road in Karen. It is approximately 2.5 km from the road. Appendix 1

3-2 Physical Environment

3-2.1 Climatic Conditions

Below is a summary of the climatic conditions of Nairobi where the proposed development is located:

i) Rainfall
Nairobi has a bimodal rainfall pattern, in which the maxima occur in March-April (long rains) and November-December (short rains). The simple rainfall regime is complicated by the uncertainty of rainfall from year to year. The average annual rainfall is 875mm, which may actually vary from 500mm to more than 1500mm.

The average daily temperature varies from 17°C in July/August, to 28°C in March. The maximum daily range of temperature is quite large – 10°C to 30°C – in May and February respectively.

ii) Temperature
The average daily temperature varies from 17°C in July/August, to 28°C in March. The maximum daily range of temperature is quite large – 10°C to 30°C – in May and February respectively.

3-2.2 Topography
The formation of the Rift valley has strongly influenced the geology and geomorphology of the Nairobi area. Nairobi region falls from the edge of the Rift Valley to the west with an elevation of 2,300 meters (7,500ft) to 1,500meters (5,000ft) to the east of the city, with the center itself at 1,700meters (5,500ft).

3-2.3 Geology and Soils
The geology of Nairobi has been dominated by rifting and volcanism associated with tectonic movements. The proposed site lies to the north-western side of the Nairobi CBD and has predominately red soil. This type of soil is well drained and stable.
3-2.4 Water Potential
Ndakaini, Ruiru, and Susumua dams are the principal sources of water for Nairobi. These dams are all on rivers emanating from the Aberdare Forest (one of Kenya’s five “water towers”). Several factors compromise the city’s water quality, ranging from natural phenomena such as the high fluoride content in groundwater, to anthropogenic factors such as poor wastewater treatment and environmental degradation both within the city and in the surrounding countryside. The Nairobi River Basin consists of three major rivers (Nairobi, Ngong’, and Mathare) whose catchments are found within the Kikuyu and Limuru Hills.

3-3 Socio-Economic Attributes

3-3.1 Population
The population in Nairobi County is 31,138,369 which is an increase from 2,143,254 after the 2009 census (KNBS). This explains that the rate that people are migrating to the County has increased. Therefore more residential places and commercial facilities should come up to cater for the increased population.

3-3.2 Economic Activities
Karen is one of the oldest residential areas offering a rich cultural and historical background evidenced in sites such as the Bomas of Kenya and Karen Blixen Museum as well as wildlife parks including Nairobi National Park, National Animal Orphanage, Sheldricks home, Ostrich Park, Giraffe Centre as well as the scenic Ngong hills in close proximity. Karen is also home to prestigious institutions such as Hillcrest, Brookhouse and Banda Schools private schools which provide all-round education based on an international curriculum. The Karen Hospital is also situated in this area.

3-4 Infrastructure and Utilities

3-4.1 Water Supply
The property is served by a trunk water line from Nairobi Water and Sewerage Company. The site borders Mbagathi River to the East and has a river frontage of 400m; there are currently 2 pump stations on site possibly used to supplement the water supply.

3-4.2 Foul Water Drainage
The project area is not connected to the Nairobi City Water and Sewerage Company trunk sewer system. Foul water is discharged into an on-site septic tank and bio digesters, with possible connection to the trunk sewer system in future. The septic tank and bio digesters are sited and designed to Nairobi City County standards.

3-4.3 Storm Water Drainage
Storm water from the development drains towards Mbagathi River.
3-4.4 Solid Waste Disposal
A private contractor shall be engaged for waste collection and disposal at designated Nairobi City County approved waste disposal sites.

3-4.5 Electricity Supply
The plot is already connected with electricity supply from Kenya Power Company.

3-4.6 Landscaping
The site is to be landscaped to plan so as to provide an aesthetically pleasant view. There will be green spaces within the compound. This will replace the trees and vegetation that will be cleared during excavation and site clearing stage.

3-4.6 Roads and Access
The proposed site shall be accessed through the fronting Ngong Road.
CHAPTER 4: NATURE AND DESIGN COMPONENTS OF THE STUDY

4-1 Overview

The proposed project is aimed at putting up integrated master plan which includes: town houses, serviced villas, a shopping center, a nursery school, clinic and recreational, center on Plot L.R NO. 5954/2 and L.R NO. 5830/7 (AMALGAMATED) in Karen, Nairobi County.

There will be 50 No. Serviced Villas on 10 hectares of land. Each villa will occupy approximately 0.2 hectares of land.

There will be 15 cottages occupying 0.6 hectares of land.

The Recreation facility will entail a swimming pool, a club, playgrounds, a tennis court and 5 conference centers.

The Nursery school, commercial facilities and community amenities will occupy 1.0 hectares of land.

There will be 9m wide internal roads within the development that will enable easy accessibility to the different facilities within the compound. There will be 3m and 4m wide walkways within the compound to provide safety and easy mobility for the pedestrians.

The development will also include a borehole and a Bio Digester occupying 0.1 hectares of land and it will also include open spaces and a utility plant within the compound as well.

The project site occupies 11.897 hectares (Approximately 29.4 acres).
PLATE 4-2 : A VIEW OF THE SITE

Source: Field work survey

PLATE 4-3: MBAGATHI RIVER

Source: Field work survey
4- 4 Construction of the proposed Integrated Master Plan

The proponent proposes an integrated master plan which includes town houses, serviced villas, shopping center, nursery school, clinic, recreational and conference center. A structural engineer will inspect the proposed structures to ensure they are structurally sound. Architectural drawings have been prepared to show the actual designs and layout of the proposed project. All drawings have been submitted to the relevant agents and are awaiting approval. The main works will involve: Clearing the site, Excavation, Building works, Plumbing works, Interior finishes, Electrical and mechanical works among others.

This will be an entirely new development starting from excavation, foundation, superstructure and other finishes. Detailed drawings of the proposed development have been attached as Appendix 5.

4-5 Driveway, Walkway and Parking Spaces

Paved driveways and walk ways shall be constructed to give a proper way on which to move for both people and vehicles. There will also be adequate parking provided on the Ground Floor in accordance to County Government of Nairobi parking requirements.
CHAPTER 5: PROJECT ACTIVITIES

5-1  Overview

The activities that will be involved in the development of the proposed project include:
- Hoarding
- Clearing the site and excavation
- Building works
- Plumbing and drainage works
- Electrical works among others
- Site landscaping

5-2  Site Preparation

i)  Hoarding

A hoarding will be erected around the plot.

ii) Gate and Dustbin Cubicles

A steel gate will be put up at the front of the property. There will also be covered waste receptacles protected from adverse weather conditions as well as scavengers.

iii) Site Clearance and Excavation

The site clearance entails removal of any obstructions on the way of the intended construction activity. The clearing process will not involve the use of heavy machinery or explosives.

The proposed site is currently vacant. However the existing vegetation on site will be cleared to pave way for the proposed development. In order to develop the proposed comprehensive development, excavation and earth works will be involved. The main method of excavation to be used is the trenching method in order to accommodate the building foundation/footing along the steep slope of the project site. The load bearing capacity of the underlying soil is stable and economical for construction of the foundation.

iv) Laying Out the Site

The site will then be laid out to identify the location of the proposed building on site. The corner points and edges of the proposed building units will be established accordingly. The marking out will use sticks and strings as well as chalk lines.
5-3 Construction of the Foundation

The foundation is that part of the building structure that is beneath the ground floor/basement level. The foundation includes the footing and foundation wall of a building. The depth of the foundation is to be determined on site but will not be less than 1200m deep. Strip concrete foundation will be to structural engineer’s detail. RC foundation walls are to be water proofed with approved water proofing agent to structural engineer’s detail. All RC foundations will be to the structural engineers’ details.

The area enclosed by the foundation walls is to be backfilled with compacted hardcore. The foundation shall not encroach on any neighboring plots or road reserves. Approved water proofing membrane DPM and anti-termite treatments are to be provided under the ground floor concrete slab.

5-4 Construction of Super Structure

i) Ground Floor Plan

The Ground floor slab level to be determined on site by the Architect.

ii) Walls

All walls to be reinforced with hoop iron at every alternate course.

iii) Doors and Windows

All materials for doors and windows shall be determined by the Architect.

5-5 Clearing of the Site

The site will be given a general cleaning after completion of construction activities and any leftover material and debris will be carted away. Similarly, any tools and equipment still on site will be removed.

5-6 Final Inspection

Final inspection will be undertaken to ensure that the project has been done properly and according to the terms of the contract. The inspection team will normally include the project proponent/client, the architect, the engineer and the contractor or their representatives. The inspection will normally start at the beginning of the construction to the end and look at every detail of construction, functioning of mechanical and electrical installations etc.
5-7 Decommissioning

Decommissioning is an important phase in the project cycle and comes last to wind up the operational activities of a particular project. It refers to the final disposal of the project and associated material at the expiry date of the project’s life span. If such a stage is reached, the proponent needs to remove all materials resulting from the demolition from the site.

The following should be undertaken to restore the environment:

- The site should be well landscaped by flattening the mounds of soil
- All the equipment should be removed from the site
- Fence and signpost unsafe areas until natural stabilization occurs
- Backfill surface openings if practical

The table below shows the proposed decommissioning plan.

Table 2: PROPOSED EMP FOR DECOMMISSIONING

<table>
<thead>
<tr>
<th>Expected Negative Impacts</th>
<th>Mitigation Measures</th>
<th>Actor</th>
<th>Time Frame</th>
<th>Cost (Kshs)</th>
</tr>
</thead>
</table>
| Proliferation of Solid Wastes e.g. scrap material and other debris | -Use of an integrated solid waste management system i.e. through a hierarchy of options.  
- The contractor will select disposal locations based on the properties of the particular waste generated. | Contractor | During decommissioning   | 300,000.00  |
| Disturbance of Flora and Fauna, Soil erosion, drainage problems | -Implement an appropriate re-vegetation programmed to restore the site to its original status. | Contractor | During decommissioning   | 150,000.00  |
- During the decommissioning period, appropriate surface water run off controls will be taken to prevent erosion.

- Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences.

<table>
<thead>
<tr>
<th>Accidents and Injuries on site.</th>
<th>- Fencing and signs restricting access will be posted to minimize disturbance of newly vegetated areas.</th>
<th>Contractor</th>
<th>During decommissioning</th>
<th>500,000.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td>950,000.00</td>
</tr>
</tbody>
</table>
CHAPTER 6: MATERIALS, PRODUCTS AND BY PRODUCTS

This section will look into the materials to be used, products and by-products including waste to be generated by the project and the method of disposal. Table 6-1 gives a summary:

Table 3: Materials, Waste generated and Disposal Methods

<table>
<thead>
<tr>
<th>Project Phase</th>
<th>Materials to be Used</th>
<th>Waste/By-Products Generated</th>
<th>Disposal Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Clearance</td>
<td>- Trucks</td>
<td>- Air fumes</td>
<td>- Used oil to be reused for lubricating movable parts of equipment e.g. wheelbarrows.</td>
</tr>
<tr>
<td></td>
<td>- Fuel</td>
<td>- Used oil</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Spare parts and lubricants oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Steel</td>
<td>- Used timber</td>
<td>- Contractors to dispose off-site.</td>
</tr>
<tr>
<td></td>
<td>- Cement</td>
<td>- Broken tiles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Paving slabs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Timber</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Nails,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Galvanized iron sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Gravel, sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Tiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Glass etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical &amp; Mechanical</td>
<td>- Electrical gadgets (Pipes, switches, electrical wire,</td>
<td>- Accidental breakages</td>
<td>- Contractors to dispose off-site.</td>
</tr>
<tr>
<td>Installations</td>
<td>etc.)</td>
<td>- Usable parts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Plumbing gadgets</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Storage tanks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>- Food stuff</td>
<td>- Domestic garbage</td>
<td>- Collected by a private contractor for final disposal.</td>
</tr>
<tr>
<td></td>
<td>- Plastic containers</td>
<td>- Waste water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Water</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Operation phase(Pharmacy) | -Syringes -Medicine | - Waste medicines  
- Packaging contaminated with medicines  
- Items used to handle and administer medicines, e.g. medicine-contaminated syringe bodies. | -Connect to bio digester tank  
- Incineration of medical waste  
- Land filling of the medical waste |

**EIA Study report for proposed Comprehensive development on plot L.R No.5954/2 and 5830/7(Amalgamated) along Ngong Road, Nairobi County**
CHAPTER 7: PUBLIC PARTICIPATION

7-1 Overview

The Consultation and Public Participation Process is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by EMCA 1999 section 58 on EIA for the purpose of achieving the fundamental principles of sustainable development. This chapter describes the process of the public consultation and public participation followed to identify the key issues and impacts of the proposed project. Views from the local residents and the business community who in one way or another would be affected or have interest in the proposed project were sought through interviews and structured questionnaires as stipulated in the Environment Management and Coordination Act, 1999.

7-2 Objectives of the Consultation and Public Participation (CPP) Exercise

The objectives of the Consultation and Public participation exercise were to:

1. Disseminate and inform the stakeholders about the project with special reference to its key components and location.
2. Create awareness among the public on the need for the EIA for the proposed project.
3. Gather comments, suggestions and concerns of the interested and affected parties.
4. Incorporate the information collected in the EIA study.

The public participation exercise enabled the establishment of a communication channel between the general public and the team of consultants, the project proponents and NEMA. The process also enabled the concerns of the stakeholders to be known to the decision making bodies at an early phase of project development.

7-3 Methodology used in the CPP

The environmental and social assessment public participation exercise was conducted by a team of experienced registered environmental experts through Key informants interviews and discussions, Field surveys and observations and Structured Questionnaires. In general, the following steps were followed in carrying out the entire CPP process:

- Identification of stakeholders interested in the project
- Compiling a database of the interested and affected parties
- Administration of questionnaires to different target groups and local community members neighbouring the proposed project site.
- Carrying out interviews with the key informants.
7.4 Results of the Public Consultations Exercise

Due to the enormous social and economic benefit of the proposed project, there was no objection towards the development of the proposed comprehensive development. This confirms that the project is suitable for the local area.

Table 4: Summary of pertinent issues raised by Stakeholders

<table>
<thead>
<tr>
<th>Name of Stakeholder</th>
<th>Contacts</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thelma M.</td>
<td>TEL: 0733571153</td>
<td>• It is a brilliant idea</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The project should be regulated by NEMA.</td>
</tr>
<tr>
<td>Joshua Nyange</td>
<td>Tel:0708424454</td>
<td>• It will be a productive project.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The project will increase the security of the area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• There should be no corrosive chemicals used</td>
</tr>
<tr>
<td>Wilfred Kamau</td>
<td>TEL: 0722715911</td>
<td>• We welcome the proposed project.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Good management of the project especially the recyclable materials.</td>
</tr>
<tr>
<td>Killu Bernard</td>
<td>TEL: 0723775015</td>
<td>• The area will open up for modern rural development.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• There should be no waste water discharge to existing water systems.</td>
</tr>
<tr>
<td>Fredrick Tewa Tsuma</td>
<td>TEL: 0712947810</td>
<td>• The project is good and helpful</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• It will bring unity to the community.</td>
</tr>
<tr>
<td>Stephen Nzioki</td>
<td>TEL: 0727450514</td>
<td>• It will create employment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The residents will be able to access services easily</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mbagathi River should be conserved.</td>
</tr>
<tr>
<td>KENYA PLANT HEALTH INSPECTORATE</td>
<td>TEL: 0709891000</td>
<td>• No objection on the coming up of the project</td>
</tr>
<tr>
<td>SERVICE(KEPHIS)</td>
<td></td>
<td>• Security measures should be put in place</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Economic activities will increase in the area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increase the use of exhausters.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Harvesting of rain should be encouraged.</td>
</tr>
<tr>
<td>Beatrice Njuguna(KCB)</td>
<td>TEL:0722646123</td>
<td>• It is a good thing since we will have more people around and bring business to KCB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The security should be monitored.</td>
</tr>
<tr>
<td>Boniface Oduor</td>
<td>TEL:0725735259</td>
<td>• The project will improve the economy of the surrounding.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• It will create job opportunities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Proper discharge of waste water from the project to avoid pollution of Mbagathi River.</td>
</tr>
<tr>
<td>Odera Ibram</td>
<td>TEL:0713209939</td>
<td>• It is a smart idea</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Appropriate measures should be taken to avoid any pollution.</td>
</tr>
</tbody>
</table>
7.5 Conclusion

From the foregoing, it is clear that the proposed project has actively involved the key neighborhood stakeholders who did not object to the development. The EIA report has taken into account mitigation measures that when implemented will ensure the mentioned negative impacts are contained. The stakeholders major concerns have been taken into account so as to ensure that any negative impacts to both the social and biological environments will be mitigated.
CHAPTER 8: THE POTENTIAL ENVIRONMENTAL IMPACTS

8-1 Impacts during Construction Process

Potential impacts of the proposed project have been considered and the assessment of the various parameters carried out in accordance with NEMA guidelines. Potential impacts of the proposed project have been considered and the assessment of the various parameters carried out in accordance with NEMA guidelines.

8-1.1 Positive Impacts

i) Income Opportunities

The development of the proposed comprehensive development will create business opportunities by providing market to suppliers during the construction process. It will also lead to creation of employment both directly and indirectly during the construction phase. Casual laborers, semi-skilled and skilled labor professionals such as town planners, supervising engineer, contractor staff and architects among others will benefit from the employment opportunities created by the proposed project.

ii) Optimal Use of Land

The construction activities will promote the local economy and inter-linkages. Construction materials and operating the project have associated fees levied. The fees are paid to different parties like the local government and individuals and in return it is used to boost the local economy.

iii) Revenue Generation

The various payments for permits, licenses and approvals for the project are direct revenue to the local and national governments.

8-1.2 Negative Impacts

i) Noise Pollution

This will mainly be from the common construction machinery used at the site. Continuous exposure to noise levels above 85db can cause damage to hearing leading to occupation deafness.
However, the level of noise from common construction machineries is expected to be low in this threshold. Regardless, all construction activity will be carried out during the day and sound-attenuated equipment will be used.

   ii) Air Pollution

There is likely to be pollution in terms of air and dust during the project’s operational phase. Air pollution is likely to be from vehicle exhausts during transportation of materials to the site. The movement of tracks is also likely to cause excess dust.

   ii) Sanitation and Health Hazards

There is likely to be littering during loading of refuse and uncontrolled human waste from workers on site. This can affect human and animal health, and will be appropriately mitigated.

   iii) Accidents and Safety Risks

On any construction site, the risk of accidents and other related safety concerns is high. This danger is posed to the workers on site as well as the adjacent residents and passers-by. Thus, there is need to put in place measures to protect them against falling debris and construction waste.

   iv) Mushrooming of Food Kiosks

Usually, such development projects have the potential of attracting unplanned commercial activities that come to take advantage of the increased trade prospects. This often leads to mushrooming of kiosks, which are attracted by the prospects of increased business, especially selling food. Some have a potential to pollute the environment owing to lack of sanitation infrastructure. The proposed project intends to provide room for onsite provision of such support services.

   v) Disturbance of Flora and Fauna

In order to develop the proposed development, excavation and earth works will be involved. The main method of excavation to be used is trenching in order to accommodate the building foundation/footing. This will mean cutting down of the existing trees and vegetation within the site. During earthworks, there will be disturbances and displacement of small animals and birds that have inhibited the vegetation in the property.
iv) Visual Intrusion

During construction, the main visual impacts would occur during earthworks for the foundation of the building. This impact would be generally be confined to the site.

vii) Soil Disruption

Since the proposed project development involves digging up of trenches (earthwork) for laying out the foundation and hard landscaping, this is likely to disrupt the soil compaction and layout leading to poor water infiltration and seepage. It might also lead to poor drainage.

8-2 Impacts during Operational Phase

8-2.1 Positive impacts

As discussed in the earlier sections of the report, there are numerous positive impacts that will be realized as a result of the successful execution of the proposed project. Some of these positive impacts include:

i) Strengthening of Local Economy

On completion, the development will lead to an influx of people in the area, hence bolstering local trade. This will have a positive impact on the economy and livelihoods of local communities.

ii) Overall Development

The proposed project will attract various support services, as well as create linkages to other necessary services. This in turn will promote the overall development of the project area.

iii) Optimal Use of Land

The proposed comprehensive development ensures optimal use of land. Considering that the proposed project site is currently vacant, and the scarcity of developed land in the area, the project enhances the returns on the limited developed land in this area.
8-2.2 Negative Impacts

i) Pressure on Existing Facilities

The proposed development is also likely to increase pressure on existing infrastructure such as roads and water supply. This would be due to increased human and vehicular densities in the project area.

iii) Proliferation of Uncollected Solid Waste

The proposed development is likely to contribute to an increased generation of solid waste. This has a potential of attracting disease vectors such as rats, flies, and cockroaches.

8-3 Impacts during Decommissioning Phase

The wastes produced during the decommissioning phase, if not well disposed off, can pose a threat to the environment and can be hazardous to both the people and kill the aesthetic nature of the area. These wastes include but not limited to:

- Paint - Cement and soil
- Sand, gravel and cement - Glass
- Crashed stones and ballast - Concrete tiles and slabs

The above wastes will be adequately cleared from the site to mitigate against any negative impacts.

8-4 Summary of Impacts

Environmental impacts can be positive or negative, direct or indirect. The magnitude of each impact is described in terms of being significant, minor or negligible, temporary or permanent, long-term or short-term, specific (localized) or widespread, reversible or irreversible. Some impact mitigation have already been addressed in the proactive design and other mitigation can only be guaranteed through active, responsible management, helped by following the guidelines in the project Environmental Management Plan.
These qualities are indicated in the assessment tables as follows:

**Table 5: Types of Impacts**

<table>
<thead>
<tr>
<th>Key</th>
<th>Type of Impact</th>
<th>Key</th>
<th>Type of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>++</td>
<td>Major positive impact</td>
<td>+</td>
<td>Minor positive impact</td>
</tr>
<tr>
<td>--</td>
<td>Major negative impact</td>
<td>-</td>
<td>Minor negative impact</td>
</tr>
<tr>
<td>0</td>
<td>Negligible/zero impact</td>
<td>NC</td>
<td>No change</td>
</tr>
<tr>
<td>SP</td>
<td>Specific/localized</td>
<td>W</td>
<td>Widespread</td>
</tr>
<tr>
<td>R</td>
<td>Reversible</td>
<td>ir</td>
<td>Irreversible</td>
</tr>
<tr>
<td>sh</td>
<td>Short Term</td>
<td>L</td>
<td>Long term</td>
</tr>
<tr>
<td>T</td>
<td>Temporary</td>
<td>P</td>
<td>Permanent</td>
</tr>
</tbody>
</table>

On the basis of the information gathered during the field study, potential environmental impacts of the project are tabulated below

**Table 6: Anticipated Environmental Impacts**

<table>
<thead>
<tr>
<th>Impacts on or due to</th>
<th>Construction</th>
<th>Occupation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollution:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Air/dust</td>
<td>T</td>
<td>ir</td>
<td>0</td>
</tr>
<tr>
<td>- Noise</td>
<td>T</td>
<td>ir</td>
<td>0</td>
</tr>
<tr>
<td>Site Drainage</td>
<td>0</td>
<td>++</td>
<td>Storm water from the site will drain towards Mbagathi River</td>
</tr>
<tr>
<td>Flora and Fauna</td>
<td>-</td>
<td>0</td>
<td>There will be minor destruction to flora and fauna habitat during excavation and landscaping</td>
</tr>
<tr>
<td>Public Health</td>
<td>-t</td>
<td>ir</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value 1</td>
<td>Value 2</td>
<td>Value 3</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Disturbance to the public</td>
<td>-t/*</td>
<td>-</td>
<td>Disturbance to the public would occur due to noise and dust during construction and traffic movement</td>
</tr>
<tr>
<td>Sites of Cultural, Historic or Traditional significance</td>
<td>0</td>
<td>0</td>
<td>There are no sites of cultural, historic or traditional significance</td>
</tr>
<tr>
<td>Visual Intrusion</td>
<td>-/t/p</td>
<td>+P</td>
<td>During construction, visual intrusion is attributed to construction works including construction traffic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>After construction the visual intrusion will be permanent. However this will be positive as the building will improve the aesthetic value of the neighborhood</td>
</tr>
<tr>
<td>Income generating opportunities</td>
<td>+t</td>
<td>++</td>
<td>During construction, there will be employment opportunities available to contractors and consultants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A significant amount of employees will also be employed during occupation e.g. solid waste management staff, guards, caretakers etc.</td>
</tr>
<tr>
<td>Construction Materials</td>
<td>+/-</td>
<td>0</td>
<td>Building stone will be required for construction. Other materials will include steel, tiles, pipes, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>All materials must be sourced from bona fide commercial suppliers, and undesirable, hazardous or otherwise banned materials should not be used.</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>-sh sp</td>
<td>-</td>
<td>Construction waste will be disposed of at approved County Government of Nairobi dump sites.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>During occupation, the generated solid wastes will be collected by a private contractor.</td>
</tr>
<tr>
<td>Clean up on completion</td>
<td>-sp</td>
<td>0</td>
<td>The contractor should ensure that when works are completed, the site is left clean and tidy.</td>
</tr>
</tbody>
</table>
CHAPTER 9: HEALTH, SAFETY AND ACCIDENT PREVENTION PLAN

9-1 Overview

There are no major peculiar anticipated accidents during the project cycle but the common accidents that can occur in any activity of this kind.

Table 7: Summary of anticipated accidents and the action plans

<table>
<thead>
<tr>
<th>Type Of Possible Accidents</th>
<th>Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers’ injury during construction</td>
<td>- First aid provision</td>
</tr>
<tr>
<td></td>
<td>- Maintenance of all machinery in good working condition at all times.</td>
</tr>
<tr>
<td></td>
<td>- Workers compensation</td>
</tr>
<tr>
<td></td>
<td>- Wearing of protective gear by the workers</td>
</tr>
<tr>
<td></td>
<td>- Proper training of workers on on-site safety measures</td>
</tr>
<tr>
<td>Fire outbreak (electrical etc.) during construction and occupation</td>
<td>- Train staff on safety and precaution measures of fire</td>
</tr>
<tr>
<td></td>
<td>- Provide and regularly maintain firefighting equipment</td>
</tr>
<tr>
<td>Robbery</td>
<td>- Install alarm systems</td>
</tr>
<tr>
<td></td>
<td>- Contract security firm to keep guard</td>
</tr>
<tr>
<td></td>
<td>- Avail electric security fence after construction</td>
</tr>
<tr>
<td>Road Accidents</td>
<td>- First aid provision</td>
</tr>
<tr>
<td></td>
<td>- Insurance cover</td>
</tr>
<tr>
<td></td>
<td>- Avail the necessary warning/caution signs</td>
</tr>
<tr>
<td>Drainage blockages</td>
<td>- Proper maintenance of drainage systems</td>
</tr>
<tr>
<td></td>
<td>- Responsible disposal of waste</td>
</tr>
</tbody>
</table>
9-2 Plans to Ensure the Health and Safety of Workers and the General Public

9-2.1 Noise

During the construction phase, noise will be produced by construction machines such as concrete mixers, grinders, excavators and the movement of construction vehicles to and from the site.

Mitigation measures:
- Sound-attenuated equipment will be used as much as possible
- People participating in the construction activities should be provided with Personal Protective Equipment (PPE) such as ear muffs for ear protection and their use thereof should be enforced.
- The consultants and contractors are requested to guarantee that the works are carried out in a proper manner and planning so as to minimize the impact of the construction in terms of noise.

9-2.2 Air Quality

The proposed development is not expected to emit fumes, dust or odor that it would affect the current air quality of the area. However, fumes Nitrogen Oxides (NOx) and Sulphur Oxides (SOx) generated from vehicles could be a major source of air pollutants, although it is not likely to cause any significant impact on the local air quality. It is however likely that during the construction phase, both the infrastructure and the building works might induce fumes and dust.

Mitigation measures:
- All equipment on site should be properly maintained and in good operating condition so as to emit minimal air pollution
- Masks to be provided to all personnel in dust generated areas throughout the period of construction
- The consultants and contractors are requested to guarantee that the works are carried out in a proper manner so as to minimize the impact of the construction on the air quality
- Proper maintenance of construction vehicles to minimize air pollution
9-2.3 Road Safety

Traffic will need to be controlled during construction especially with heavy vehicles turning and by enforcing speed limits for construction vehicles. Warning/caution signs should be erected at the site.

9-2.4 Public Disturbance

Noise disturbance to the public would occur during construction works including construction traffic. After construction the impact noise will be insignificant.

Mitigation measures:
- Warning / information signs should be erected when construction works are about to begin
- Construction activities should not be carried out at night
- Liaise closely with the local community

9-2.5 Public Health and Occupation Safety

During construction there will be increased dust, noise and air pollution levels. These are considered to be negative impacts, although for the public they would be minor. The workforce would be more exposed to these hazards.

Mitigation measures:
- Emergency Response Plans (ERPs) should be well understood and communicated to all concerned parties including the local inhabitants of the area
- Workmen should be provided with suitable protective gear (such as nose masks, ear plugs/muffs, helmets, overalls, industrial boots, etc), and there should be a fully equipped first aid kit on site
- The project proponent will avail sanitary facilities to the construction workers
- Information and education on the operation and management of the facility, including all the environmental aspects should be offered to all concerned for purpose of project responsibility as well as safety.

9-3 Site Organization

To ensure adequate health and safety conditions and prevent accidents on site, efforts will be made to have a clear site organization plan. These include:

- Developing a clear site organization plan and construction schedule
- Delivery and storage of material at appropriate locations
- Right size of staff/workers with clear work schedule and appropriate protective gear
• Control staff and vehicle movement on site and keep out unwanted persons
• Site office with safety kit
• Site toilet
• Adequate water supply for both construction work and worker use.

9-4 Project Team

In order to ensure proper organization of activities during plan, design and construction of the project, there must be appropriate project team. These include:
• Town / physical planner
• Environmental Impact Assessment Expert
• Project Architect
• Structural / Civil Engineer
• Service Engineers
• Quantity Surveyor
• Land Surveyor

9-5 Enforcement of Standards and Legal Requirement

The project must ensure that appropriate standards and legal requirements are met. These include:
• That the building works are in accordance to approved Architectural drawings and plans
• That building operations to meet the building code specifications
• That requirements of the Factory Workers Act are followed
• That requirements of the Public Health Act are followed
• That requirements as outlined in the Environmental Action Plan are observed

9-6 Activities of Workers

The following activities by workers are clearly identified and must be closely monitored and organized to ensure health, safety and accident standards on site:

• Pushing of wheel barrows
• Hand packing of stones on road surface
• Lifting and laying of building material – stone, concrete etc.
• Plastering of walls
• Bending, cutting and laying of reinforcement steel
• Other general building works
9-7 Activities by Machinery and Light Equipment

The activities of machinery and plant must also be properly organized and monitored in order to ensure high health and safety conditions and to prevent accidents. The machinery to be used on site include:

- Compacting machine
- Vibrators
- Concrete mixer
- Small size hoist machine
- Goods truck
- Tipper

9-8 Insurance

The project proponent and building contractor will take appropriate insurance cover for the various project activities and personnel and/or workers.
CHAPTER 10: ENVIRONMENTAL MANAGEMENT/MONITORING PLAN

10-1 Introduction

Environmental management and monitoring involves, among others, the putting in place of sustainable environmental mitigation measures and monitoring plans. It is essential that the project is both environmentally friendly and appreciated by local residents. As already noted in chapter Eight of the report, the implementation of this project will have a lot of positive impacts on the local community, which will include creation of employment directly or indirectly.

10-2 Environmental Monitoring and Evaluation

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

Section 68 (2) of EMCA empowers NEMA to appoint an inspector who may enter any land/premises to determine adherence to EMP and any other conditions that may have been issued with an EIA license. Section 68 (3) requires the proponent to keep accurate records of the project and make annual audits which should be submitted to NEMA. The Lead EIA/EA expert is equally charged with a responsibility to ensure that the EMP is fully implemented and that any unforeseen impacts are mitigated and advice the proponent accordingly.
Table 8: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN FOR THE PROPOSED COMPREHENSIVE DEVELOPMENT

<table>
<thead>
<tr>
<th>Project Phase</th>
<th>Project Activities</th>
<th>Potential Impacts</th>
<th>Mitigation Measures</th>
<th>Means of Monitoring</th>
<th>Actor</th>
<th>Estimated Cost (Kshs)</th>
</tr>
</thead>
</table>
| Construction Phase| Construction of the proposed comprehensive development | - Air Pollution  
- Noise Pollution | - Exposed stockpiles of e.g. dust and sand, will be enclosed, covered, and watered daily, or treated with non-toxic soil binders  
- All workers on the site will be required to wear appropriate protective clothing while on duty  
- All personnel working on the project will be trained prior to starting construction on methods for minimizing air quality impacts.  
- Ensure that the appropriate way leaves and setbacks (as indicated in the survey plan) are adhered to | Regular checks | Contractor | Included in development cost |
|                   | Construction of the Foundation             | - Oil Spillage  
- Noise  
- Dust  
- Soil destruction | - Ensure use of serviceable vehicles  
- Ensure removal of all materials brought in during construction | Regular checks | Contractor | Included in development cost |
|                   | Construction of the superstructure         | - Oil spillage.  
- Noise  
- Soil destruction | - Ensure NO oil spillage occurs  
- Ensure use of manual labor and hand tools | Periodic checks | Contractor | Included in development cost |
<table>
<thead>
<tr>
<th>Building works</th>
<th>Procurement and Transportation of construction materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Dust</td>
<td>- Oil Spillage</td>
</tr>
<tr>
<td>- Noise</td>
<td>- Material spillage</td>
</tr>
<tr>
<td>- Worker accidents</td>
<td>- Littering the site</td>
</tr>
<tr>
<td>- Health infection</td>
<td>- Soil compaction</td>
</tr>
<tr>
<td></td>
<td>- Heavy vehicle traffic</td>
</tr>
<tr>
<td>- Employ skilled and trained workers and provide protective clothing</td>
<td>- Ensure NO spillage occurs</td>
</tr>
<tr>
<td>- Prepare clear work schedule.</td>
<td>- Ensure the use of serviceable vehicles</td>
</tr>
<tr>
<td>- Have adequate worker insurance cover</td>
<td>- Ensure no littering of the open spaces</td>
</tr>
<tr>
<td>- Provide sanitation facilities and clean drinking water</td>
<td>- Ensure safe storage of materials</td>
</tr>
<tr>
<td>- Enforce occupational health and safety standards.</td>
<td>- Construction vehicle drivers will be under strict instructions to minimize unnecessary trips</td>
</tr>
<tr>
<td>- Adequate collection and storage of waste will be provided on site, and safe transportation to, and display methods at designated areas.</td>
<td>- All trucks hauling soil, sand and other loose materials shall be covered</td>
</tr>
<tr>
<td></td>
<td>- Traffic speed of construction/ other vehicles will be restricted to not more than 15 mph</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regular checks</th>
<th>Contractor</th>
<th>Included in development cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regular checks</td>
<td>Contractor</td>
</tr>
</tbody>
</table>

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_EIA Study report for proposed Comprehensive development on plot L.R No.5954/2 and 5830/7(Amalgamated) along Ngong Road, Nairobi County_
<table>
<thead>
<tr>
<th>Operation Phase</th>
<th>Storm water discharge flowing towards the Mbagathi River</th>
<th>- If not well managed could lead to flooding and property destruction</th>
<th>- Ensure the storm water drains flow towards the Mbagathi River.</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual environmental Audit</td>
<td>- Noncompliance with the provisions of EMCA (1999) could result in closure of the facility.</td>
<td>- Undertake initial environmental audit after completion</td>
<td>- Undertake annual environmental audit of the development in compliance with the EMCA 1999</td>
<td>Annually</td>
<td>Property manager</td>
<td>50,000.00 p.a</td>
</tr>
<tr>
<td>Proliferation of solid wastes</td>
<td>- Bad odor</td>
<td>- Wastes to be collected regularly to control air pollution and vermin/insects etc.</td>
<td>- Provide proper solid waste disposal and collection facilities</td>
<td>Regular checks</td>
<td>Property manager</td>
<td>20,000 per month</td>
</tr>
<tr>
<td></td>
<td>- Destruction of the aesthetic value of the property</td>
<td>- Resource recovery will be encouraged once the project takes off so as to shrink waste stream and recover non-recyclables</td>
<td>- Availability of dustbin cubicles protected from rain and animals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Negative impact on human health</td>
<td>- Wastes will be collected by a licensed operator to avoid illegal final dumping at unauthorized sites</td>
<td>- All persons involved in refuse collection shall be in protective gear</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation Phase</td>
<td>Medical Waste</td>
<td>Decommissioning Phase</td>
<td>Public Health and Occupation Safety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>-----------------------</td>
<td>-------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Improper medical waste disposal and treatment can lead to health risks like cancer and also environmental risks like water pollution.</td>
<td>-Pharmaceutical waste will be placed in pharmaceutical waste containers labeled “incineration only” so that they can be visible from any lateral direction. The containers should also be color coded to differentiate the pharmaceutical waste from the hazardous pharmaceutical waste.</td>
<td>-Ensure all hazardous areas are marked</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Pharmaceutical waste including syringes will be placed into a sharps container or chemo container at the point of generation, stored in a utility room and then transported to a central holding area.</td>
<td>-Provide safety regulations and first aid kits in visible accessible areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Pharmaceutical waste will be managed and disposed of by the pharmacy according to procedures specific to the medication type.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-A permitted contractor will transport and incinerate the hazardous pharmaceutical waste generated by the clinic.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Regular checks**

**Property manager**

**20,000 per month**

**Periodic checks**

**Property manager**

**50,000.00 p.a**
| Waste Water Disposal | If not properly managed could compromise sanitary hygiene of the building and the pollution of the Mbagathi River | - The proposed comprehensive development shall be connected to the bio digester  
- Regular checks of the sewer line to ensure it is in proper working condition | Periodic checks | Property manager | Inclusive in development cost |
|---------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------|----------------------|-----------------------------|
| Water wastage       | Leaking taps and hose reels.                                                                                     | - Installation of pressurized faucets  
- Management of water usage  
- Change all water valves that are leaking  
- Avoid unnecessary wastage of water  
- Ensure all firefighting equipment are in good working condition | Periodic checks | Property manager | 60,000.00 p.a |
| Demolition activities | Flora and fauna disturbance                                                                                     | - Implement an appropriate re-vegetation programed to restore the site to its original status.  
- Appropriate surface water run off controls will be taken to prevent surface erosion.  
- Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences | Contractor | 950,000.00 |
| TOTAL               |                                                                                                                  |                                                                                                                  |                  |                      | 1,180,000.00 |

*EIA Study report for proposed Comprehensive development on plot L.R No.5954/2 and 5830/7(Amalgamated) along Ngong Road, Nairobi County*
CHAPTER 11: APPRAISAL OF ALTERNATIVE DEVELOPMENT OPTIONS

11-1 Overview

A thorough assessment shows that the negative impacts likely to be caused by the project can be mitigated successfully. Various alternatives of the proposed development are appraised in this chapter.

11-2 No Development Investment

The nil intervention describes a situation in which the proponent does not undertake the proposed building development. This option would imply economic loss to the proponent, as well as to the local and national economies. The proponent will continue paying land rent and rates for a piece of land that is not earning income. The locals would lose in terms of employment generation as this would be foregone if the site is not developed. The cost of labor is estimated at KShs.200,000,000.00 (Two hundred million only). The Central Government would also lose the tax income that would be generated by the project if implemented.

11-3 Relocation Option

The other option available for the project implementation is for the proponent to relocate it to an alternative site. At the moment, the proponent does not have an alternative site. This implies that they have to buy another piece of land elsewhere. Looking for land of the similar size and market location and completing official transactions might take over one year, with no guarantee that the land would be available, and if such land is available, its cost might be beyond affordable for the proponent. The proponent will have to restart the planning, design, and approval of the project afresh. The proponent will need to re-engage professionals like EIA lead/audit experts and physical planners to assess the viability of the new site. New costs will also arise from seeking an EIA approval from NEMA for the new site at 0.1% of development cost to the authority.

In a year’s time, the cost of labor and construction materials would have increased tremendously given the current high inflation rate in the country. This could lead to a situation like zero option and the project may no longer be viable leading to eventual abandonment. The standoff will discourage local and international investors from investing in industrial and/or construction industry.
11-4 Exploration of Alternative Land Uses

From the field survey it was established that industrial use cannot be compatible with the existing developments in the neighborhood since it is predominantly a residential area. The commercial facility and recreational facilities will blend well with the current land use since there are similar facilities 1km away from the site.

11-5 Conclusion

The alternative option analyzed has implications, which makes the current design option proposed by the proponent to be more viable. It is concluded that:

- The alternative is likely to lead to noise and air pollution to the surrounding and it would not be compatible to the surrounding residential developments.

- There are several residential, commercial and recreational establishments in the neighborhood whose construction the County Government of Nairobi has approved. The proposed development will therefore blend easily with the current developments in the area.

11-6 Potential Negative Impacts and Mitigation Measures

The potential negative impacts and possible mitigation measures for the proposed building development are summarized on the table below:
Table 9: Potential Negative Impacts and Mitigation Measures

<table>
<thead>
<tr>
<th>Potential Negative Environmental Impacts</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Air/Dust Pollution</td>
<td>2-1 All machinery and equipment should be maintained in good working condition to ensure minimum emissions including carbon monoxide, oxides of nitrogen and sulphur.</td>
</tr>
<tr>
<td></td>
<td>2-2 Masks should be provided to all personnel in dust generating areas throughout the period of construction.</td>
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<tr>
<td></td>
<td>2-3 The project site should be enclosed by dust screens to minimize the effects of construction-related dust on surrounding users.</td>
</tr>
<tr>
<td></td>
<td>2-4 Exposed stockpiles e.g. of sand should be enclosed, covered and watered daily, or treated with non-toxic soil binders.</td>
</tr>
<tr>
<td>3. Site Safety</td>
<td>3-1 Construction of adequate hoarding around the existing buildings prior to commencement of any works.</td>
</tr>
<tr>
<td>- Construction Debris</td>
<td>3-2 Clear placement of signage to warn pedestrians and surrounding users of threat of falling debris.</td>
</tr>
<tr>
<td></td>
<td>3-3 Provide and regularly maintain adequate firefighting equipment.</td>
</tr>
<tr>
<td>- Fire Safety</td>
<td>3-4 All site staff to be trained on fire safety procedures, emergency response and use of firefighting equipment.</td>
</tr>
<tr>
<td>- Worker Safety</td>
<td>3-5 Establish fire assembly points.</td>
</tr>
<tr>
<td></td>
<td>3-7 Install a fire alarm.</td>
</tr>
<tr>
<td></td>
<td>3-8 Prepare comprehensive Accident Response Plan prior to commencement of construction.</td>
</tr>
<tr>
<td></td>
<td>3-9 All workers should be trained on proper accident response procedure prior to commencement of construction.</td>
</tr>
<tr>
<td></td>
<td>3-10 Strictly enforce adherence to on-site safety.</td>
</tr>
<tr>
<td>Section</td>
<td>Procedures</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>All workers to wear appropriate PPE while on site</td>
<td></td>
</tr>
</tbody>
</table>
| 4. Solid Waste Management | 4-1 Construction waste will be disposed of at approved County Government of Nairobi dumpsites and by properly registered private contractors.  
4-2 Waste to be sorted and disposed of in accordance to Legal Notice 120 of 2006, Waste Regulations.  
4-3 Waste generated during the project operational phase will be collected by a private contractor for final disposal  
4-4 Provide covered receptacles for waste disposal and storage throughout the project site  
4-5 All persons involved in waste collection and disposal shall be in appropriate PPE |
| 5. Disruption of existing natural environment and modification of micro-climate:  
- Increased development density  
- Obstruction of ventilating wind  
- Increased surface run-off | 5-1 Development restricted to approved density – building line, plot coverage and plot ratio  
5-2 Careful layout and orientation of buildings to respect wind and sun direction  
5-3 Minimum use of reflective building material and finishes for roof, wall and pavement  
5-4 Reuse of excavated soil for landscaping and planting trees and flowers to restore part of the biodiversity within the site |
| 6. Traffic Management | 6-1 Provide adequate on-site parking  
6-2 Construction vehicles shall be under strict instructions to minimize unnecessary trips  
6-3 Traffic speeds for construction and other vehicles coming to and from the project site shall be restricted to 15 mph |
CHAPTER 12: PROJECT BUDGET

12-1 Overview

The total project cost is estimated at KShs. 1,000,000,000 (one billion only).

12-2 Capital Investment Costs

The main capital investment costs relate to: Site preparation, Excavation, Building structure, External works and Finishes.

12-3 Professional Fees and Labor Costs

The project involves lawyers, town/physical planners, environmentalists, architects, engineers, quantity surveyors etc. It is estimated that 20% of the project development cost will be allotted for labor charges. A labor force will also be employed. The total professional fees and labor costs is estimated at KShs. 200,000,000.00 (Two hundred million only).

12-4 Cost of Materials

Cost of construction materials is estimated to take 60% of the total development cost. This can be therefore approximated at about KShs. 600,000,000.00 (Six hundred million only).

12-5 Project Time Schedule

The whole project cycle from inception, planning and design, and construction is estimated to take 1½ Years. The construction period is estimated to take 15 months.
CHAPTER 13: CONCLUSION AND RECOMMENDATIONS

13-1 Conclusion

Completion of the project will have very high positive social and economic impacts on the area. In the new vision of a Nairobi Metropolitan region, the project is definitely a step in the right direction. Its completion will provide 50 No. Serviced Villas, 5 Conference Centers, a Nursery School, Clinic and a Recreational Centre which consists of a club, play grounds and cottages. Implementation of the proposed project will provide employment opportunities for local residents as well as contribute positively to the local economy.

13-2 Recommendations

- That the National Environment Management Authority does consider, approve and grant the required Environmental Impact Assessment License to the proponent of the proposed development with respect to Plots L.R. No. 5954/2 and 5830/7 (Amalgamated) situated in Karen, Nairobi County.

- That the County Government of Nairobi does support this application for Environmental Impact Assessment License by the proponent for the proposed development with respect to Plots L.R. No. 5954/2 and 5830/7 (Amalgamated) situated in Karen, Nairobi County.

- That the Director of Physical Planning does support this application for Environmental Impact Assessment License by the proponent for the proposed development on Plots L.R. No. 5954/2 and 5830/7 (Amalgamated) situated in Karen, Nairobi County.

- That the study report here now presented is sufficient and meets the requirements of the Environmental (Impact Assessment and Audit) Regulations 2003.
REFERENCES

1. Republic of Kenya (1999); The Environmental Management and Coordination Act

2. Republic of Kenya (1996); The Physical Planning Act (Cap 286)

3. Republic of Kenya (1996); The Physical Planners Registration Act (No. 3 of 1996)


6. R.S Ambasht, P.K Ambasht 1999; Environmental and Pollution (An Ecological Approach)
APPENDICES

Appendix 1

Location Map
Appendix 2

- Property Ownership Documents
APPENDIX 3

- Respondents Location Map
- Returns from Public Consultations Exercise
APPENDIX 4

Current Practicing License for the Lead Expert
APPENDIX 5

Architectural Drawings for the Proposed Comprehensive Development