ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY FOR THE PROPOSED AFFORDABLE HOUSING PROJECT ON PLOT: L.R. NO. DAGORETTI/RIRUTA 66/8877 NAIROBI COUNTY, DAGORETTI SOUTH SUB COUNTY OF NAIROBI COUNTY

PREPARED BY:

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PROPONENT

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SEPTEMBER 2021

CERTIFICATION

We, the under signed, hereby approve that all information given here in this study report is accurate and true according to the best of our knowledge and understanding.

PRELIMINARY PROJECT DETAILS

Location of Project:	L. R. No. Dagoretti/Riruta 66/8877, Wanyee Estate, Ngando Ward, Dagoretti South Sub-County, Nairobi County
GPS Coordinates:	Latitude: 1°17'49.57" S Longitute: 36°45'6.03" E
Neighbours:	Residential Development Properties such as Tsavo Skywalk
Nature of Proposed Activity:	Affordable Housing Project
Project Proponent	Suekem Ventures Limited
Contact Person:	Mr. Murugesan
Position of Contact Person:	Finance Director
Email:	*jm@amsproperties.com*
Telephone Number	+254733612239
Date of ESIA:	September 2023

Signature.....**Date**....24/10/2023.....

For Project Proponent

Official Stamp

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT EXPERTS

This Environmental and Social Impact Assessment (ESIA) Study Report has been prepared by a team of experts from Devlink Resources Consultants as per the Environmental Management and Coordination Act No. 8, 1999 (revised 2015), the Environmental (Impact Assessment and Audit) Regulations, 2003 (Legal Notice No. 101) and the provisions of the Legal Notice Number 31 and 32 of 2019 for submission to the National Environment Management Authority (NEMA) to enable review and necessary advice.

PATRICK KITUTA: (Lead Expert)

BONIFACE MWANIKI: (Associate Expert)

Signature: ..... **Date**.....25/10/2023.....

For ESIA Experts

Official Stamp

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Signature: ……..…..… Date……

For ESIA Experts

Official Stamp

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SUMMARY

The Proponent (Suekam Ventures Limited) is planning development and operation of an affordable housing project comprising of 1074 housing units on his piece of land within Wanyee Estate, Ngando Ward, Dagoretti South Sub-County, Nairobi County. As a preliminary legal requirement, and for preparation purposes, the proponent has commissioned an Environmental Consulting Expert (the consultant) to carry out an ESIA Study of the proposed development to evaluate the project's potential impacts on the environment and on the socio-economic parameters in the area. The Assessment has been conducted to full completion in accordance with the Environmental Management and Co-ordination (Amendment) Act (EMCA), 2015 and the Environmental (Impact Assessment and Audit) Regulations (Amendment), 2019.

This ESIA Study addresses both environmental and socioeconomic issues concerned with the development, operation or decommissioning of the proposed blocks of affordable housing units. The proponent aims to construct three fourteen floor blocks of affordable housing units. Each block will consist of 360-housing units of different sizes, hence a total of 1084 units. The project will comprise of a total of 401-bedsitters, 315-one-bedrooms and 358-two bedrooms. The construction will take an average of 30months to completion.

The world over, construction activities impact to the environment in one way or another, be it the social, economic, biological or physical environments. Such impacts should be checked to avoid or reduce any negative effects to the environment, the general public and its health. With improved infrastructure in the form of housing provision, there is bound to be a rise in business opportunities leading to increased population. Increase of population, be it temporary (during construction as a result of labor import) or permanent (as a result of employees or tenants to reside/operate from the proposed development), is likely to stretch services and other facilities in and around the project area. Measures should be put in place to ameliorate against any potential negative impacts and maximize on any positive ones. All the above concerns call for such a project to be subjected to an EIA.

According to the Environmental Law of Kenya, Section 58 of the Environmental Management and Coordination Act (EMCA) 1999 (Amended in 2015), Legal Notice No. 101 of 2003 (revised in 2016) and Legal Notice Number 31 an 32 of 2019, a project of this magnitude is supposed to be subjected to an ESIA Study. Procedural guidelines on the ESIA Study are spelt out in Legal Notice No. 101 and Legal Notice Number 31 and 32 of 2019. The procedural steps involved in this assessment are as follows:

- Baseline Studies, Identification of key stakeholders, Consultation and public participation
- Scoping and development of the Terms of Reference (ToRs)
- Analysis of project alternatives
- Impacts identification and analysis and Development of mitigation measures

- Development of the Environmental Management Plan (EMP)

Objectives of the EIA are to:

- Consider all possible positive and adverse social, economic and environmental impacts of the proposed project
- Conduct a comprehensive public consultation
- Develop the baseline information of the project location
- Design and prepare mitigation measures and action plans to address all possible significant negative environmental impacts.
- Prepare an ESIA Study Report for consideration by the National Environmental Management Authority (NEMA) and necessary advice thereafter

In Kenya, ESIA has to be conducted according to the requirements of EMCA. An ESIA Study document submitted to the enforcement authority, NEMA, enables the issuing of an EIA License. When properly designed and implemented, ESIA is a powerful tool for ensuring that environmental issues are given due consideration during project design, allowing the benefits of the project to be maximized, while reducing the potential environmental and social costs of development. Thus, all due care should be taken into account to ensure that the environment of the project area is not disturbed in a way that could affect the living standards and styles of the surrounding people in a negative manner.

The ToR for the ESIA were to establish baseline conditions, conduct a comprehensive public consultation impact assessment, development of mitigation measures and an ESMP with respect to the environment, socio-economic and community participation, physical environment, energy, environmental health/public health and safety, analysis of legislative and institutional framework for environmental management in Kenya, and analysis of project alternatives. It was also required to establish institutional needs to implement the recommended action plans.

The preliminary findings during the public consultations with project site immediate neighbors and stakeholders indicated that the general public within the project area has a mixed feeling towards the project, with most of them in support of the project as long as: they are involved, it is transparent, their livelihoods are taken care of, and they are fully sensitized on what the project involves, while others have a feeling that it will lead to too much activity in the area, something which could affect their privacy and sense of place, just to mention but a few.

A number of project alternatives were considered in the assessment. These included the “no project” alternative. Although this would lead to preservation of the environmental conditions, this alternative was the

least favorable if we are to seriously consider the economic advantage of the proposed project. Potential Decommissioning phase impacts include loss of direct and indirect employment, demolition waste, noise pollution, dust and exhaust emissions, occupational health and safety hazards. The EMP that was developed for this ESIA Study report outlines the actions that are required to address the identified potential negative impacts, responsibility, implementation stage, costs and relevant regulations/standards to guide monitoring and auditing of the effectiveness of the proposed mitigation measures.

The proposed project offers many significant positive impacts at the local, regional, national and even international levels. The anticipated positive impacts include: direct and indirect employment generation, increase in revenue collection, increased business opportunities, promotion of enterprises and above all, increase in the much-needed housing facilities in the City of Nairobi. Being a multi-storey project in an urban set up, it offers some potential avenues for a better environment such as the following:

i. **Environment -** The potential reduction in environmental impacts through a reduced '*ecological footprint'* and reduction in transportation energy make high-rise living issues critically important in today's context with regard to urban environment. In the urban context, tall buildings such as the proposed ones provide great potential for renewable energy generation. For example, wind energy, as wind density increases with altitude, and even tapping of solar energy as few obstructions from either trees or other buildings exist etc.

   Through the study of an ecologically sustainable storey-building design (green buildings), construction and operation issues, and giving representative solutions, the project aims to ensure that energy and water savings and harvesting strategies are incorporated in the proposed design. This will ensure that we continue to work towards commitments to Carbon Dioxide (CO_2) emission reduction, whilst continuing to maintain the highest standards of internal living conditions for the project occupants.

ii. **Social** - High-density city housing is a priority for urban centres not only in Kenya, but all over the world. Given the increasing demand for city housing for residential houses, high-rises have an important role to play in the regeneration of our cities. This project will highlight the key requirements for a 'socially sustainable' storey house in terms of privacy, accessibility, etc. by understanding the potential social impacts of high-rise living. The project will also explore how present technologies, such as enhanced security systems, and services can add to the quality of life. The project through its dissemination strategy will try and remove the stigma being attached to storey blocks due to their un-safety in case of emergencies and embrace ways to design socially acceptable storey houses.

iii. **Economic -** The project aims to understand the key factors influencing initial cost, whole life cost and rental value of high-rise residential flats. The project will present approximate costs of sustainable strategies, such

that the clients and developers can appreciate the economic benefits and understand that sustainable storey houses are a profitable and affordable proposition.

Radical technological interventions could be employed to ensure the development of truly sustainable storey residential houses. Particular building technologies and features that are currently used in storey house construction, and which could be applied to this particular project, to enhance their sustainability include:

- Natural ventilation/ Natural day-lighting
- Balconies, terraces and sky-courts
- Sustainable and renewable energy systems including photovoltaic panels and wind turbines
- Maximised floor plan space
- Sky gardens and vertical landscaping
- Variety of facilities
- Low embodied energy and construction processes

On the other hand, potential significant negative environmental impacts of the proposed project may affect environmentally sensitive areas such as underground water sources, air quality, humans and their cultural properties. The potential social impacts could include loss of sense of place, lack of privacy and increased traffic. The main issues are geographically limited, well defined, and well understood in Kenya. Thus, the proponent's major task in respect of the ESMP is to properly manage the potential negative impacts while enhancing the positive ones to ensure a project that is economically, socially and environmentally sustainable.

It is hoped that the information presented in this report will be used to evaluate whether the proposed project is likely to have significant negative socio-economic and cultural impacts. It will also inform the decision to license/approve its implementation or to deny permission for its establishment by the Authority. It is anticipated that the proposed development will bring substantial economic and social benefits to the local residents. In addition, most impacts will be of a temporary nature during the construction phase and can be avoided with implementation of the recommended mitigation measures.

The proposed project could be approved for implementation provided that the proponent adequately incorporates measures to mitigate the potential negative impacts while enhancing the potential positive impacts as well as implementing the ESMP.

1. THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

1.1 Introduction

The Proponent has put aside some funds to develop his piece of land within Wanyee Estate, which is a suburb of the Capital City of Nairobi. The land parcel to be developed is registered to Suekem Ventures Limited, Plot No. Dagoretti/Riruta 66/8877 Nairobi County. The proponent aims to construct three fourteen floor blocks of affordable housing units. Each block will consist of 360-housing units of different sizes, hence a total of 1084 units. The project will comprise of a total of 401-bedsitters, 315-one-bedrooms and 358-two bedrooms. The construction will take an average of 30months to completion.

In this regard, the proponent has commissioned an Environmental Consulting Expert (the consultant) to carry out an ESIA Study of the proposed development to evaluate its benefits and/or impacts to the local residents and on the environment both in the short term and in the long term. The Assessment has been conducted to full completion in accordance with the Environmental Management and Co-ordination (Amendment) Act (EMCA), 2015 and the Environmental (Impact Assessment and Audit) Amendment Regulations, 2019.

This is the study report of an ESIA for the proposed project in accordance with Section 58 of EMCA, Legal Notice No. 101 of 2003 (Revised in 2016) and Legal Notice Number 31 and 32 of 2019. The purpose of the ESIA is to provide information on the nature and extent of potential environmental and social impacts that could arise from the construction and operation of the proposed project and all related activities taking place concurrently.

1.2 Environment Impact Assessment Methodologies

The scope of this ESIA Study was guided by the requirements in EMCA and in particular by the Environmental (Impact Assessment and Audit) Regulations, 2003 (Amended in 2016). EIA is the systematic examination conducted to determine whether or not a program, activity or project will have any adverse effects on the environment. According to the Canadian Environmental Assessment Agency (2004), EIA provides the following benefits: *"an opportunity for public participation; increased protection of human health; the sustainable use of natural resources; reduced project costs and delays; minimized risks of environmental disasters; and increased government accountability".* The objective of ESIA Study is not to force decision makers to adopt the least environmentally damaging alternative because if this were the case, few developments would take place. However, ESIA is just but one of the issues addressed by decision makers as they seek to balance the competing demands of development and environmental protection. The ESIA Study will also assist the government through NEMA to advice the project proponent via licensing on whether the project should be implemented or not, and if it should proceed, then under what conditions. It also provides a monitoring guideline for the project management to act upon. A wide range of methods were used in the various stages of the ESIA Study. They included methods used by the various specialists for:

- Scoping of key issues and development of the ToRs for the assessment
- Carrying out the various baseline studies
- Stakeholder analysis, Consultation and public participation
- Impact analysis and the development of an EMP.

The purpose of the scoping exercise was to capture issues that required investigation in the ESIA Study process. The scoping was conducted in a number of consultative meetings with individuals within the project area. Previous reports of the project area were key sources of secondary data to review habitat; demographic and settlement; the physical environment; historical archeological monuments and cultural heritage. The review of literature has included work done by government Lead Agencies and Local and International Non-Governmental Organizations (NGOs). These assessments have formed the background information for the present ESIA Study.

1.2.1 Data collection procedures

For this Study, the Consultant undertook environmental screening and scoping in order to focus the environmental assessment study more appropriately and also avoid unnecessary data and resource wastages. The data collection will be carried out through standard one-on-one engagements, public participation, stakeholders interview, environmental and social baseline surveys, literature reviews, observations and photography and desktop studies of secondary sources of information, where necessary in the manner specified in Part V (section 31-41) of the Environmental (Impact Assessment and Audit) Regulations, 2003.

Environmental screening and scoping was undertaken to identify all potential impacts that might result from implementation of the proposed development. This activity was also aimed at determining the need for an environmental impact assessment study and what level of assessment was necessary. Issues considered included the physical location, sensitive areas, area of influence and nature of anticipated impacts. The scoping process helped the consultant to identify most critical issues requiring attention during the assessment where environmental issues identified were categorized into physical, ecological, social, economic and cultural aspects. The project falls under the medium risk category of projects and does not exceed 100 units hence, requires a summary project report to be undertaken.

1.2.2 Site Survey and Stakeholder Engagement

Site Assessment and Stakeholder participation was conducted on various dates, as stated below:

i. Site reconnaissance visit and survey, which included observation and photography on the 6th September 2023.
ii. Key informant interviews (face to face engagements) with key stakeholders and public consultation meetings held on the 18th and 25th September, 2023 and a third one on the 2nd October 2023.

Site survey through observation and photography enabled physical inspection 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 ESIA Study process, structured questionnaires were administered in line with one-on-one interviews with key stakeholders as well as holding three public consultation meetings. The neighboring households were majorly considered for the exercise. Discussions with key stakeholders as well as interviews with neighbours were key sources of primary data for this study. All the information gathered is incorporated into this report in the public participation section and the questionnaires attached to the appendices.

Desktop studies were used to gather more secondary information regarding the proposed project as well as the project site. This included documentary review on the nature of the proposed activities, project designs and the environmental setting of the area among others

1.3 Objectives of the Study

The objective of the ESIA Study is to provide the Authority (NEMA), with sufficient environmental information and the project details that will be used during the decision making process to authorize/approve its implementation. The information provided will also provide sufficient environmental and social safeguards to ensure that the proposed project is compliant during its implementation and operation. The Assessment is expected to achieve the following objectives:

i. To identify all potential significant Environmental and Social Impacts of the Proposed Project and recommend measures for mitigation;
ii. To assess and predict the Potential Impacts during the project design, Site Preparation/Pre-Construction, Construction Phase, Operational phase and Decommissioning phase of the project;
iii. To generate a Baseline and propose mitigation measures to be implemented during the project cycle;
iv. To gather recommendations and concerns from project affected persons especially immediate neighbours with the aim of integrating such into the implementation of the proposed development;
v. To develop an ESIA Study Report inclusive of an ESMP for the proposed development to be submitted to NEMA for environmental and social decision making.

1.4 Scope of the Assessment

The Kenya Government policy on all new projects, programmes or activities requires that an ESIA be carried out at the planning stages of the proposed project undertaking to ensure that significant impacts on the environment and socioeconomic fabric are taken into consideration during the design, construction, operation and decommissioning of the project. The second schedule of EMCA Amendment Act, 2015, Legal notice no 31, provides a comprehensive framework of categorization of projects that require environmental assessments while legal notice no 32 of the same schedule outlines the framework of undertaking such assessments and

reporting procedures. The Consultant shall conduct analyses/assessment following those guidelines which shall detail the positive and negative effects resulting from the development of the proposed project on the environment, and prepare an ESIA Study report recommending appropriate solutions to minimize any undesirable effects resulting from construction and operation of the proposed affordable housing project. The analyses shall include, but not limited to the following:

- Description of project baseline;
- Description of project details;
- Disturbance of vegetation, and proposed plans for re-vegetation;
- The prevention of soil erosion and sedimentation;
- The presentation of health hazards arising from potential pollution as a result of the project;
- Measures for the rehabilitation of construction materials;
- Health and sanitation of facilities used by those in the construction site;
- Assessment of the impact on demographic factors;
- Identify potential environmental impacts that could result from the project;
- Occupational Safety and Health concerns;
- Carry out public participation and consultations on the positive and negative impacts of the project;
- Propose Mitigation Measures to the identified adverse environmental and social impacts;
- Development of ESMP with associated costs.

1.5 Legal Justification

Under the NEMA ranking criteria for ESIA studies, legal notice no 31, the proposed 1074-unit affordable housing project falls under Category C Projects. Such projects are characterized as having high environmental/social impacts/risks. Such impacts could however, be effectively mitigated through standard and locally recognized measures. A high risk ESIA Study Process is therefore anticipated for this project which will result to an ESIA Study Report. The Study Report will provide sufficient information to NEMA for decision making. The Consultant will coordinate the entire ESIA Study and any related institutional support matters. The ESIA Study will be carried out to full completion in line with NEMA Regulations as specified in section 58 of EMCA, 2019 (Amended) Cap.387 and other relevant legislations. The ESIA Study report will be submitted to the proponent for consideration and approval before it is submitted to NEMA.

1.6 Need for the Project

Development in housing delivery has been supported by the government through encouraging creation of relevant housing institutions, developing relevant by-laws and regulations and putting in place an appropriate framework for housing delivery. Encouraging the participation of the private sector in housing delivery for the different socio-economic groups is a sure guarantee of providing housing for a large percentage of the population. From 2004, the Government of Kenya (GoK) redefined its role in housing delivery (GoK, 2003; GoK,

2006). This has been through the different ways for example coming up with a new housing policy after a hiatus of forty years. The government of Kenya supports different means of housing delivery. The latest of which is the re-enactment of the grade two building by-laws and regulations for the development of slums, developing relevant Acts of Parliament, developing policies and providing the necessary political goodwill. Before 2003 successive regimes in Kenya were unwilling to allocate housing the necessary importance that it deserves. The responsibility of the delivery of housing for the public servants has always been moved between the different government ministries. The only other time that the department would be involved would be during the formulation of the government documents on housing. From 2003 onwards, the government has shown its commitment to housing, which was recognized as a key area in development. The government has changed its role to that of an enabler, partner and catalyst in the housing delivery process (Central Bureau of Statistics, 2002; GoK, 2003; GoK, 2006). The government's involvement in housing development has taken different ways which include formulating a new housing policy that was released in 2004, and embarking on upgrading slums and urban informal settlements under Kenya Slum Upgrading Program (KENSUP) (*GoK, 2003; UN-Habitat, 2003*). This new housing role of the GoK is clearly stated in the 2006 housing policy (GoK, 2006). The government is to be concerned with nurturing an environment that would prompt potential investors to engage in housing delivery. This includes facilitating the private sector by enacting relevant Parliamentary Acts on housing and finance, promoting housing development and enabling both the low and middle income to access housing. The Housing Act aims at creating an institution that would be a one-stop housing delivery agent on behalf of the government (GoK, 2006). It replaced the then Housing Act Cap 117 of the Laws of Kenya that mainly covered the operations of the National Housing Co-operation (NHC), a state-owned body. Also, the government has embarked on redeveloping affordable low-income mass housing across several settlements especially within Nairobi (Ochieng, 2007). It is against this backdrop that the proponent proposed to put up affordable housing units in the form of three blocks of flats in Wanyee area in Dagoretti area of Nairobi County.

1.6.1 Housing as a Human Right

Housing is a Human Right in as much as air and/or water. Like food, even those who cannot afford it need it perhaps much more than those who can, because the latter could be in it for the investment returns. By its nature, housing represents a major investment requiring a substantial capital outlay. In the majority of housing projects, the developer, whether as a corporate or individual, has to recognize the time value concept of money.

1.6.2 The Gap

There is a glaring gap between the demand and availability of affordable middle- and upper-class housing in the more affluent sections of urban centers. It is against this backdrop that areas near cities and urban centers have attracted an interest in housing property development. Land Tenure, Financing, Legal Framework, Building Materials and Appropriate Technology seem to be the greatest challenges to affordable housing in both rural and urban areas. Invariably they generate informal settlements in towns and rural areas alike.

1.6.3 Informal Housing

Housing is described as informal when it does not conform to the laws and regulatory frameworks set up in the environment in which it occurs. It can be informal at several levels. Housing can be provided through construction firms that are not licensed and whose work is not subject to guarantees. In turn, the housing is not likely to conform to the planning and building regulations in force or to be built in areas where there is no need to conform or outside of city boundaries. Housing that does not conform to rules may do so in several ways, including:

i. Being built on land intended for another use (even though the building itself may conform to the standards laid down in the regulations);
ii. Not conforming to all of the standards laid down for that part of the city;
iii. Not being subject to planning permission or building inspection (even though it may be eligible);
iv. Being built on land not owned by the occupier and without permission of the owner.

Formal housing can become informal by the process of extension and alteration (transformation) by users without permission, or in ways that do not fulfill stipulated standards. This is now very common in government–built estates all around the world, as well as private dwellings in cities in Kenya as demand for housing continues to outstrip the supply by far. The conceived project is designed to be within character of the current housing trend in the area.

1.6.4 GoK Policy and Regulatory Framework on Housing Delivery

Through the years the GoK has been guided on its role in housing delivery by successive *ad hoc* documents aka Sessional Papers and by the five tear development plans. Applications of these documents have been guided by the 1968 Building By-laws and Regulations. There is NEMA, created through an Act of parliament, EMCA that became effective in 2002 and amended in 2015. Before commencement of any work on housing or any type of construction it is mandatory that NEMA approval is sought and obtained. Finally, there is the Housing Authority to be created under the Housing Act (GoK, 2006). This will oversee the entire housing delivery. Before the release of the 2004 Housing Policy, the only existing one was the 1966/67 Housing Policy that had been put in place by Charles Abrams through the sponsorship by the United Nations (UN). This has since been overtaken by pace of developments. In the 2004 Housing Policy, the government's role has been restated (GoK, 2003). It limits its participation to that of an enabler. Also, it lays emphasis on sustainability. In terms of the regulatory framework, there are the necessary Building By-Laws and Regulations. These are for adoption by the local authorities. Kenya is committed to progressive realization of the right to adequate housing for all its citizens. It is the Government's long-term objective to move towards a situation where every individual or family lives in decent affordable housing, whether publicly or privately developed. The National Housing Policy for Kenya of 2004 states that:

> *"Improvement of housing for the Kenyan population is a major concern to the Government. This concern has been influenced by the fact that the improvement in housing stock is a strategically important social and*

economic investment. In addition, well planned housing and infrastructure of acceptable standards and affordable cost when combined with essential services affords dignity, security and privacy to the individual, the family and the community as a whole. Adequate shelter also prevents social unrest occasioned by depravity and frustrations of people living in slums and informal settlements. Besides this social function, housing is also an investment good contributing both directly and indirectly towards poverty reduction by employment generation, raising of incomes, improved health and increased productivity of the labour force" (GoK 2004).

Making adequate and affordable shelter available to all is the key mandate of the Ministry of Housing. The GoK recognizes that its citizens need the "Houses Now" and proposes to develop the market using the key measures outlined in the Housing Policy. The GoK believes that housing is an instrument of poverty reduction and therefore, would like to adopt a holistic approach to the housing sector. As a part of this strategy, the Government is working towards increasing the disposable income of households; making serviced land available; promoting low cost and rental housing - especially for the poor; and enhancing access to appropriate financing instruments. The Government recognizes the ingenuity exhibited by the urban poor in their quest for shelter. Their pragmatic approach will be harnessed and put to maximum utility through community-based strategies for shelter and urban development. Among other things, the policy aims at facilitating increased investment by the formal and informal private sector, in the production for low and middle-income dwellers. The estimated current urban needs are 150, 000units per year, which can be achieved if the existing resources are fully utilized by the private sector with the enabling hand of the government. It is estimated that the current production of new housing in urban areas is only 20, 000-30, 000 units annually, giving a short fall of over 120, 000 units per annum. The shortfall in housing has been met through the proliferation of squatter and informal settlements and overcrowding. To alleviate the huge shortfall of urban housing mentioned above and to curb the mushrooming of informal settlements/slums, various interventions and strategies have to be adopted. In the policy paper, the government correctly accepts the fact that it cannot meet the housing shortfall on its own and that the best policy is to encourage the private sector to chip in while the government provides an enabling environment for development. The government will provide an enabling environment by doing the following:

- Facilitating the supply of serviced land at affordable prices in suitable locations.
- Expanding and improving infrastructure facilities and services.
- Using research findings as well as innovative but cheap conventional building materials and technologies to improve production of housing units.
- Harmonizing the Banking Act, the Building Society Act, the Insurance Act and the various Acts and By-Laws that have so far proved to be a hindrance to the sourcing of housing finance.
- Generally easing the path of funds from the private investor/government to the development project and issuing workable guidelines on Estate Management and Maintenance.

The promotion of this development is therefore well within the government current and long-term policies of ensuring housing for all by 2030.

2. PROJECT LOCATION, DESCRIPTION AND BASELINE INFORMATION

2.1 Introduction

This chapter provides the main features of the baseline biophysical and socio-economic information of the project area.

Environmental description, also known as baseline studies, is intended to establish the present state of the environment, taking into account changes resulting from natural events and from other human activities (Glasson, 1994; Canning et al., 2003). If an environmental description is flawed, this will reduce the accuracy of subsequent predictions and mitigation measures (Canning et al., 2003).

2.2 Project Location

The proposed project is located in Wanyee estate, Ngando ward, Dagoretti North Sub-county, Nairobi County, 1.1Kilometers from Dagoretti corner shopping center, next to Mwaka Estate, and Tsavo Skywalk block of residential apartments.

Figure 1: Location of the proposed project site on Google maps (2023).

The site is easily accessible via a tarmac road from Naivasha road through Wanyee Road. The road network in the area is upgraded to tarmac making it easy for movement and transport. The site is next to Tsavo Skywalk Block of Residential Apartments.

Figure 2: The proposed project site next to Tsavo Skywalk Residential Apartments to the right

2.3 Project Details and Components

The housing development is meant to offer high standard and affordable housing units as that which exists in the area. The proponent aims to construct three fourteen floor blocks of affordable housing units. Each block will consist of 360-housing units of different sizes, hence a total of 1084 units. The project will comprise of a total of 401-bedsitters, 315-one-bedrooms and 358-two bedrooms. The construction will take an average of 30months to completion.

2.3.1 Objectives

The main objective for the proposed development is to provide adequate, high standard and affordable housing units for the people within Dagoretti South Sub-county and the Nairobi City County at large. The objective is in line with the Government of Kenya's agenda to improve the housing conditions of her citizens. Other objectives are to improve business in the area and contribute to economic growth of the country as well as creating employment opportunities for the locals within Wanyee Estate.

2.3.2 Activities

The project is proposing to construct three fourteen-storey blocks to be used for rental housing within Wanyee Estate and for residents within Nairobi. It will consist of 1074 units of different sizes. The project scope will involve;

a) Laying of the foundation
b) Construction of component Units
c) Installation of piping and electric
d) Roofing and Landscaping

Note that the site is open and covered by grass only.

Material input for the construction are presented in the table below while the main project output will include: Construction waste (cement bags, stone chips, wooden wastes, metallic wastes); Waste associated with personnel (domestic wastes-accessories, waste paper, plastics); Noise emissions from construction material, delivery vehicles, among others. The management of the undesirable outputs is discussed in depth in the impact identification and mitigation chapter.

Table 1: Project inputs

Project Component	**Activities**
Foundation work	Soil excavation and backfill
Leveling	Stone Chips, Ballast and Concrete
Component units	Construction using locally available material; ballast, stones, cement, metals, concrete, sand and gravel as well as water etc.
Electric and piping installation	Skilled electrical engineer and plumber: electric cables and wire, pipes
Landscaping	Architect; collection and proper handling/disposal of construction debris and material, leveling, re-vegetation

2.4 Utilities

The proposed project will require other utility inputs including water and energy supply during its lifecycle. Water in the area is scarce and currently underground aquifers are the most appropriate and convenience alternative sources of fresh water for domestic consumption. The proponent should seek the Water Resources Authority's consent in the event that a borehole would be required for the facility. However, the consultant recommends investing in water harvesting technologies such as roof catchment to supplement water supply within the premise. But to be noted is that the area is connected to the municipal water supply mains. Energy use and consumption is currently a major topic for discussion around the globe especially in relation to climate change and related discourses. It is upon the proponent to ensure energy efficiency for the project and more preferably invest in green energy. The governments grill supplies the area with electricity but other alternatives can be sought to supplement and improve energy efficiency. Such can include the use of solar energy for security lights for example and creating awareness to the personnel in access of the property to only switch on machines, lights etc. when necessary.

2.5 Sewerage System

Wanyee area is connected to the municipal sewer line and reticulation system for the management of waste water and sewage, which the proponent considers draining into the municipal drainage system.

2.6 Sensitive areas

The screening and scoping exercise established that the nearest stream is 600m away. It was also noted from the physical characteristics of the flowing water that it was highly contaminated presumably with fecal matter, organic matter and inorganic material. The proponent is advised to ensure that the activities of the proposed development do not in any way contribute to further contamination of the stream.

2.7 Conformity to Zonation Plan

Wanyee Estate is a residential area comprising of different housing units some of which incorporate small scale businesses such as shops, eateries, warehouses, supermarkets, carwash and kiosks, all of which area for providing essential necessities to the residents. The tallest building spotted nearest to the project site is a fourteen-storey residential building. There are other ongoing similar projects in the locality aimed at providing affordable shelter to the locals. The proposed development therefore blends well with the zonation planning of the area.

Figure 3: A view of some of the neighboring similar residential properties

2.8 Environmental and Social Baseline

2.8.1 Introduction

Environmental Baseline Study is vital in predicting and evaluating potential environmental impacts of a proposed development. The Baseline Study aided in understanding the existing environmental conditions thus defining the focus of the environmental impact analysis and resources that need protection through appropriate and viable mitigation measures.

The Baseline study process entailed the scoping exercise which covered, but not limited to issues such as climatic conditions, drainage and water resources, soils, flora, fauna, land use, land tenure and socioeconomic aspects. Baseline environmental information is assembled through collection and analysis of existing data as well as carrying out specific field studies.

2.9 Biophysical environment

2.9.1 Climate

The rainfall pattern of the project area is similar to most other areas within Nairobi where bi-modal distribution is experienced. The rainy seasons are from March to May and mid- October to mid- December. The average rainfall is 950 millimeters. The climate is humid highland subtropical in character with seasonal dry and wet periods.

2.9.2 Temperature

Temperatures are highest during the months of January to mid-March before the onset of the long rains. The temperature is lowest in the months of June and July. Average annual temperatures range from 12^{o}C to 26^{o}C with average minima and maxima of 10^{o}C - 12^{o}C and 22^{o}C - 24^{o}C respectively. Average potential evaporation is between 1,450 and 2,200mm per year.

2.9.3 Rainfall

The proposed project site is located in an area that receives a bi-modal rainfall pattern with heavy rain in the months of March to May and short rains in the months of October and December. However, it should be noted that rainfall patterns have drastically changed and are unpredictable due to global warming effects all over the world. This region receives an average rainfall of 950millimeters annually, where the lowest downpour is experienced in October while the month of April receives the highest amount of rainfall.

2.9.4 Vegetation Cover

The project location is within a tropical/subtropical climatic zone. However, any wildlife expected to be found in such a climate is no longer in existence due to vast infrastructural development in the area. The land is currently a residential area with only buildings. There exist some exotic trees scattered in the locality mainly of eucalyptus species. The proposed site has no vegetation cover currently and is secured by a perimeter wall.

Figure 4: Proposed project site

2.9.5 Geology

The terrain in the proposed site location is gently rolling but divided by gently sloping valleys and small hills. The main types of soils are black cotton and red soils that form patches in different parts of the area. The black cotton soils are dominant in Dagoretti area.

2.9.6 Socio-Economic Environment

Description of the socio-economic environment involved an analyses of the administrative boundaries, demography (population estimate & projections), economic structure and labour, commercial sector, agriculture, community infrastructure, transport, perceptions of the local community over the proposed facility, energy sources, natural resources (economic minerals) and utilities (power, communication, water supply and quality etc.).

According to the Kenya Population and Housing Census conducted in 2019, The total population in the country was 47,564,296 of which 23,548,056 were Males, 24,014,716 females, and that of Nairobi City was approximately 4,397,073. The capital city's population has grown by 40 per cent in the last 10 years from 3,138,369 in 2009, the 2019 census data reveals. This now means Nairobi accounts for 9.2 per cent of the country's total population. In 2009, there were 1,605,230 females in Nairobi compared to 1,533,139 males. In 2019, the number has risen to 2,192,452 females and 2,204,376 males. Embakasi Sub-county recorded the highest population in Nairobi with 988,808 people. It is followed closely by Kasarani at 780,656. Njiru is third with 626,482, Dagoretti fourth with 434,208, Westlands (308,854), Kamukunji (268,276), Starehe (210,423), Mathare (206,564), Langata (197,489), Makadara (189,536) and Kibra being last with 185,777. The average household size in Dagoretti stands at 2.8.

2.9.7 Infrastructure

The proposed development occurs at a predominantly residential area with few amenity infrastructure including churches, schools and hospitals. The proposed site is near the Aqua-wells Venture Limited which is the common public landmark in the area and the sole fresh water distributor and supplier. A tarmac road (Ngina road) serves the area making transport easy and a cabro fitted road leads to the project site.

2.9.8 Water and Sewerage

The area is connected to the county sewer line that follows the natural drainage through the area. Majority of the households are connected to the municipal sewerage and reticulation system and the developer intents to do the same. Unfortunately, the municipal county council does not supply water for domestic use in the area.

2.9.9 Social Economic Activities

The neighbourhood depicts a population with different ethnic residents the Majority of whom are Kikuyus. There is no much difference in cultural activities practiced in the area. The area is predominantly a residential area with vast residential infrastructure and few support facilities. Economic activities are common in the area with small scale business enterprises including food kiosks, groceries and shops incorporated within the residences.

2.9.10 Land Use

The area is a residential area with few economic activities taking place. It is therefore in a residential type of land use

3. ENVIRONMENTAL LEGISLATION IN KENYA

2.1 Introduction

Kenyan Acts of Parliament which mention the environment and/or natural resources are numerous. But some are more direct than others, and thus indicate certain critical areas of legal intervention in the management of natural resources and the environment. A prominent feature of Kenya's environmental legislation is its diffuse nature with provisions being contained in about 77 statutes. Most of the statutes are Sectoral either by the natural resources such as fisheries, water, forestry and wildlife, or by the functional sectors such as public health, agriculture, factories, mining, shipping or chiefs' authority.

2.2 General Overview

Kenya has a policy, legal and administrative framework for environmental management. Under the framework, NEMA is responsible for ensuring that ESIAs are carried out for new projects and environmental audits on existing facilities as per EMCA. ESIAs are carried out in order to identify potential positive and negative impacts associated with the proposed project with a view to taking advantage of the positive impacts and developing mitigation measures for the negative ones. The guidelines on ESIAs are contained in sections 58 to 67 of the Act. According to section 68 of EMCA, The NEMA is responsible for carrying out ESIAs on all activities that are likely to have a significant effect on the environment. ESIA is a tool for environmental conservation and has been identified as a key requirement for existing facilities to ensure sustainable operations with respect to environmental resources and socio-economic activities in the neighbourhood of the facilities. The government has established regulations to facilitate the process on EIAs and environmental audits. The regulations are contained in the Kenya Gazette Supplement No. 56, legislative supplement No. 31, Legal Notice No. 101 of 13th June 2003 (Amendment 2016). In order to ensure that the proposed project activities conform to existing policies and laws, a number of key statutes were examined. This enabled the identification of specific provisions of various relevant laws that need to be adhered to. These included the following:

- Constitution of Kenya (2010)
- Environmental Management Principles and Guidelines
- National Environmental Action Plan 2009-2013(NEAP 2009-2013)
- Environmental Management and Coordination Act No. 8 of 1999 (Amended in 2015)
- Environmental Impact Assessment and Audit Regulations 2003.
- Occupational Safety and Health Act (OSHA) 2007.
- County Government Act, 2012 (Amended in 2014)
- Physical Planning Act, (Revised Edition, 2012).
- Local Authority Act (cap 265).
- EMCA (Waste Management) Regulations, 2006 Legal Notice No.12.
- The Public Health Act, Cap 242.
- Noise and Excessive Vibrations Pollution Control Regulations 2009.
- Climate change policy

2.3 Constitution of Kenya (2010)

Article 42-Environment* of the Constitution** indicates that every person has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefits of present, future generations through legislative and other measures; particularly those contemplated in Article 69, and have obligations relating to the environment fulfilled under Article 70[1]. ***Article 43-Economic and social Rights indicates that every person has the right to accessible reasonable standards of sanitation.

2.3.1 Rationale for Environmental Provisions within the Constitution

The provision for legal and institutional mechanisms is one of the basic conceptual tools for environmental management. Further, considering that the environment supports life, it requires protection that is stable and can only be changed, if necessary, by a special and substantial majority. These Constitutional provisions for environmental management are not new, and already exist in other countries. Environmental provisions were outlined, albeit superficially, in the previous constitution of Kenya. The constitution's innovation is the presentation, in greater detail, of obligations in respect of specific natural resources, as well as the human aspects of environmental management. Environmental provisions are included in Chapter Four, under 'Rights and Fundamental Freedoms', Chapter Five, under 'Environment and Natural Resources', and Chapter Ten, under 'Judicial Authority and Legal System'. The Fourth Schedule also includes environmental provisions under 'Distribution of functions between National and County Governments' and the Fifth Schedule titled 'Legislation to be enacted by Parliament'.

2.3.2 Rights and Fundamental Freedoms

Environmental rights and freedoms are presented in Article 42 of the new constitution, which states:

> *Every person has the right to a clean and healthy environment, which includes the right– (a) To have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and (b) To have obligations relating to the environment fulfilled under Article 70.11*

The right to a clean and healthy environment was merely implied in the previous (1964) constitution under the 'right to life' (Section 71) since the constitution did not contain explicit environmental provisions. The improvement made in the 2010 constitution is first and foremost, the statement that a clean and healthy environment is everyone's right, as well as further elaboration on what exactly is meant when conferring this right. The right to a clean and healthy environment was previously acknowledged in EMCA. However, the elevation of this right to constitutional status has only been achieved in the new constitution.

2.3.3 Environment and Natural Resources

These are elaborated in Chapter Five, titled 'Land and Environment' which consists of two parts, the first dedicated to land, and the second to environment and natural resources. The second part, the main focus of this paper, is titled 'Environment and Natural Resources' and consists of four Articles detailing obligations, enforcement, agreements and legislation relating to the environment.

[1]LAWS OF KENYA, *The Constitution of Kenya, 2010* (Attorney General Nairobi, 2010), http://www.wipo.int/edocs/lexdocs/laws/en/ke/ke019en.pdf.

2.3.4 Obligations in Respect of the Environment

i. Sustainable Environmental Management

These obligations are found in Article 69, which consists of two parts and provides guidance to the State on its role in sustainable management of the environment in Kenya. The commonly used definition of 'sustainable development' is derived from the 1983 United Nations World Commission on Environment and Development (WCED), which produced the Brundtland Report (named after the Chairman) and also referred to as 'Our Common Future'.[5] This report's significance lies in the fact that it was the first to focus on global sustainability. More specifically, sustainable development was defined as '… *meeting the needs of the present without compromising the ability of future generations to meet their own needs*…' 'Vision 2030', Kenya's long term national planning strategy, also emphasizes the need to achieve economic growth in a sustainable manner. Article 69 (a) of the new constitution, by stating '*The State shall ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits*', acknowledges the role of the state in ensuring sustainable development as well as the importance of equitably sharing benefits derived from the environment.

ii. Tree Cover

Forests in Kenya, like those elsewhere in the world, are unique in their contribution to environmental balance, as well as economic and socio-cultural functions. Nonetheless, they are victim to increasing demand for products and services, competition with other land uses, and poor governance. Kenya's present forest cover is equivalent to 5.9% of land area, which is inadequate to significantly contribute to the national economy while fulfilling environmental and socio-cultural functions. The Kenya Forest Services, in its Strategic Plan 2014-2018, proposes to sustainably manage the forests through the combined use of ecological, economic and social approaches, guided by the Forest Conservation and Management of 2016, and in cooperation with the relevant institutions, including the Ministry of Forestry and Wildlife. Article 48 of EMCA outlines the procedure regarding registration of forests. Specifically, the Director General of the NEMA and the Chief Conservator of Forests, following consultations, may enter into contractual arrangements with private owners for registration of land as forest land. The same provision also requires these two authorities to ensure that the traditional interests of local communities with regard to these forests are not jeopardized. Article 69 (b) of the new constitution states that '*The State shall work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya*', which is a recognition of the obligation of the State and its organs, including the Ministry of Forestry and Wildlife and the Kenya Forest Service, to ensure that the present forest cover is increased, so as to adequately meet the needs placed upon forests in Kenya. The protection of the traditional interests of local communities is provided for in the subsequent article of the new constitution, and not presented in a combined manner as was done in EMCA. This revision acknowledges that traditional interests are not only tied to protected areas like forests, but are

important in their own right.

iii. Public Participation

The United Nations Conference on Environment and Development (Rio Conference) of 1992 through Local Agenda 21, and the Convention on Access to Information, Public Participation in Decision making and Access to Justice in Environmental Matters (Aarhus Convention) of 1998 recognize the benefits of public participation in environmental decision-making. Unfortunately, public participation has in some instances been viewed as a mere administrative formality, to the extent that environmental degradation has many times been attributed to lack of access to information and public participation. However, different levels of public participation have been acknowledged, each with its merits and demerits. Notably, the Government of Kenya acknowledges the role of public participation in democratic governance and sustainable development. Article 69 (d) of the new constitution, which states that 'The State shall encourage public participation in the management, protection and conservation of the environment', demonstrates Kenya's commitment to public participation, as well as reiterates the responsibility to ensure that public participation serves the purposes for which it is intended.

iv. Genetic Resources and Biological Diversity

Kenya ratified the Convention on Biological Diversity (CBD) of 1992 in 1994, and thereafter established the National Biodiversity Strategy and Action Plan (NBSAP) to address the requirements of the CBD through the then Ministry of Environment and Natural Resources. Kenya's biological resources are diverse, with 80 per cent of the population depending on them for livelihood; yet management of these resources is weak. In spite of the provisions outlined in the EMCA for an inventory of biological diversity and specific conservation measures, including *in situ* conservation, adequate information on the non-consumptive values of resources is lacking, and there is limited access to biodiversity data and information and low levels of adoption of new technologies, including biotechnology. Consequently, plant and animal species are overexploited, resulting in genetic erosion and endangering of rare species. The Ministry of Environment and natural resources is currently charged with coordination of all environmental matters in the country. Through Article 69 (e) of the new constitution which states *'The State shall protect genetic resources and biological diversity*', it is expected that the State will work with its agencies (and in this case the Ministry) to protect genetic resources and biological diversity. It is upon the project proponent to ensure that the activities related to the implementation and operationalization of the project is well aligned to the provisions of the Constitution of Kenya without fail.

2.4 Environmental Management Principles and Guidelines

The Proponent is expected under law and best practice to consider and exercise all the principles and tenets of environmental management. These principles are as discussed below:

2.4.1 Sustainability

The principle of sustainability requires that natural resources should be utilized in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations. It strives for equity in the allocation of the benefits of development and decries short-term resource exploitation which does not consider the long-term costs of such exploitation.

2.4.2 Principle of Intergenerational Equity

The principle of sustainability should be examined together with that of intergenerational equity, which focuses on future generations as a rightful beneficiary of environmental protection. Essentially, the principle of intergenerational equity advocates fairness, so that present generations do not leave future generations worse off by the choices they make today regarding development. Its implementation requires the utilization of natural resources in a sustainable manner while avoiding irreversible environmental damage.

2.4.3 Principle of Prevention

The principle of prevention states that protection of the environment is best achieved by preventing environmental harm in the first place rather than relying on remedies or compensation for such harm after it has occurred. The reasoning behind this principle is that prevention is less costly than allowing environmental damage to occur and then taking mitigation measures.

2.4.4 Precautionary Principle

The precautionary principle recognizes the limitations of science, as it is not always able to accurately predict the likely environmental impacts of resource utilization. It calls for precaution in the making of environmental decisions where there is scientific uncertainty. Accordingly, it is closely related to the principle of prevention and can be viewed as the application of the principle of prevention where the scientific understanding of a specific environmental threat is not complete. The precautionary principle thus requires that all reasonable measures must be taken to prevent the possible deleterious environmental consequences of development activities. Further, it demands that scientific uncertainty should not be used as a reason for not taking cost effective measures to prevent environmental harm.

2.4.5 Polluter Pays Principle

The polluter pays principle requires that polluters of natural resources should bear the full environmental and social costs of their activities. It seeks to internalize environmental externalities by ensuring that the full environmental and social costs of resource utilization are reflected in the ultimate market price for the products of such utilization. Since environmentally harmful products will tend to cost more, this principle promotes efficient and sustainable resource allocation as consumers are likely to prefer to the cheaper less polluting substitutes of such products.

2.4.6 Principle of Public Participation

The principle of public participation seeks to ensure environmental democracy and requires that the public, especially local communities should participate in the environment and development decisions that affect their lives. It requires that the public should have appropriate access to information concerning the environment that is held by public authorities and should be given an opportunity to participate in decision-making processes. Hence this was fulfilled via consultation of some of the people living around the proposed project site.

2.5 National Environmental Action Plan 2009-2013(NEAP 2009-2013)

The National Environment Action Plan (NEAP) was first published in 1994, and the most recent document was revisited in 2007 with a scope from 2009 - 2013. The NEAP provides a framework for the implementation of the Environment Policy and realization of the National Millennium (Standard) Development Goals and Vision 2030. The plan outlines measures to combat climate change including mitigation and adaptation, improving inter-sectoral coordination, mainstreaming sustainable land management into national planning, policy and legal frameworks and undertake research on impact of climate change on environmental, social and economic sector. The plan also aims to increase the country's forest cover and adopt economic incentives for management of forest products. It is upon the project's proponent to ensure that the activities and components of the project are geared towards attaining the gist of the NEAP

2.6 The Environmental Management and Coordination (amendment) Act, 2015

The Environmental Management and Coordination Act (EMCA and its Attendant Environmental (Impact Assessment and Audit) Regulations of 2003 (Amendment, 2016) provides for the establishment of an appropriate legal and institutional framework for the management of environment in Kenya. The Act introduces two important aspects of urban environmental management, which are directly related to the proposed project: environmental impact assessment (EIA) and environmental audit (EA). ***Section 58 (1)*** has underscored that any person being a proponent of a project Shall before be financing, commencing or proceeding with submit an EIA report to the National Environmental Management Authority (NEMA) of Kenya[2]. ***Section 68 (1)*** gives NEMA the mandate for carrying out all 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 EIA study.

2.6.1 Compliance with EMCA

- The proponent has undertaken an ESIA as per the requirements of Section 58 (1) of EMCA, 1999 (amended in 2015) awaiting approval prior to the commencement of the project.
- The proponent will implement the proposed ESMP and adhere to the conditions set in the license of the proposed project.
- The proponent will adhere to subsequent EMCA legislations such as the noise and waste regulations

[2]George M. Wamukoya and Francis DP Situma, *Environmental Management in Kenya: A Guide to the Environmental Management and Coordination Act* (Centre for Research and Education on Environmental Law, 2000).

throughout the cycle of the project.

- The proponent shall undertake Environmental audits for the project and submit the reports to NEMA as per the ESIA/EA guidelines.

2.6.2 The Environmental (Impact Assessment and Audit) Regulations, 2003 (Amended in 2016)

PART I (3) provides the projects and activities that are subjected to the regulations. The proposed residential estate development falls under the second schedule of the Act. PART 1 (4) provides the restrictions to which a proponent should consider before establishing a project. The anticipated impacts have already been established and an ESMP will be prepared highlighting the mitigation measures for the identified impacts, the responsible person, timelines for implementation and the cost. Registered experts were contracted to conduct an ESIA for the purposes of establishing the impacts. PART II (7, 8) highlights the provisions for preparing a project report. A comprehensive ESIA Study with details stated in this section has been prepared by NEMA registered experts and duly submitted on the proponent's behalf. PART (III), (IV) issues guidelines on preparing an ESIA Study report. A study report was prepared on the ESIA by the experts as per the specified directives of the regulations and an EMP was generated.

2.7 Physical Planning Act (Revised Edition, 2012)

The Physical Planning Act aims at developing a sound spatial framework[3]. The plan proposals enhance and promote intergraded spatial/physical development. The Physical planning Act makes specific provisions in respect to the mandate of local authorities. The objects of the Act are to provide the principles, procedures and standards for the preparation and implementation of physical development plans at the national, regional, county, urban, and rural and cities level and provision of the procedures and standards for development control and the regulation of physical planning and land use. ***Section 24 (1) of*** the Act says that the Director may prepare with reference to any Government land, trust land or private land within the area of authority of a city, municipal, town or urban council or with reference to any trading or marketing center, a local physical development plan. ***Section 24(3) says that*** the Director may prepare a local physical development plan for the general purpose of guiding and co-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) says that*** 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. ***Section 29 (a) says*** 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. ***Section 36*** 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 impact on environment, the applicant will be required to submit together with application an environmental

[3]The Republic of Kenya, "The Physical Planning Act Chapter 286" (Kenya law reports, 2009).

impact assessment report.

2.7.1 Compliance with this Legislation

- The proponent will ensure that the land is utilized in an ecofriendly manner and is restored to its original condition once the project is decommissioned.
- The proponent has to ensure the residential development does not in any way have injurious impact on the environment and that a developmental footprint of less than 75% is maintained.

2.8 The Public Health Act (Cap 242)

Section 15 (1x) –Nuisance

Any noxious matter or wastewater discharged from any premise, such as a building constitutes nuisance. Any premise not kept in a clean and free from offensive smell such as gases which are injurious to health such as those from commercial establishments shall therefore generate nuisance. The Act therefore stresses that no person shall cause a nuisance to exist on any land or premise occupied by him. The Act acknowledge that it shall be the duty of all local authorities to take all lawful measures for maintaining its district at all times in a clean and sanitary condition for remedy of any nuisance or condition liable to be injurious to heath. 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 building are insufficiently protected, the owner shall be compelled to observe the require regulations, else he shall be guilty of an offense[4].

2.8.1 Compliance

- The proponent will ensure solid waste shall be handled by a NEMA Approved garbage collector on regular basis and disposed appropriately as per the waste regulations.
- Sanitary facilities shall be in conformity with MOH standards and installation of standard fittings.

2.9 Occupational Safety and Health Act, 2007 (Revised in 2012)

The Act makes provision for the health, safety and welfare of persons employed. The provision requires that all practicable measures be taken to protect persons employed from any injury. The provisions of the act are also relevant to the management of hazardous and non- hazardous wastes, which may arise at the project site during construction and operation. The act provides that all measures should be taken to ensure safety, health and welfare of all the stakeholders in the work place. Workers and occupants' safety will be given priority as the clinic operates. The construction sites for different contractors shall be registered as workplace with the directorate of occupational safety and health services under the ministry of labour social security and services. A fire audit, risk assessment and safety and health audit has to be conducted for the sites at least once every year. All provisions of this Act relevant to the project activities shall be adhered to. All plants shall be subjected

[4]The Republic of Kenya, "The Public Health Act Chapter 242" (Kenya law reports, 2012).

to periodical examinations as provided by law.

2.10 County Government Act, 2012 (Amended in 2014)

Section 116 (1) states that" a county government and its agencies shall have an obligation to deliver services within its designated area of jurisdiction". According to Section 116 (2) A county shall deliver services while observing the principles of equity, efficiency, accessibility, non-discrimination, transparency, accountability, sharing of data and information, and subsidiarity. Section 117 (1) of the act states that" A *county government and its agencies shall in delivering public services—*

(a) give priority to the basic needs of the public;

(b) comply with the respective policy and standards provided by the National Government;

(c) Promote the development of the public service delivery institutions and, ensure that all members of the public have access to basic services.

Section 117 (2) states that "*Public services shall be equitably delivered in a manner that accords to;*

a. *Prudent, economic, efficient, effective and sustainable use of available resources; (b) continual improvement of standards and quality;*
b. *Appropriate incorporation of the use of information technology; and*
c. *Financial and environmental sustainability.*

Section 117 (3) states that "A *county government shall carry out regular review of the delivery of services with a view to improvement".*

Compliance

- The proponent will source services from the national government such as electricity, water and sanitation at the county level (from the Nairobi County Government) as well as approval for the project should be done by the County Government under the Physical Planning Act.

2.11 Water Quality Regulations, 2006

The law is based upon the principle that everybody is entitled to a healthy and clean environment. Section 42, is pertinent to the implementation of this project. These Regulations shall apply to drinking water, water used for industrial purposes, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife, and water used for any other purposes[5].

Compliance

- The proponent shall strictly adhere to the provisions and requirements of these regulations. He must

[5]The Republic of Kenya, "The Environmental Management and Coordination, (Water Quality) Regulations 2006." 2006, www.nema.go.ke.

ensure all applicable water standards are observed to ensure clean, safe water for all purposes.

- Hence the project proponent will ensure proper disposal of waste water and sewage to be generated from the housing development

2.12 Noise and Excessive Vibrations Pollution (Control) Regulations, 2009

Part II of the rregulations[6] regulations; section 3 states: "Except as otherwise provided in these Regulations, no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. Any person who contravenes the provisions of this Regulation commits an offence. The provisions are as per the following table:

Table 2: Maximum Permissible Noise Levels

Zone			*Sound Level Limits dB(A) (Length-14hours)*		*Noise Rating Level (NR) (Length-14 hours)*	
			Day	Night	Day	Night
A.	Silent Zone		40	35	30	25
B	Places of worship		40	35	30	25
C.	Residential:	Indoor	45	35	35	25
		Outdoor	50	35	40	25
D.	Mixed residential (with commercial some &Places of entertainment)		55	35	50	25
E.	Commercial		60	35	55	25

Time Frame	
Day	6.01 a.m. – 8.00 p.m. (Length-14 hours)
Night:	8.01 p.m. – 6.00 a.m. (Length-10hours)

Compliance: The proponent shall take into concern the provisions of the this Act and ensure that the proposed residential development complies with the provisions of the Act.

2.13 Waste Management Regulations (2006)

This legislation gives guidelines for handling different kinds of waste. Some of the relevant sections to the proposed project include **Part II Section 1** which states that "No person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle" whilst **Part II Section 6 says that "**Any person who owns or controls a facility or premises which generates waste shall minimize the waste generated by adopting the following cleaner production principles":

a) ***improvement*** *of production process through:*

i. Conserving raw materials and energy

ii. eliminating the use of toxic raw materials within such time as may be prescribed by the Authority

iii. reducing toxic emissions and wastes

b) ***Monitoring*** *the product cycle from beginning to end by:*

[6]The Republic of Kenya, "The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009." 2009, www.nema.go.ke.

i. *Identifying and eliminating potential negative impacts of the product.*

ii. *Enabling the recovery and re-use of the product where possible.*

iii. *Reclamation and recycling.*

c) ***Incorporating*** *environmental concerns in the design, process and disposal of a product*[7].

Compliance

- The proponent will ensure that all waste is segregated before being transported to a designated waste treatment facility by a contracted NEMA licensed waste transporter.

2.14 Employment Act 2007 (Revised Edition 2012)

2.14.1 General Principal

The Act constitutes minimum terms and conditions of employment of an employee and any agreement to relinquish vary or amend the terms set shall be null and void. The Act stipulates that no person shall use or assist any other person, in using forced labour. Clause 5 of the Act states that its shall be the duty of the Minister, Labour officer, the National Labour Court and the subordinate labour courts to; Promote equality of opportunity in employment in order to eliminate discrimination in employment Promote and guarantee equality of opportunity for a person who, is a migrant worker or a member of the family of the migrant worker lawfully within Kenya. No employer should discriminate directly or indirectly, against an employee or prospective employee or harass an employee or prospective employee on the following grounds; race, colour, sex, language, religion, political or other opinion, nationality, ethnic or social origin, disability, pregnancy, mental status or HIV status. An employer shall pay his employees equal remuneration for work of equal value. The project will ensure that no discrimination occurs of any kind during the implementation of the proposed project.

2.14.2 Part IV Rights and Duties of Employment

The provisions of this part and part VI constitute basic minimum and conditions of contract of service. The employer shall regulate the hours of work of each employee in accordance with provisions of this Act and any other written law. Subsection (2) of section 27 states that an employee shall be entitles to at least one rest day in every period of seven days. An employee shall be entitled to not less than twenty-one working days of leave after every twelve consecutive months. No overworking of employees, whether permanent or casuals will be allowed.

2.14.3 Maternity Leave

Section 29 of the Act stipulates that a female employee shall be entitled to two months maternity leave with full pay and an employer who has paid a female employee wages for two months during her maternity leave shall be reimbursed by the National Social Security Fund, the equivalent of wages paid by the employer during maternity leave or a lesser amount as may be determined by the minister in rules made by the minister for that

[7]The Republic of Kenya, "The Environmental Management and Co-Ordination (Waste Management) Regulations, 2006.," n.d., www.nema.go.ke.

purpose. Subsection 8 of section 29 further states that no female employee shall forfeit her annual leave entitlement on account of having taken her maternity leave. Where this law applies, it shall be observed to the later.

2.14.4 Section 37 (conversion of casual employment to term contract)

Where a casual employee works for a period or a number of continuous working days which amount in the aggregate to the equivalent of not less than one month; or performs work which cannot reasonably be expected to be completed within a period, or a number of working days amounting in the aggregate to the equivalent of three months or more. The contract of service of the casual employee shall be deemed to be one where wages are paid monthly. In calculating wages and the continuous working days, a casual employee shall be deemed to be entitled to one paid rest day after a continuous six days working period and such rest day or public holiday which falls during the period under consideration shall be counted as part of continuous working days.

2.15 Work Injuries Benefits Act 2007

2.15.1 Obligations of Employers

Section 7 of the Act stipulates that every employer shall obtain and maintain an insurance policy, with an insurer approved by the Minister in respect of any liability that the employer may incur under this Act to any of his employees. The project proponent has been advised to ensure that he acquires insurance as per the provisions of the Work Injuries and Benefits Act (WIBA).

2.15.2 Registration of Employer

Every employer carrying on business in Kenya shall within the prescribed period and in the prescribed manner register with the Director of Occupational Health and Safety Services and any other information as the Director may require. Subsection 4 of section 8 of the Act states that where an employer carries on business in more than one workplace, or carries on more than one class of business, the Director may require the employer to register separately in respect of each place or class of business.

2.15.3 Employer to Keep Record (Section 9)

Section 9 states that an employer shall keep a register or other record of the earnings and other prescribed particulars of all employees and produce the same on demand by the director for inspection. Such records shall be retained for at least six years after the date of last entry. Thus, all records in relation to the implementation and operation of the project shall be well kept and maintained.

2.15.4 Right to Compensation

An employee who is involved in an accident resulting in the employee's disablement or death is subject to the provisions of this Act, and entitled to the benefits provided for under the Act. Subsection 3 of section 10 of the Cat however states that no employee shall be entitled to compensation if an accident, not resulting in serious

disablement or death, is caused by the deliberate and willful misconduct of the employee. Section 12 of the act stipulates if an employee is injured in an occupational accident or contracts an occupational disease while the employee, with the consent of the employer. is engaged in any organized first aid, ambulance or rescue work, or firefighting or other emergency services, the accident or disease is for the purpose of this Act, deemed to have arisen in the course of the employee's employment, hence has a right to compensation. The project proponent is advised to observe the provisions of this Act in case of any accident or diseases.

2.15.5 Reporting of Accidents

A written or verbal notice of any accident shall be given by or on behalf of the employee concerned to the employer and a copy to the Director of Occupational Health and Safety within twenty-four hours of its occurrence in case of fatal accident. In case of any accidents, the rules shall be applied to the latter.

2.15.6 Lapse of Right to Benefits

A right to benefits in accordance with this Act shall lapse if the accident is not reported to the employer within twelve months after the date of such accident. However, it shall not be bar to compensation if it is proved that the employer had knowledge of the accident from any other source. Section 30 of the Act states that compensation for permanent disablement shall be calculated on the basis of ninety-six months earnings subject to the minimum and maximum amounts determined by the minister after consultation with the board. In case of a fatal accident compensation shall be paid to the dependents of the employee in accordance with the set provisions in the third schedule. The employer shall further be liable to pay reasonable expenses for the funeral of the deceased employee subject to the maximum amount determined by the minister, after consultation with the National council for occupational Health and Safety. The First Schedule of the Act gives the minimum degree of Disablement for various body parts while the second Schedule gives a list of work description and the associated occupational disease.

2.16 Labour Institutions Act 2007

The Act establishes the National Labour Board whose functions are to advice the minister on:

- All matters concerning employment and labour
- Legislation affecting employment and labour
- Any matter relating to labour relations and trade unionism
- Labour inspection service
- Reported strikes and lockouts
- Labour market information and indices etc.
- The board shall in consultation with the minister, establish;
- Work permit committee
- National manpower development committee

- Trade dispute committee
- Productivity committee and such other committees or panel as are necessary for the performance of board's functions.

Section 34 of the act stipulates that an authorized officer may either alone or in the presence of another person, enter any premises or place where persons are, or may be employed for the purpose of performing his duties as specified under the Act. The labour officer may, for the purpose of monitoring or enforcing compliance with any law require the production of wages sheets or other employment records kept by an employer, enter inspect and examine all latrines and other sanitary arrangements or water supply, inspect and examine all food provided or appearing to be provided for employees, and take samples thereof in duplicate, in the presence of the employer or the employers representative which samples shall be sealed and one sample so sealed shall be left with the employer, order that all buildings and premises where employees are housed or employed be kept in a clean and sanitary condition. Section 37 of the act states that the medical officer shall exercise the powers conferred upon the labour officer and in addition:

- Order an employee who, in his opinion is sick and for whom the conditions prevailing at the place of employment are not conducive to rapid recovery of his health to proceed to hospital and in that case the employer shall at the earliest opportunity and at his own expense send the employee to the place of work or to a hospital, as the case may be.
- Condemn any food provided for employees which, in the opinion of the medical officer, is unfit for human consumption, and all food so condemned shall be destroyed forthwith in the presence of the medical officer.
- Order at the expense of the employer, such variety of food for an employee as he may deem necessary as well as Inspect all drugs and medicine provided for the use of employees

The provisions of this Act are bound to be observed without fail by the project proponent.

2.17 Kenya Urban Roads Authority

2.17.1 Introduction

The Bill of rights guarantees all Kenyans freedom of movement and gives all Kenyans a right of access to their homes, education, healthcare services, housing, water, social security and to clean and healthy environment. Roads are one of the modes of transport of people and goods and are used to interconnect other modes as well as provide access to basic social services. Roads account for about 93% of all freight and passenger traffic in Kenya. Roads are key enablers for economic, social and political development. Therefore, roads must be managed in a prudent and effective manner to realize the dream of Kenya as enshrined in the Vision 2030. Thus, it is upon the project proponent to ensure that no road is blocked or affected in a manner that may affect the movement of members of the public in a negative manner.

2.17.2 Policy on Aligning the Roads Sub-Sector with the Constitution

This policy seeks to align roads sub-sector to the Constitution of Kenya for an efficient and effective road network. It provides for a legal, institutional and administrative framework for the management of roads at the National and County level. The policy builds on Sessional Paper No. 5 of 2006 on the Development and Management of the Roads Sub-Sector for Sustainable Economic Growth. Kenya public road network has been categorized into the national trunk roads and the county roads by the Constitution. The network is 160, 886km and is currently classified according to functionality. This policy further defines the national trunk roads and the county roads. The category and classification are dynamic and will evolve over the years.

Prior to the Reforms of 2006 in the Roads Sub-Sector, the uncertainties, duplication of roles and inconsistency in the road asset management system largely contributed to poor state of roads in the country. This was mainly due to the fact that several Ministries concurrently exercised road management responsibilities through some of their departments and agencies. Further, most road management agencies employed inefficient operational procedures under bureaucratic civil service regulations and lacked clarity in the legal, operational and structural relationships amongst themselves. The Sessional Paper No. 5 of 2006 which was approved by Parliament on 19th October 2006 spelt out policies to be pursued by the Government in the medium term for sustained growth and provided the legal and institutional framework for the management of roads. The reforms under the Sessional Paper No 5 of 2006, realized the four basic building blocks necessary for effective roads management i.e., ownership, clarified responsibility, stable financing and commercialized management. In 2007, the Kenya Roads Act was enacted. The Act established three Roads Authorities with responsibility of clearly defined mandates on the management of respective sub-networks. Prior to the promulgation of the Constitution, the roads sub-sector was managed as follows:

i. The Ministry of Roads, responsible for:

- Policy formulation & coordination
- Setting of standards
- Advisory to roads sub-sector
- Land use management
- Implementation and reviewing/updating of the Road Sector Plan
- Registration of engineers
- Registration and regulation of construction industry
- Capacity building in the sub-sector
- Road transport research & development function
- Provision of mechanical & transport services

ii. Kenya Roads Board

Kenya Roads Board (KRB) which funds maintenance of all roads including approval of Roads Maintenance Levy Fund (RMLF) funded maintenance work programmes, and carrying out of technical and financial audits of the works.

iii. Roads Department

Roads Department – provides technical and support services to the Roads Authorities.

iv. Kenya National Highways Authority

Kenya National Highways Authority (KeNHA) is responsible for the management, development, rehabilitation and maintenance of national roads classified as classes A, B, and C Roads.

v. Kenya Rural Roads Authority

KeRRA is responsible for the management, development, rehabilitation and maintenance of rural roads classified as classes D, E, and unclassified rural Roads (first schedule Kenya Roads Act, 2007).

vi. Kenya Urban Roads Authority

Kenya Urban Roads Authority (KURA) is responsible for management, development, rehabilitation and maintenance of all public roads in cities and municipalities except where those roads are national roads.

vii. Kenya Wildlife Service

The Kenya Wildlife Service (KWS) is responsible for roads in National Parks and National Reserves as well as access roads allocated to it by the Ministry of Roads. KWS, just like the three Roads Authorities will report to the Ministry of Roads on road development projects while Kenya Roads Board will approve its maintenance works. Policy on aligning the roads sub-sector with the constitution also states that environmental issues should be looked at holistically. The national and county governments in liaison with the National Land Commission should ensure compliance with the land use and development plans in accordance with existing laws. It should be prohibited by law allocation of protected areas reserved for road reserves or way-leaves. The boundaries of such areas should be clearly delineated and documented. There should be Designation and keeping of an inventory of all road reserves placed under the National Land Commission (NLC) to hold and manage it in trust for the people of Kenya. All services by other players (e.g. advertisements in form of Bill boards or ICT infrastructure) on overpasses, under passes or road reserves should be paid for and the funds realized used solely for road development and maintenance at both National and County levels of government.

2.18 The Energy (Solar Water Heating) Regulations, 2012

The Regulations including the Energy (Solar Water Heating) Regulations, 2012; The Energy (Energy Management) Regulations, 2012 and the Energy (Solar Photovoltaic Systems) Regulations, 2012 on the 4th

September 2012 were made under the Energy Act 2006 and are meant to facilitate implementation of sections 103, 104 and 105 of the Act.

2.18.1 The Energy (Solar Water Heating) Regulations, 2012 require among other things that: -

i. All premises within the jurisdiction of local authorities with hot water requirements of a capacity exceeding one hundred litres per day shall install and use solar heating systems;
ii. Within a period of five years from the effective date of the Regulations, all existing premises with hot water requirements of a capacity exceeding one hundred litres/day shall install solar heating systems;
iii. An owner of premises, Architect and an Engineer engaged in the design, construction, extension or alteration of premises shall incorporate solar water heating systems in all new premises designs and extensions or alterations to existing premises;
iv. An electric power distributor or supplier shall not provide electricity supply to premises where a solar water heating system has not been installed in accordance with the Regulations;
v. The design, installation, repair and maintenance of a Solar Water Heating System shall be in accordance with the Code of Practice – Solar Water Heating for Domestic Hot Water; Kenya Standard KS 1860:2008 and the Building Code made under the Local Government Act;
vi. The Solar Water Heating Regulations will be implemented in liaison with the local authorities responsible for implementing Section NN31.5 of Planning and Building Regulations, 2009;
vii. A person shall not undertake any solar water heating system installation work if not licensed by the Energy Regulatory Commission as a solar water heating system technician or a contractor.

2.18.2 The Energy (Energy Management) Regulations, 2012 require among other things that: -

i. All designated energy consuming facilities shall carry out energy audits once every three years;
ii. All energy audits will be carried out by an energy auditor licensed by ERC;
iii. All energy audit reports, Implementation plans and Energy Policies shall be submitted to ERC;
iv. The designated facilities will be required to implement at least 50% of the energy audit recommendations within three years.

2.18.3 Energy (Solar Photovoltaic Systems) Regulations, 2012 require among other things that: -

i. All persons designing and installing solar PV shall be licensed by ERC;
ii. All manufacturers, vendors, distributors& contractors of solar PV systems shall be licensed by ERC;
iii. A vendor or contractor shall be responsible for the design and specifications of complete solar PV systems, except in situations where customers purchase individual system components from different vendors in which case the customers shall indicate in the signed system design declaration form that they did not require the said design or specifications from the vendor or contractors;
iv. All manufacture, sale, installation, use and disposal of solar PV systems and components shall be in

accordance with the provisions of the Environmental Management Coordination Act, No 8 of 2015 and the Occupational Safety and Health Act, No 15 of 2007.

2.19 Policy Framework

2.19.1 Environmental Policy Framework (2013)

The Kenya Government's Environmental Policy of 2013 is geared towards sound environmental management for sustainable development. This is envisaged in the principle of prudent use, which requires that the present day usage should not "compromise the needs of the future generations". This is applicable in the proposed project because resources will be drawn for use in the proposed project. The policy emphasis is on environmental protection in order to ensure sufficient supplies for the present and future generations. The policy envisages the use of the "polluter pays principle", where one is expected to make good any damage made to the environment. The Kenya Government's Environmental Policy aims at integrating environmental aspects into national development plans. The broad objectives of the National Environmental Policy include:

- ✓ Optimal use of natural land and water resources in improving the quality of human environment;
- ✓ Sustainable use of natural resources to meet the needs of the present generations while preserving their ability to meet the needs of future generations;
- ✓ Integration of environmental conservation and economic activities into the process of sustainable development; &
- ✓ Meet national goals and international obligations by conserving bio-diversity, arresting desertification, mitigating effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth.

ESIA critically examines the effects of proposed project on the environment and identifies potential negative and positive impacts of any development activity or project, how it affects people, their property and the environment. EIA also identifies measures to mitigate the negative impacts, while maximizing on the positive ones. It seeks to minimize adverse impacts on the environment and reduces risks. If a proper EIA is carried out, then the safety of the environment can be properly managed at all stages of a project-operation, monitoring and evaluation as well as decommissioning. Impact assessment is required at the planning stage of a project or development activity. This helps the decision makers to factor in environment safeguards in project designs thereby avoiding possible negative impacts of the proposed project. EAs are undertaken annually after the commissioning of the project. EAs are to be undertaken regularly on projects including this one, to ensure that they operate within the set environmental principles.

The Environmental (Impact Assessment/Audit) Regulations, 2003 were issued in accordance with the provisions of EMCA of 1999. The Regulations must be administered, taking into cognizance provisions of EMCA, 1999 and other relevant national laws. The project proponent will need to observe the provisions of the various statutes that are aimed at maintaining a clean and healthy environment.

2.19.2 National Housing Policy of 2004

Kenya's National Housing Policy dates back to 2004 and was aimed at addressing the deficit in housing supply and in arresting the deteriorating housing conditions countrywide and to bridge the shortfall in housing stock arising from demand that far surpasses supply, particularly in urban areas. The policy aims at:

i. Enabling the poor to access housing and basic services and infrastructure necessary for a healthy livingenvironment especially in urban areas;
ii. Encouraging integrated, participatory approaches to slum upgrading, including income generating activities that effectively combat poverty;
iii. Promoting and funding of research on the development of low cost building materials and construction techniques;
iv. Harmonizing existing laws governing urban development and electric power to facilitate more cost effective housing development;
v. Facilitating increased investment by the formal and informal private sector, in the production of housing for low and middle-income urban dwellers; and
vi. Creating a Housing Development Fund to be financed through budgetary allocations and financial supportfrom development partners and other sources.

2.19.3 Climate Change Policy

Kenya is a leader in addressing climate change and was one of the first countries in Africa to enact a comprehensive law and policy to guide national and subnational climate action. The Climate Change Act of 2016 and the National Climate Change Action Plan (NCCAP) 2018–2022 provide guidance for low-carbon and climate resilient development. Kenya's priorities as articulated through these, and other, instruments include: adaptation, afforestation and reforestation, landscape restoration, climate-smart agriculture, geothermal and clean energy development, energy efficiency, and drought and flood risk management. It is upon the project proponent to ensure that the project takes into consideration climate change adaptation measures such as use of clean energy, rain water harvesting and establishment of vegetation cover around it.

2.19.4 National Water Policy, 2021

The National Policy of Water which was promulgated in April 1999 as Sessional Paper No. 1 of 1999 calls for decentralization of operational activities from the central government to other sectors, including local authorities, the private sector and increased involvement of communities in order to improve efficiency in service delivery. It also tackles issues pertaining to water supply and sanitation facilities development, institutional framework and financing of the sector. According to the policy, in order to enable sustainable water supply and sanitation services, there is need to apply alternative management options that are participatory through enhanced involvement of others in the provision of these services but particularly the private sector. It is therefore important for the proposed project management to factor in sanitation facilities in the proposed project to avoid

contamination of water resources. The overall objective of the National Water Policy is to lay the foundation for the rational and efficient framework for meeting the water needs for national economic development, poverty alleviation, environmental protection and social well-being of the people through sustainable water resource development and management.

2.19.5 Land Policy of 2009

The Sessional Paper No. 3 of 2009 on National Land Policy was formulated to address the critical issues of land administration, access to land, land use planning and environmental degradation. It also addresses restitution of historical injustices, conflicts, unplanned proliferation of informal urban settlements and information management. It recognizes the need for security of tenure for all Kenyans. The overall objective of the National Land Policy is to secure rights over land and provide for sustainable growth, investment and the reduction of poverty in line with the Government's overall development objectives. Among others, the Policy provides the framework for the maintenance of a system of land administration and management that will provide efficient and effective utilization of land and land based resources. The Policy designates all land in Kenya as public, community and private land. Most significantly, the Policy establishes a mechanism for securing the tenure of public land by placing all public land under the National Land Commission to hold and manage the land in trust for the people of Kenya. The Policy has provisions aimed at protecting forest reserves and water catchment areas through establishment of mechanisms for repossession of any public land acquired illegally or irregularly and establishment of an appropriate system for registering public institutional land. Through the Policy, the Government will ensure that all land is put into productive use on a sustainable basis by facilitating the implementation of key principles on land use, productivity targets and guidelines as well as conservation.

2.20 Compliance

Compliance with set environmental standards is important in ensuring that systems, operations and activities do not harm our environment. Narrowing down to construction, operationalization and decommissioning of the proposed flats , there are compliance levels that should be observed by all such as discussed under the reviewed laws above.

4. ANALYSIS OF PROJECT ALTERNATIVES

This chapter analyses the project alternative in terms of site and non-implementation. The purpose of including alternatives in the EIA is to identify and evaluate alternate actions that accomplish similar goals and promote sustainable development (Anderson et al., 2003). Alternatives should be economically feasible with minimal adverse environmental impacts and time delays. Diverse alternatives to the proposed action must be included in the EIA. Alternatives may include both design and location options (Steinneman, 2000). In most case, the EIA process often occurs too late in the decision-making process to consider a full range of alternatives. This can undermine EIA goals to encourage more environmentally sound and publicly acceptable solutions. Allowing new alternatives and objectives to evolve in relation to environmental conditions and public preferences may be a solution to most of the environmental and socio-economic problems associated with the implementation of new projects (Anderson et al., 2003).

4.1 No-Action Alternative

The '*no-action/project'* alternative, which serves as a baseline for comparative analysis, must be included where the environmental impact of taking the proposed action is too high compared to the impact of not taking the proposed action. The *"No project"* alternative option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. Under *"No project"* option, the proponent's proposal would not receive necessary approval from Authorities. The proposed construction would not be implemented. This option would however, involve several losses both to the proponent and the community as a whole. The *"No Project"* alternative option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The economic status of Kenyans would remain unchanged
- The local skills would remain underutilized (in terms of labor provision)
- Increased poverty and crime in Kenya due to lack of job opportunities
- The housing sector would continue to suffer due to lack of enough residential houses in our urban areas such as Wanyee area in Dagoretti.

4.2 Alternatives in Terms of Site

The proposed development is within an area where it is mostly and highly welcomed according to the views collected during the public participation exercise. In addition, the land parcel to be developed is a private property owned by the developer. Acquiring an alternative site for the proposed development could be a costly venture. And the benefits anticipated by the locals would otherwise be lost.

4.3 Alternatives in Terms Of Designs

There is the potential to adopt the most favorable and environmentally friendly design for the proposed

development since it is still at the planning stage. This will as well be informed by stakeholders' inputs regarding the proposal. Waste management and environmental pollution are the most serious concerns in the area which must be factored in when designing for the project. Designs should also be considered in a way to ensure efficiency in terms of energy and resource/material use.

4.4 Alternatives in Terms Of Processes

A competent civil engineer will be involved in the project implementation to oversee its activities and ensure that construction is undertaken according to the designs and recommended standards and that the most appropriate materials are used for construction in the right proportions, quantities, quality and ratio.

4.5 Alternatives in Terms Of Technologies

Modern environmentally friendly technologies are highly encouraged in the implementation and operational phases of the proposed development. These include technologies to reduce air emissions and potential contributions to climate change and GHG emissions covering all the project phases. As well modern technologies for waste management including reducing point source generation, sorting at point source and recycling and re-use are highly recommended during the operation phase.

4.6 Waste Water/Sewage Management Alternatives

The available technologies that can be considered as alternatives include Use of constructed/artificial wetland; Use of septic tank and/or bio-digesters; Use of stabilization ponds/lagoons; Use of waste treatment plants such a Bio-box or the Vex-P system; Connection to the municipal council sewage system; Use of conservancy tanks, partial treatment and pumping to a municipal council sewage system. The available and feasible alternative to sewage and waste water management is the connection to the municipal sewer system in the area.

4.7 Alternatives to Achieving Green Building

The areas of concern may be categorized broadly as proper and efficient use of resources. These include power, water and other sources of energy; Reducing waste and pollution and improving occupant health. Green building can take on various forms. From the basic housing level to the national level, efforts are being put to reduce reliance on the costly fossil fuels. Some of the methods that can be adopted in this include:

i. The Use of Renewable Energy

More houses are powering up using solar panels. The availability of the technology and ease of setting up the panels have gone a long way in encouraging its adoption. The use of biomass (popularly known as biogas) is also gaining a significant foot hold in many homes. This is more so in rural areas, where animal waste is enhanced to produce gas used in powering up. Waste (such as papers, plastics, and so forth) is also being used in an ingenious pilot project in areas of Nairobi to produce heat energy. This has been embraced in these

communities as it provides an affordable way to cook and heat water. The proponent is advised to explore the use of renewable sources of energy such as solar for water heating (which is currently a requirement by law) and wind for security lighting.

ii. Adoption of Water Harvesting, Treatment and Re-Use

Large housing projects such as the proposed one should adopt water treatment and re-use to cut on costs. With demanding clientele who want green compounds all year round, this technology is quite handy. The used water is collected and treated in collection tanks placed within the estates. This water is then re-used for irrigation of lawns and also in flushing toilets. Hence this calls for the adoption of sewage treatment systems such as the bio-box. In addition, water harvesting should also be taken more seriously. Methods include tanks and also water pans in areas having space. Trenches in gardens are also dug up with the sole intention of trapping run-off water. Hence, the proposed project should entail rain water harvesting without failure.

iii. The Use of Plants or Vegetation

Plants can be used as water towers to aid in replenishing ground water. Homes in hot areas are advised to adopt plants to keep the temperatures down. The project proponent is also advised to establish a vegetation cover around the development.

iv. Adoption of Natural Lighting and Ventilation

Strategic building of windows and porches goes a long way in enhancing natural lighting. Sun roofs are also becoming a common feature in many homes, allowing much sunlight into the rooms. These are just some of the few methods that could be adopted in going green in building the proposed project.

5. STAKEHOLDER ENGAGEMENT

6.1 Introduction

Stakeholder Engagement is an important element of the ESIA Study process in that it enables the Study report and the project to be informed by the interests and concerns of the stakeholders. The process of stakeholder engagement further provides an opportunity for stakeholders to have their interests and concerns considered and taken into account during the decision-making process.

Legal Notice no 101 of June 2003 requires that all environmental and social assessment processes in Kenya to incorporate Public Consultation- a requirement informed by awareness that development and implementation of projects can occasion diverse impacts on stakeholders who should consequently be informed appropriately following which they can make informed reaction and decision to the proposed development.

6.2 Legislations on Stakeholder Engagement

This project is committed to meaningful, effective and informed public participation. Several Kenyan national statutes necessitate participation of stakeholders in proposed developments, especially when the project is likely to affect stakeholders' livelihoods either directly and/or indirectly. Pertinent legislations include:

- The Constitution of Kenya, 2010.
- The Environmental Management and Coordination Act (EMCA) of 1999 (Revised in 2015).
- The Environmental (Impact Assessment and Audit) Regulations of 2003 (revised in 2016).
- Legal Notice Number 31 and 32 of 2019

6.3 Approach to Stakeholder Engagement

Public participation is a deliberative process in which the public is involved in problem solving or decision-making in policy formulation, legislation, or project implementation. It is a process by which community concerns, needs, and values are incorporated into government and corporate decision-making. Public participation recognizes the diversity of group aspirations, needs, and values, and permits collective decision-making, thereby allowing consensus designed to achieve more policies that are legitimate. The essence of public participation is to strengthen and deepen democratic governance.

Residents of a proposed project site have to live with the project if implemented. They have the most to gain if the project impacts are beneficial to them. Conversely, they have the most at stake if the project goes awry. Not just residents but for projects whose impacts have a wide geographical spread, distant communities need to be involved. Stakeholder input is thus vital at the earliest stage possible in project development and should continue throughout the project cycle.

The approach undertaken for information disclosure and consultation involved the following key processes.

- Identification of key stakeholders; immediate neighbours, households, via a public advertisement of public meetings by placing adverts at the chief's offices and at the site, involving the area administration including *Nyumba-Kumi*, etc.;
- Conducting expert consultations, informal interviews and Key Informants;
- Holding three public consultation meetings at the project site involving explanation of the project and its impacts (both positive and negative).
- Assessing the influence and impact of the project on these stakeholder groups and vice versa.
- Summing up of key findings and observations from the consultations;
- Preparing and incorporating stakeholders' comments in the ESIA Study report.

6.4 Stakeholder Identification

The people and groups identified for this project as key stakeholders were the immediate neighbors to the proposed development. Informal interviews were conducted at their households on the 18th and 25th of September and on the 2nd of October of 2023 and their details and comments registered in a registration and comment sheet in the form of a questionnaire (see attached copies). Public consultation meetings were also held at the project site at the same dates (see attached minutes and attendance lists). Most of the respondents reached out were local residents conversant with the area and its challenges.

6.5 Summary of Key Issues Raised During the Engagement Process

The summary of key issues and concerns raised during the stakeholder engagement exercise were captured in structured questionnaires and minutes. The questionnaires and minutes are attached to this report in the appendices. In summary, the local community anticipates high benefits from the proposed development especially in terms of economic growth, improvement of businesses as well as improved housing and general community growth in terms of infrastructure.

According to the respondents, the biggest challenge that this project must consider to address is the availability of clean water for domestic use and the consequent management of the resulting waste water. Unfortunately, the area lacks adequate supply of water for consumption from the city water and sewerage company although the area is connected to the municipal sewer. Other challenges include poor housing, because immediate neighbors to the site are iron-sheet constructed houses. The project should also aim to address electric power by installing its own electricity transformer. Condemned by the participants was the issue of contractors not paying casuals, not giving women chances to work in the site, allowing drug peddling around and within the project site, allowing immorality around and within the project site or employing underage people within the project site. The project contractor and proponent agreed to work closely with the local administration to ensure such vices are not witnessed around and within the project. Not to be allowed as well is construction work to neither start before 7am nor go beyond 6pm

The respondents and local residents hardly anticipate negative impacts. However, there could be potential injuries, accidents and incidents during the construction phase which can be easily addressed by fencing off the project site. In addition, there have been incidents of building collapsing and the local residents showed considerable concern.

According to the respondents' judgment, the contributing factors for building collapsing include the use of sub-standard construction material, failure by contractors to follow instructions by the authority and engineers, poor foundations, putting up buildings in hurry, poor rationing of ballast, sand and cement and use of low quality material such as construction metals of other sizes other than the recommended ones. The respondents recommended that, the proponent should be keen on such issues to ensure safety of their future tenants. The contractor and proponent assured of never to witness such a thing for the proposed project. Other than the above issues, the residents highly anticipate many benefits from the proposal which include:

- ✓ Improved/high market value of the land around the project site
- ✓ Improved security
- ✓ Improvement in terms of the environment
- ✓ Population growth and diversity leading to improved business flourish
- ✓ Creation of employment
- ✓ Improved housing and infrastructural development
- ✓ Improved accessibility and
- ✓ General community development

Figure 6: First public consultation meeting

Figure 7: Second public consultation meeting

Figure 8: Third public consultation meeting

6. IMPACT ASSESSMENT, IDENTIFICATION AND MITIGATION

7.1 Overview

The impact assessment and identification process involved evaluating the significance of identified impacts using a risk-based impact assessment approach which considers the likelihood of impact occurring and the severity of consequences using descriptors in the matrices developed. The risks are then rated and mitigation measures proposed that are commensurate with the risks to ensure that the environmental risk is reduced to as low as reasonably possible. Some of the key issues identified in the scoping and screening exercise included:

i) Change in land use
ii) Pollution and pollution control
iii) Waste generation and management
iv) Population influx
v) Attraction of development
vi) Employment opportunities
vii) Improved housing

7.2 Methodology

The ESIA Scoping exercise involved predicting, recognizing and prioritizing the likely impacts through methods such as observation, photography, interviews, review of the proposed project designs, documentary review of the existing infrastructure, interviews as well as expert judgment with the objective of establishing priorities, both environmental and social, and making decision on the assessment boundaries. It also facilitated avoidance of unfocused information that could have otherwise misled the report.

The evaluation approach implemented is mandated by NEMA as a Receptor-Specific Analysis approach addressing the various sources of impacts from the project's different implementation phases. The general evaluation process included identifying potential receptors and impacts associated with the proposed development. The evaluation of baseline data, literature research and the nature of the surrounding environment provided crucial information for the process of evaluating and describing how the project could affect the biophysical and socio-economic environment. The next step was the assessment of the impacts in terms of their significance, duration, reversibility, likelihood of occurrence and geographical extent. The list of criteria used to assess significance is shown in the table below. The rating of likelihood of occurrence criteria is shown below:

Table 3: Likelihood of Impact Occurrence Rating Criteria

Likelihood to occur	Category	Score
Impact is highly likely or certain to occur under normal operating/ construction conditions	High	C
Impact may possibly occur under normal operating/construction conditions.	Medium	B
Impact is unlikely to occur under normal operating/construction conditions but may occur in exceptional circumstances	Low	A

Based on above list of criteria, the impacts of severities were determined. Having identified and characterized

the potential significant impacts during each phase using the screening procedure identified above, a matrix was developed to summarize all identified impacts during each phase of the project, the criteria used is shown in the below table:

Table 4: Impact Identification Matrix

		Likelihood Rating		
CONSEQUENCE RATING		A	B	C
	1	1A	1B	1C
	2	2A	2B	2C
	3	3A	3B	3C
	4	4A	4B	4C
	5	5A	5B	5C
	6	6A	6B	6C

KEY			
Consequence		Likelihood	Acceptability
1-Negligible	4-Significant	A-Low	Negligible with minor mitigation
2-Minor	5-Catastropic	B-Medium	Minimize Impacts
3-Moderate	6-Beneficial	C-High	Unacceptable

7.3 Positive Impacts

This EIA process has through technical evaluation of the project characteristics, receiving environment and inputs from interested and affected parties, arrived at the following possible impacts.

7.3.1 Design Phase

Table 5: Positive Impacts During the Design Phase

Receptor	Impact	Impact description	Impact Rating
Socio-Economic	**Environmental Opportunities**	Development of designs avails opportunities for green/sustainable designing of the project thereby minimizing environmental impacts whilst fortifying the project to achieve its intended objectives. It provides an opportunity to develop designs that appreciate energy conservation and sustainable resource uses thereby increasing environmental resource management	**6A**
	Generation of Income and Source for government revenue	The government will earn some income through taxation from the income generated from consultancies by the professionals/ consultants. Similarly, payment for project design plans and project approvals will be a source of income to the government departments.	**6B**
	Creation of employment and business opportunity	The design phase of the project will create employment and business opportunities for various professionals/consultants involved in the planning stage of the project.	**6C**

7.3.2 Construction Phase

Table 6: Positive Impacts During the Construction Phase

Receptor	Impact	Impact description	Impact Rating
Land use and Visual Impact	**Optimal use of land**	The construction of the project will transform the existing land use. According to various respondents, the market value of land will go high.	**6C**
	Aesthetic Value	The project design entails to improve the aesthetic nature of the environment through ensuring proper land sapping thus improving the beauty of the area.	**6C**
Socio-Economic	**Market for goods and services**	Sourcing of materials and services for the implementation of this project will create market for the material and service providers such as on transporters and suppliers of raw materials.	**6C**
	Creation of Employment	During the construction period, new jobs will be created in the form of skilled and unskilled labour. The majority of unskilled labour should be sourced from the project area. Indirect employment will be in the form of suppliers and other forms of sub-contracted works that will be required for construction. Support to businesses such as food kiosks may also be set-up near or within the site.	**6C**

Receptor	Impact	Impact description	Impact Rating
	Revenue Generation to the government	The government will get income/revenue in terms of taxes on the construction materials to be used in the construction phase by taxes. Similarly, the people employed in the construction sites will be subject to income tax deduction hence earning the government more revenue.	**6B**
	Improved informal sector opportunities	During the construction phase, it is expected that, the other businesses in the informal sector will flourish. These include food vendors who will be benefiting directly from the construction staff members who will be buying food and other commodities from them. This will promote the informal sector in securing some temporary revenue and hence livelihood.	**6B**
	Improved living standards	Skilled and unskilled personnel will find a source of income to support their families with basic needs and secondary needs in case of surplus income. It will also earn the access to good nutrition and health care	**6B**

7.3.3 Operation Phase

Table 7: Positive Impacts In the Operation Phase

Receptor	Impacts	Impact description	Impact Rating
Land use and Visual Impact	**Optimal use of land**	The construction of the project will expand on the existing land use. Proper design and planning of the proposed building sets precedence for optimal use of land. Proper landscaping will ensure improved aesthetic of the area.	**6B**
Socio-Economic	**Employment creation**	In the operation phase of the project more job opportunities will arise for the unskilled labour such as cleaners, security guards etc. Taken together, job creation will help to reduce the problem of unemployment with attendant improvement in income for the workers' household and revenue hence improving livelihoods while reducing poverty levels.	**6B**
	Improved access to social services	The area is anticipated to have accelerated development including construction of more rental residential houses. As well infrastructural development is highly anticipated especially upgrading of the road networks, improved security etc.	**6A**
	Improved housing	The proposed houses are of higher standards than those already in existence. They are as well expected to be cheaper and affordable to most of the struggling residents.	**6C**
	Business growth	Small scale business owners anticipate more customers to support their business which will contribute eventually to economic growth.	**6B**
	Land valuation will go high	With such developments in the area, available plots will gain the status of prime plots indicating that the market value of land in the area will be high	**6C**
	Improved security	Security in the area is anticipated to increase due to installation of security lights and probably street lights. As well more security personnel will be deployed in the premises	**6B**

7.4 Potential Negative Impacts and Proposed Mitigation Measures

The potential negative impacts identified as potentially associated with the proposed development are outlined below in the order of the project phases. Mitigation measures for each identified impact are also provided. A summary of the identified impacts and their analysis is highlighted in table below:

Table 8: Summary of potential negative impacts

Impact	Likelihood	Consequence	Impact Rating	Acceptability
1. Air emissions (dust and exhaust)	High	Minor	**2C**	**Minimize impacts**
2. Effect on flora and fauna	Low	Negligible	**1A**	**Negligible/minor mitigation**
3. Noise Generation	High	Minor	**2C**	**Minimize impacts**
4. Clearing of vegetation	Low	Negligible	**1A**	**Negligible/minor mitigation**
5. Health Impacts	Medium	Moderate	**3B**	**Minimize impacts**
6. Solid waste generation	High	Significance	**3C**	**Minimize impacts**
7. Employment discrimination	Low	Negligible	**1A**	**Negligible/minor mitigation**
8. GBV/PLWD	Medium	Minor	**2B**	**Minimize impacts**
9. Accidents and incidents	Medium	Significance	**4B**	**Minimize impacts**
10. Waste water generation	High	Significance	**3C**	**Minimize impacts**

Most of the anticipated impacts are minor to almost negligible and easily mitigated using local techniques.

7.4.1 Design Phase

There are no anticipated adverse impacts during this phase of the project development.

7.4.2 Construction Phase

Most of the anticipated Negative impacts associated with the proposed development are expected during the construction phase. This phase involves many activities which are a threat to the social, economic and environmental aspects though in the short term. Identified impacts and proposed measures to mitigate them include:

a) Air quality

Excavation works, construction activities, and movement of vehicles has the potential to contribute to air pollution through dust emissions as well as exhaust emissions; Engine burning fossil fuels in vehicles and generators will emit oxides of Carbon, Sulphur and Nitrogen posing risks to human and environmental health, Such pollutants are associated with global warming; Welding operation will also emit gases and fumes such as ozone, chromium particularly in its hexavalent state (Cr+6), nickel (potential carcinogens), cadmium and lead, whilst others include NOX, NO2, CO, CO2, O3 from mild and stainless-steel welding.

All these emissions lead to air pollution, which is a potential risk to human health, potentially causing: impaired vision & co-ordination, headaches, dizziness, confusion, nausea, obstruction of pulmonary veins, damage to lung tissues, emphysema, and bronchitis and cumulative impacts of these can be fatal leading to death.

- *The contractor to develop and implement an ambient air quality monitoring program to verify construction related emission levels, identify main sources and develop potential action for improvement.*
- *The contractor to ensure all vehicles, equipment and machinery are in good working order with a particular attention to motor combustion efficiency and anti-pollution systems.*
- *Avoid leaving mechanical equipment, machinery, trucks, and vehicles idling unnecessarily at the work site.*
- *Limit vehicle and machinery speed within the work site to minimize dust generation.*
- *Use water sprays as dust abatement to limit excessive dust emissions from granular material handling and piling, and vehicle movements.*
- *Ensure trucks transporting granular material are equipped with a tarpaulin to cover the material during travel between material site source and work site.*
- *Drop granular material as close to the ground possible to reduce generation of airborne particles.*
- *While respecting established working hours, favor trucking activities during periods of low traffic to ensure optimal operation of trucks.*
- *Favor the use of electrical equipment over fuel combustion equipment, when possible.*
- *Providing all employees with suitable safety and protective gears (PPEs);*
- *Ensuring that all machinery used on the site is properly maintained and inspected before use;*

b) Waste generation

The construction phase will lead to generation of construction wastes from the civil works and operations on the materials involved in the process. These wastes include metal cuttings, rejected materials, plastic paper bags, wood shavings, food wastes, surplus materials, among others. This type of waste poses risks to both human and environmental health because they are either biodegradable like (food waste) or non-biodegradable wastes.

- *The proponent should contract a licensed waste handler to manage the solid waste generated during construction.*
- *Excellent housekeeping standards should be maintained on site and stores*
- *Enforce sorting of waste at source for easy waste handling*

c) Noise and Vibration

Noise is expected from movement of vehicles and construction equipment. Noise would arise from: -

- Ground preparation activities such as excavation and leveling.
- Construction activities at the site such as loading and offloading materials,
- Operation of the concrete mixer

The noise generated may create a nuisance or disturbance to the surrounding areas. Whereas at the site, the loud noises pose a risk to the workers and site personnel since loud noise increase the risk of ear damage and deafness or noise induced hearing loss.

The World Health Organization recommends 55decibels as the maximum noise levels whereas, according to EMCA (Noise and Excessive Vibration Pollution) Control regulation of 2009, gives maximum permissible levels for construction site as 60dB (A) during daytime and 35dB (A) for residential areas, back hoe will produce 85-95dB (A), Chain saw 110dB (A), Front-end loader 90-95 dB (A), and jack hammer 112dB (A) among others. Fortunately, there will be minimal need to none of the use of such equipment for this project however the following measures must be put into consideration:

- *Ensuring that all machinery used on the site is properly maintained and inspected before use*
- *Prohibit idling of vehicles on site or near sensitive receptors.*
- *Generators and machinery to be shut down when not in use*
- *Construction works to take place only during stipulated time according to the Noise regulations, 2009*
- *Enclose the construction site*

d) Biodiversity (Flora, Fauna and Habitat)

The project site has already been cleared and secured using a perimeter wall hence, there will be no vegetation to be lost. However, there will be potential change in species composition and displacement of sensitive species

due to general site preparation. This impact will be applicable during the construction phase only since no more land will be needed thereafter. Despite minimal disturbance, the following measures should be put into consideration.

- *Ensure proper landscaping after constructions works*
- *Where possible preserve/conserve trees and other vegetation*
- *Increase the vegetation cover*
- *Create a buffer near the stream and avoid any human interference.*

e) Increased Water Demand

Water is a major concern especially in construction sites. The proposed development will most likely cause strain to the existing water supply in the area, which will have a direct impact to the main water supply especially if the supply remains constant. This calls for proper mitigation measures to be put into place. Hence proposed mitigation measures include the following:

- Avoid wasting the water supplied to the site.
- Encourage water reuse/recycling during both construction and operational phases.
- In order to encourage water conservation during operational phase the proponent should install water conserving taps that turn off automatically when water is not in use.
- Encourage proper water management systems.

f) Potential Effects due to Increased Power Demand

It is expected that there will be high power consumption especially during occupation phase. The proposed development will be connected to the existing power line and this might strain this resource. However, the contractor, construction workers and the eventual occupants will be encouraged to conserve energy and to use energy conserving appliances as much as possible. Energy conservation involves proper use of electrical appliances, lighting systems and other electrical gadgets utilized for different purposes. Thus, the proposed mitigation measures are as stated below:

- All electrical appliances should be switched off when not in use.
- Put off all lights when not in use.
- Use energy conserving electric lamps for general lighting.
- Utilize natural light inside buildings to avoid using electricity for lighting during the day.
- Explore the use of solar and wind energy especially for site security lighting during the night
- Create awareness among workers by use of stickers on the need to conserve energy

g) Impacts in Relation to Surface Drainage

Good drainage system is used to prevent land near human settlement from becoming saturated with water which collects or accumulate/flood after a downpour or from other sources. Poor drainage causes dampness to

building structures as well as water stagnation. Dampness is influenced by poor drainage, in the presence of warmth and darkness, breeding grounds for malaria and other diseases can be directly traced to it. Hence, proper drainage of the general property/premise comes in handy to enhance effective flow of the much-anticipated surface run-off emanating from the roof catchments and other newly pave areas within the site. To prevent bad effects of poor drainage, the following mitigation measures are proposed for this project:

- During construction, the design of the drainage system should ensure that surface flow is drained suitably into the public drains provided to control flooding within the site.
- Drainage channels should be installed in all areas that generate or receive surface water such as drive ways and along the building block-edges of the roofs.
- Channels should be covered by approved materials to prevent occurrence of accidents and entry of dirt that would compromise flow of run-off.
- Drainage channels should ensure safe disposal of run-off/surface water &should be self-cleaning.
- Paving of the side walkways, driveways and other open area should be done using pervious materials to encourage recharge and thus reducing water run-off volume.

h) Community Health and HIV/Aids

The prevalence of HIV/AIDS in the area could increase at the construction due to the influx of people into the project area thereby increasing the infection rates. This could be pushed up by traders and worker's interactions due to the availability of money to spend. Some workers could use this money to look for women and engage in illicit sex thereby creating avenues for the spread of the pandemic. Influx of new people to the project area especially construction workers can affect the number of new cases of HIV, because they often interfere with an otherwise stable situation. This could as well be true during the operation phase when tenants rent the houses.
Pollution by dusts during construction may lead to increased incidences of respiratory tract infections among the construction workers and local population; Poor sanitation and waste disposal practices at construction site may jeopardize public health. Mitigation Measures recommended for implementation to enable reduce the spread of the virus and other diseases include the following:

- ✓ *Proponent and contractor to consider employing local labourers as this limits the number of labourers settling in new places leaving their families behind;*
- ✓ *Develop HIV/AIDS awareness programmes or initiatives to target the construction workers, tenants and the general members of the community, particularly the youth; with the objective of reducing the risks of exposure and the spread of HIV virus in the project area;*
- ✓ *Develop appropriate training and awareness materials for Information, Education and Communication on HIV/AIDS;*
- ✓ *Identify other players (local CBOs, NGOs, and government organizations) on HIV/AIDS for enhanced collaboration;*
- ✓ *Develop an intervention strategy compatible with the construction programme to address success of the*

HIV/AIDS prevention and provide peer educators for sustainability in collaboration with other stakeholders; and

- ✓ *Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs.*

Such measures should also be implemented during the operation phase of the project.

i) Impacts on Gender and GBV

Gender Based Violence (GBV) risks can intensify within local communities when there are large influxes of male workers from outside the area during the construction period. Such workers often come without their families and have large disposable incomes relative to the local community, and can pose a risk in terms of sexual harassment, violence and exploitative transactional relationships. A large influx of male labour may also lead to an increase in exploitative sexual relationships and human trafficking whereby women and girls are forced into sex work and cases for defilement.

During the construction phase, female workers are also vulnerable to various forms of harassment, exploitation and abuse, aggravated by traditionally-male working environments and found that sexual harassment and exploitation are the common features of workplace life. However, a Gender Action Plan (GAP) will have to be prepared to deal with such issues. Contractors will address the risk of gender-based violence, through:

- *Mandatory training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women. Training may be repeated.*
- *Informing workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted;*
- *Adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence;*
- *Developing a system to capture gender-based violence, sexual exploitation and workplace sexual harassment related complaints/issues.*

j) Accidents /Incidents to Workers and Public

Increased traffic volume and activities during construction are likely to cause accidents. Also, during the construction of the proposed project, it is expected that construction workers are likely to have accidental injuries and hazards as a result of accidental occurrences, handling hazardous waste, lack or neglect of the use of protective gears etc. at the time of construction the public are also prone to such accidents as well. All necessary health and safety guidelines should be adhered to so as to avoid such circumstances. Workers are more likely to be exposed to diseases from contact with potentially harmful building materials. The contractor

will ensure the following:

- ✓ *Road safety awareness will be implemented during and after construction, targeting all the local communities, including transporters, road users, school children, teachers and all other locals.*
- ✓ *Ensure the project area is marked and appropriate signage used to warn the general public of the ongoing project;*
- ✓ *Enforcing adherence to safety procedures and preparing contingency plan for accident response;*
- ✓ *Safety education and training must be emphasized, this is in addition to proper and strict supervision of the workers;*
- ✓ *The contractors must have health and safety officer to manage all the accidents and safety concerns on site.*
- ✓ *Providing all employees with suitable safety and protective gears (PPEs);*
- ✓ *Ensuring that all machinery used on the site is properly maintained and inspected before use;*
- ✓ *Place warning signs for hazardous or flammable substances;*
- ✓ *Ensure chemicals are stored safely and MSDS are made available educating workers on the same;*
- ✓ *Periodical thorough testing or examination of plants such as lifting equipment and any pressure vessels including all their parts and fittings;*
- ✓ *Excellent housekeeping standards should be maintained on site and stores;*
- ✓ *Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the local Occupational Health and Safety Office (OHSO) are in place;*
- ✓ *Compliance with all the relevant health and safety legislation;*
- ✓ *Formulation and implementation of safety policy.*
- ✓ *Ensure that the project site is enclosed using appropriate material e.g. sack, cloth or iron sheets to ensure that any harmful objects are contained within the construction site for safe handling, maintenance and disposal.*
- ✓ *Ensure all waste, construction debris, cuttings and other solid waste are contained and disposed appropriately.*

k) Discrimination on Employment Opportunities

Most of the skilled labourers will have to be brought in from outside the project area, and this may cause some resentment among the local people. Generation of employment opportunities by the project could result to conflict between local residents and new comers or outsiders, if not appropriately managed.

- ✓ *To avoid conflicts with the local people on employment, it is proposed that the Contractor employs the locals in liaison with local administration and community contact persons in skilled and unskilled duties. The contractor is advised to be transparent and adopt a concentric model of recruitment to ensure equity.*

7.4.3 Operation Phase

Waste streams during the operation phase would include solid wastes and liquid wastes which could be

managed using locally viable technologies.

a) Solid wastes

Other than the wastes from construction, operation of the residential housing would produce considerable paper and food remains (domestic waste). Adequate containment bins must be provided in strategic locations within the compound for temporary holding of the waste. As well, a licensed waste handler should be contracted to collect the waste on regular basis to ensure cleanliness and proper environmental management practices. In addition, sorting of waste streams should be considered at source for ease of collection, disposal and treatment where necessary. Very high housekeeping standards must always be maintained.

b) Liquid wastes

Waste water during operation would likely comprise of water used in cleaning surfaces and floors, cooking and washing as well as sewage from mainly flush toilets. Surface runoff during rainy seasons would add to the volume of waste water generated. Connection into the municipal sewer system is recommended. The proponent must ensure that proper drainage systems are incorporated into the designs and adequately installed during the construction phase.

However, the proponent can also consider installing a simple waste water treatment plant onsite which will ensure water re-use and recycling hence, conserving water in the available reservoirs/sources.

c) Security

Security could be challenge especially due to population influx and presence of valuable equipment and appliances in various households. The proponent will ensure proper fencing of the property (a perimeter wall and a lockable gate are already in existence) and a lockable gate. Security personnel will be required to guard the premises both during the day and night. It is recommended that the security personnel be from a recognized company mandated to offer such services in the country and be in appropriate attire while on duty. Ensure that visitors are known and new faces to provide identification details.

Table 9: Summary Table of the Potential Negative Impacts during the Operational phase

Pressure on available utilities	It is expected that the increase in the population will put undue pressure to the available utilities such as electricity, telephones, water and roads
Micro-climate	Shade and wind funneling will be a minor impact of the development. The sudden change of the surface of the site from soil type to concrete will result to an increase in the amount of radiation being reflected back to the atmosphere and this will lead to a large diurnal change in temperature.
Residential character	A relatively large number of families will migrate into the area increasing the population of the area and leading to increased demand and pressure on the available infrastructure.
Cultural impacts	Social cohesion and blending with existing communities may pose a conflict of interests. However, this may be treated as a minor impact since most communities in Kenya are welcoming and easy to interact with. However, new tenants should be made aware on the need to try positive bonding skills once they relocate to the flats
Emissions	Air quality will also be affected during the operational phase. There will be release of gases such as CFCs from refrigerators, oxides of carbon from cooking activities and oxides of sulphur from exhaust of vehicles.
Surface run off	The paved surfaces will increase the impermeable surface area and hence water runoff from the site once the development

	is complete.
Traffic	In this phase, the main roads of plains view leading to the site area will serve the additional vehicles of the tenants who will be living in the flat. This means that there would be increased interference with traffic on this road.
Waste Generation	Both solid and liquid waste will be generated during the operational part of the project. If not properly managed, this can have adverse impacts on the environment, as well as causing nuisance such as bad odours, scattering of litter, polluting the nearby river, creating conducing environments for disease transmitting organisms etc. Liquid waste generated will include both black and grey water that if not properly managed, can lead to contamination of the surroundings, as well as manifestation of waterborne diseases. Solid waste on the other hand can lead to problems such as invasion by rodents and scavengers in the neighborhood.

d) Proposed Mitigating Measures

The project proponent should implement the following mitigation measures during the operation phase of the project:

- ✓ Discharge all wastewater and sewage to the constructed municipal sewer line
- ✓ Install appropriate firefighting equipment &ensure they are inspected at least once every 6 months.
- ✓ Provide suitable solid waste containers
- ✓ Transport all solid wastes to an appropriate disposal site. Maintain a file on dully filled copies of solid waste tracking documents from the waste transporter.
- ✓ Implement appropriate water conservation measures.
- ✓ Implement appropriate energy conservation measures like use of fluorescent tubes and solar energy for security lighting and for heating water
- ✓ Maintain on site, with the security guard, telephone contacts for emergency public service providers such as fire fighters, police services, ambulance etc.
- ✓ Adherence to the provisions given in the Occupational, Health and Safety Act, 2007

7. PROPOSED ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environment Management Plan (EMP) consists of all mitigation measures identified above. The EMP is prepared as a table identifying the impacts, assigning responsibilities for addressing the impact and providing a cost and timeframe for implementing the mitigation measure. It is prepared to show how site specific concerns and mitigation measures are addressed throughout the lifecycle of the proposed project.

The EMP has been developed with project knowledge and information available to date. As project commencement and scheduling plans are developed and changed, components of the EMP might require amending. This is therefore a working document, which can be updated whenever new information is received or site conditions change.

8.1 Environment and Social Management Plan (ESMP)

The table below gives specification of the impacts that the project has on the proposed site and the possible mitigation measures required to ensuring minimal damage of the environment and to the social fabric both during the construction and operational phases.

Table 10: The proposed EMP

ASPECT	POTENTIAL IMPACT	RECOMMENDED MITIGATIVE MEASURE	TIME FRAME	RESPONSIBLE PARTY/PERSON	COST (KSH.)	MONITORING MEANS
Environment, Social Health and Safety policy	Project unsustainability due to lack of policies which guide the contractor can have adverse effects on the general public, workers and the environment.	Formulation of Environment, Safety health and Safety policy by the contractors. This should illustrate the contractor's commitment to implement the ESMP, Trainings and the responsibilities for the team to ensure sustainable development. It should also include site management systems and procedures. These policies should be signed by top management and updated regularly. They should be projected to the operations phase where applicable	Formulate before the project commences and can be revised periodically during project implementation and even during operation phase	The Contractor/ Proponent	50,000.00	Presence of Policy manual and Policy Statement. Records on training undertaken prior to construction of works and any subsequent training.
HIV/AIDS and Sexually Transmitted Diseases	Labour intensive projects could result in increased HIV/AIDS prevalence rates in an area. HIV & AIDS can impact on a	Provide means for early detection of such diseases by having access to medical facilities eased. Provide posters, condoms and awareness creation among workers and risk population groups.	During Construction Phase During the operation phase	The Contractor, Proponent, County Administration, and local health service providers.	80,000.00	High profile visibility Statistics from data obtained from medical centres and VCT.

	community by reducing productivity and also diverting more of a family's resources into medical needs	Identify VCT centres where locals and workers can go for testing and counseling before hiring. Provide posters, condoms and awareness creation among workers and tenants				
Occupational Safety and Health	Social wellbeing of the workers together with the public has to be guaranteed by project otherwise project may result in more negative impacts. A healthy worker means the family will be provided for.	In accordance with section 11 of Occupational Safety and Health Act, 2007 Proper signage within the premises and provision of relevant equipment i.e. fire extinguishers and first aid kit	During Construction During operation	The Contractor,	150, 000.00	Health and Safety Audit reports. Presence or absence of a Health and Safety Officer. And equipment
		Medical Examination of Workers. Insurance against Injuries and casualties from accidents while at work. Routine medical examinations shall be done for all staff at local health centres.	During Construction During operation phase	The Contractor/ Proponent		Medical Examination Records and confirmation by the Subcontracted designated Health practitioner.
		Construction crew/staff shall undergo basic training in: • Occupational Health and Safety. • First Aid Administration. • Fire fighting • Safe operating procedures • How to use/wear personal protection gear. • Machinery guards and their maintenance • Handling of compressed air.	Commencement of construction activities During operation phase	The Contractor/ Proponent/ Resident Engineer		Training Certificates.
Communicable diseases (Water and Vector borne)	Diseases such as malaria, typhoid, and cholera among others can have adverse impacts to the community as they can be easily transmitted.	Provide means for early detection of such diseases by having access to medical facilities eased. Maintain good sanitation practices at all times and access to clean water. Ensure good housekeeping and waste management.	During Construction Phase During operation	The Contractor/ Resident Engineer/ proponent	50,000.00	Presence of adequate clean toilets for use by the workers. Approval of these facilities by the Public Health
Pollutions	Noise and vibration pollution during construction could affect workers and general public	Appropriate Personal Protective Equipment (PPE) to be worn by workers. Noisy jobs to be done during specific durations day time.	Throughout the construction Phases	The Contractor and proponent	100, 000.00	Presence or absence of PPEs, signage etc. Regular inspection by proponent during construction
	Air pollution in the extreme	Indiscriminate disposal of materials by burning	Throughout the cycle	Contractor, Public		Enforcement of waste

	end can result in breathing track irritation and other health problems.	should be prohibited, or only in accordance with Public Health regulations.		Health Officer, proponent		management measures and regular site inspection to ensure compliance
	Solid wastes can lead to loss of aesthetics, hazards to people and may lead to contamination of water sources Dumping of earth in plots not intended thereby hindering land use.	Waste collection and disposal to be done by a NEMA approved handler. Project to identify areas where they will dump excavated earth and adequately compensate the land owner.	Throughout and during Construction Phase	Proponent, NEMA, Contractor and Public Health Officer		Presence or absence of waste tracking documents. Regular site inspection to ensure compliance with NEMA and Public Health Regulation
Community ownership of the project	Public participation is a legal requirement	Community support mobilization and sensitization through consultative forums or questionnaire methods. The proposals made by the community be implemented	Throughout the project planning, Construction and decommissioning phase	proponent	100,000.00	Implemented community recommendations. Public consultations done.
	Safety of Plant and Equipment Safety of Workers	Construction Plant and Equipment. Extinguishers shall be subject to mandatory inspections	In compliance with the provisions of the occupational safety and health act, 2007,	approved inspector		Certificates of Examination of Plant, equipment and machinery.
		Provision and regular replacement of Personal Protection Equipment, consisting of: Overalls, helmets, dust nose masks, leather mittens, safety boots, clear eye goggles, ear muffs.	With on-going construction.	The Contractor, and proponent		PPEs availed to the staff, Replacement of all worn out PPEs. Proof of Purchases
COVID 19	Virus spread	• Develop Covid-19 Management plan • Avoid holding community meetings where many persons congregate until advised otherwise by the Ministry of Health (MoH). • Under special instances and when unavoidable, meetings of 45 pax or less can be held while observing social distancing, wearing of masks and use of sanitizers. • Sensitize all community segments and project workers on COVID 19 and precautionary measures that need to be observed. • Record temperatures, sanitize/wash hands whenever one is accessing site. • Restrict site access to only Authorized	Construction/ Operation	The Contractor, and Proponent	100,000	Screening records Reported cases

		persons • Adhere to the MoH and WHO guidelines on Covid-19 management.				
Community Health And Safety	Community health can be exposed to accidents and immense project danger	• Developing an onsite EHS Plan; • As part of the stakeholder engagement and information disclosure process, providing an understanding to the community concerning the activities proposed to be undertaken and the precautions being adopted for safety; and • Developing a grievance redress mechanism. • Restrict project site entry to authorized persons only	Construction	The Contractor, Proponent	50,000	Training records Community EHS Plan Accidents records Fenced site
Waste water/ Effluent disposal and management	Contamination of water resources. spread of diseases	• Subcontract a licensed waste handler	Project implementation and operation	The contactor, Proponent	50, 000.00	Waste collection records
Legal compliance	Poor construction and increased risks	• Adhere to all regulations and conditions for approval • Acquire all prerequisite approvals, licenses and permits before implementation	Planning phase	Contractor and Proponent	50,000.00	Permits available
TOTAL COST					**780,000**	

Table 11: Environmental Monitoring/Management plans for the Construction Phase

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Estimated Cost (Kshs.)
High Demand of Raw materials	**1.** Source building materials from local suppliers who use environmentally friendly processes in their operations.	Civil Engineer, Architect, Project Manager & Contractor	Throughout construction period	Part of the main budget
	2. Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered.			
	3. Ensure that damage or loss of materials at the construction site is kept minimal through proper storage.			
	4. Use of some recycled/refurbished or salvaged materials to reduce the use of raw materials and divert material from landfills.			
	2. Specify locations for trailers and equipment, and areas of the site which should be kept free of traffic, equipment, and storage.		1 month	200, 000.00
	3. Designate access routes and parking within the site.		1 month	
	4. Introduction of more vegetation (trees, shrubs and grass) on open spaces and their maintenance., especially at the	Architect, Project	Monthly to Annually	

	front side of the development	Manager &		
	5. Design and implement an appropriate landscaping program to help in re-vegetation of part of the project area after construction.	Landscape specialist	beginning of the project	
Increased storm water, runoff and soil erosion	1. Roof water to be harvested and stored in underground reservoirs for use in cleaning and in the toilets. The tanks should have a capacity of at least 100, 000litres. To ensure the use of such water for the stated purposes, the building should be fitted with a dual water distribution system	Civil Engineer, Mechanical Engineer, Project Manager & Contractor	During the beginning phase of the project	500, 000.00
	2. A storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structure should be designed.		1 month	100, 000.00
	3. Apply soil erosion control measures such as leveling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil.			50, 000.00
	4. Ensure that construction vehicles are restricted to existing roads to avoid soil compaction within and around the project site.		Construction period	
	5. Ensure that any compacted areas are ripped to reduce run-off.		2 months	
	6. Site excavation works to be planned such that a section is completed and rehabilitated before another section begins.	Project Manager	Throughout construction period	
	7. Construction of soil-galleys on sloppy sections.	Project Manager		200, 000.00
	8. Open drains all interconnected will be provided on site.	Civil Engineer		
	9. Roof catchments will be used to collect the storm water for some domestic uses e.g., washing of floors and cars	Civil Engineer		
Increased solid waste generation	**1.** Use of an integrated solid waste management system i.e., through a hierarchy of options: reduction, sorting, re-use, recycling and proper disposal	Project Manager & Contractor	Throughout construction period	200, 000.00
	2. Through accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed, rather than cutting them to size, or having large quantities of residual materials.		One-off	
	3. Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of			
	4. Ensure that damaged or wasted construction materials including cabinets, doors, plumbing and lighting fixtures, marbles and glass will be recovered for refurbishing and use in other projects			
	5. Donate recyclable/reusable or residual materials to local community groups, institutions and individual local residents or home owners.			
	6. Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time		Throughout construction period	
	7. Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure.		One-off	
	8. Purchase of perishable construction materials such as paints should be done incrementally to ensure reduced		Throughout construction	

	spoilage of unused materials		period	
	9. Use building materials that have minimal or no packaging to avoid the generation of excessive packaging waste			
	10. Use construction materials containing recycled content when possible and in accordance with accepted standards.			
	11. Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at the site			
	12. Dispose waste more responsibly by dumping at designated dumping sites or landfills only.	Project Manager, Mechanical Engineer & Contractor	Throughout construction period	
	13. Waste collection bins to be provided at designated points			
	14. Private waste disposal company to be contracted to transport and dispose the solid waste from site			
	15. Running educational campaigns amongst residents/workers, e.g., through use of posters, to encourage reuse or recycling of the solid waste			
Dust emission	**1.** Ensure strict enforcement of on-site speed limit regulations	Project Manager & Contractor	Throughout construction period	100, 000.00
	2. Avoid excavation works in extremely dry weathers if/and when possible			
	3. sprinkle water on graded access routes when necessary to reduce dust generation by construction vehicles			
	4. Personal Protective equipment to be worn			
Exhaust emission	**1.** Vehicle idling time shall be minimized	Project Manager & Contractor	Throughout construction period	50, 000.00
	2. Alternatively fueled construction equipment shall be used where feasible; equipment shall be properly tuned and maintained			
	3. Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas, and to switch off engines at these points			
Noise and vibration	**1**. Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.	Resident Project Manager & Contractor	Throughout construction period	50, 000.00
	2. Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, residential areas and hospitals			
	3. Ensure that construction machinery is kept in good condition to reduce noise generation			
	4. Ensure that all generators & heavy-duty equipment are insulated / placed in enclosures to minimize ambient noise levels.			
	5. Trees around the site will provide some buffer against noise propagation			
	6. The noisy construction works will entirely be planned to be during day time when most of the neighbors will be at work.			
Increased energy consumption	**1.** Ensure electrical equipment, appliances and lights are switched off when not being used	Project Manager & Contractor	Throughout construction period	Part of the main budget
	2. Install energy saving fluorescent tubes at all lighting points instead of bulbs which consume higher electric energy			
	3. Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts			

	4. Monitor energy use during construction and set targets for reduction of energy use.			
	5. Have provision for the installation of solar panels as per the provisions of the 2012 and the Energy (Solar Photovoltaic Systems) Regulations			
High Water Demand	**1**. Harness rainwater for some domestic uses such as general cleaning, in the toilets & gardening (roof catchment), hence the need for a dual water distribution system within the building	Mechanical Eng., proponent and Manage& Contractor	Throughout construction period	100, 000.00
	2. Install water conserving taps that turn-off automatically when water is not in use as well as low flush toilets & waterless urinals		One-off	
	3. Promote recycling and reuse of water as much as possible (need for a dual water distribution system within the building)	Project Manager & Contractor	Construction period	
	4. Install a discharge meter at water outlets to determine and monitor total water usage		One-off	
	5. Promptly detect and repair water pipe and tank leaks		Throughout construction period	
	6. Sensitize tenants to conserve water by avoiding unnecessary toilet flushing etc.			
	7. Ensuring taps are not running when not in use			
Generation of wastewater	**1.** Provision of means for handling sewage generated by construction workers such as mobile toilets	Mechanical Engineer & Project Manager	One-off	Part of the main budget
	2. Conduct regular checks for sewage pipe blockages or damages since such vices can lead to release of the effluent into the land and water bodies		Throughout construction period	
	3. Monitor effluent quality regularly to ensure that the stipulated discharge rules and standards are not violated			
Incidents, accidents and dangerous occurrences.	**1.** Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the local Occupational Health and Safety Office (OHSO) are in place.	Project Manager, Developer, Contractor and Site Safety Officer	Continuous	100, 000.00
	2. Enforcing adherence to safety procedures and preparing contingency plan for accident response in addition to safety education and training shall be emphasized.		Continuous	
	3. Ensure that the premises are insured as per statutory requirements (third party and workman's compensation)		Annually	
	4. Develop, document and display prominently an appropriate SHE policy for construction works		One-off	
	5. Provisions must be put in place for the formation of a Health and Safety Committee, in which the employer and the workers are represented		One-off	
	6. Ensure that Suitable, efficient, clean, well-lit and adequate sanitary conveniences have been provided for construction workers		One-off	
	7. Ensure that materials are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse		Continuous	
	8. Ensure that items are not stored/stacked against weak walls and partitions		Continuous	
	9 All floors, steps, stairs and passages of the premises must be of sound construction and properly maintained		Continuous	
	10. Securely fence or cover all openings in floors		One-off	
	11 Ensure that construction workers are not locked up such that they would not escape in case of an emergency		Continuous	

	12. All ladders used in construction works must be of good construction and sound material of adequate strength and be properly maintained		One-off	
	13. Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency. Such procedures must be tested at regular intervals		One-off for the design/ regularly for documentation	
	14. Ensure that adequate provisions are in place to immediately stop any operations where there is an imminent and serious danger to health and safety and to evacuate workers	Project Manager & Contractor	One-off	
	15. Ensure that the most current emergency telephone numbers posters are prominently and strategically displayed within the construction site		One-off	
	16. Provide measures to deal with emergencies and accidents including adequate first aid arrangements		Continuous	
Machinery/ equipment safety	**1.** Arrangements must be in place for the medical examination of all construction employees before, during and after termination of employment	Project Manager, Developer & Contractor	Continuous	50, 000.00
	2. Ensure that machinery, equipment, PPP, appliances and hand tools used in construction do comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded		One-off	
	3. Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain		Continuous	
	4. All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury	Project Manager	One-off	
	5. Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery use and other procedures/operations	Project Manager	Continuous	
	6. Equipment such as fire extinguishers must be examined by a government authorized person. The equipment may only be used if a certificate of examination has been issued	Project Manager	Continuous	
	7. Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register	Project Manager	Continuous	
occupational health and safety risks during construction period and occupational phase	**1.** Well stocked first aid box which is easily available and accessible should be provided within the premises	Project Manager, Developer & Contractor	One-off	100, 000.00
	2. Provision must be made for persons to be trained in first aid, with a certificate issued by a recognized body.		One-off	
	3. Firefighting equipment such as fire extinguishers and hydrant systems should be provided at strategic locations such as stores and construction areas.		One-off	
	4. Regular inspection and servicing of the equipment must be undertaken by a reputable service provider and records of such inspections maintained		Every 3 months	
	5. Signs such as “NO SMOKING” must be prominently displayed within the flat, especially in parts where inflammable materials are stored		One-off	
	6. Enough space must be provided within the premises to allow for adequate natural ventilation through circulation of fresh air	Project Manager & proponent/	One-off	

	7. There must be adequate provision for artificial or natural lighting in all parts the premises in which persons are working or passing	residents/ contractor	One-off	
	8. Circuits must not be overloaded		Continuous	
	9. Distribution board switches must be clearly marked to indicate respective circuits and pumps		One-off	
	10. There should be no live exposed connections		Continuous	
	11. Electrical fittings near all potential sources of ignition should be flame proof		One-off	
	12. All electrical equipment must be earthed		One-off	
	13. Develop a suitable system for the safe collection, recycling and disposal of chemical wastes, obsolete chemicals and empty chemical containers to avoid their reuse for other purposes and to eliminate or minimize the risks to safety, health and environment		One-off	
	14. Ensure that all chemicals used in construction are appropriately labeled or marked and that material safety data sheets containing essential information regarding their identity, supplier's classification of hazards, safety precautions and emergency procedures are provided and are made available to employees and their representatives		One-off	
	15. Keep a record of all hazardous chemicals used at the premises, cross-referenced to the appropriate chemical safety data sheets		Continuous	
	16. There should be no eating or drinking in areas where chemicals are stored or used		Continuous	
	17. Provide workers in areas with elevated noise and vibration levels, with suitable ear protection equipment such as ear muffs		One-off	
	18. Ensure that construction workers are provided with an adequate supply of wholesome drinking water which should be maintained at suitable and accessible points.	Project Manager & Contractor	One-off	
	19. Ensure that conveniently accessible, clean, orderly, adequate and suitable washing facilities are provided and maintained in within the site			
	20. Provision for repairing and maintaining of hand tools must be in place			
	21. Hand tools must be of appropriate size and shape for easy and safe use			
	22. Height of equipment, controls or work surfaces should be positioned to reduce bending posture for standing workers			
Safety and security	**1**. Ensure general safety and security at all times by providing day and night security guards and adequate lighting within and around the construction site.	Project Manager & Contractor	Continuous	10, 000.00 per month
Oil Spills	**1.** A designated garage section of the site fitted with oil trapping equipment to be planned for changes. Such an area will be well protected from contaminating the soil			5, 000.00n per month
Increased Food Supply/demand	**1.** Construction workers will be given breaks to go for lunch	Project Manager & Contractor	Continuous	50, 000.00
	2. Onsite canteen to supply food if possible			
Hydrology and	**1.** Hazardous substance control and emergency response plan that will include preparations for quick and safe	Mechanical	Continuous	Part of erosion

Water Quality Degradation	cleanup of accidental spills. **2.** Hazardous-materials handling procedures to reduce the potential for a spill during construction **3.** Identify areas where vehicle maintenance activities and storage of hazardous materials, if any, will be permitted	Engineer, Project Manager, Contractor & the Developer		control
Vector / Water Borne Diseases	1. Complete refuse collection and handling service to be provided	Mechanical Engineer	Continuous	50, 000.00
Exposure to Diseases	**1.** Shall be mitigated by occupational health and safety standards enforcement	Contractor & all foremen	Continuous	
Increased Pressure on Infrastructure	**1.** Coordinate with other planning goals and objectives for region **2.** Upgrade existing infrastructure and services, if and where feasible.	Architect, Project Manager, Contactor and the Developer	Continuous	
Insecurity	**1.** Appoint security personnel operating 24 hours **2.** Body-search the workers on entry, to avoid getting weapons on site, and leaving site to ensure nothing is stolen. **3.** Ensure only authorized personnel get to the site	Security Officer, Resident Project Manager & Police	Continuous	Part of general safety
Air Pollution	**1.** Suitable wet suppression techniques need to be utilized in all exposed areas **2.** All unnecessary traffic must be strictly limited on site; speed controls are to be enforced	The Contractor & Site Safety Officer	Continuous	Part of dust control
Emergence of new environmental concerns	1. Due to the magnitude of the project, the Firm of experts should carry out monitoring and evaluation. More so an initial environmental audit should also be carried within a period of 12 months after commencement of the operations	Firm of Experts.	Continuous	200, 000.00

8.2 Operational Phase EMP

The necessary objectives, activities, mitigation measures, and allocation of responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the operational phase of proposed Housing Project are outlined in the table below.

Table 12: Environmental management/monitoring Plan for the operational phase

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Estimated Cost (Kshs)
Solid waste generation	**1.** Use of an integrated solid waste management system i.e., through a hierarchy of options: 1. Source separation and reduction 2. Recycling 3. Composting and reuse 4. Combustion 5. Sanitary land filling.	Project Manager & Contractor	Throughout construction period	20, 000.00 per month
	2. Provide solid waste handling facilities such as rubbish bags and skips		One-off	
	3.Ensure that solid wastes generated at the housing units are regularly disposed of appropriately at authorized dumping sites		Continuous	
	4. Ensure that occupants of the housing units manage their waste efficiently through recycling, reuse and proper disposal procedures.			
	5. Donate redundant but serviceable equipment to charities and institutions			
	6. A private company to be contracted to collect and dispose solid waste on regular intervals			
Release of sewage into the environment	**1.** Provision of adequate and safe means of handling sewage generated at the block of flats via connection to the KWSC system	Project Manager & Mechanical Engineer	One-off	10, 000.00 per month
	2. Conduct regular inspections for sewage pipe blockages or damages and fix appropriately		Continuous	
	3. Ensure regular monitoring of the sewage discharged from the project to ensure that the stipulated sewage/effluent discharge rules and standards are not violated			
High demand for energy	**1.** Switch off electrical equipment, appliances and lights when not being used	Project Manager & Occupants of the housing units	Continuous	Part of the main budget
	2. Install occupation sensing lighting at various locations such as storage areas which are not in use all the time		One-off	
	3. Install energy saving fluorescent tubes at all lighting points within the flats instead of bulbs which consume higher electric energy		One-off	
	4. Monitor energy use during the operation of the project and set targets for efficient energy use		Continuous	
	5. Sensitize Housing Units occupants to use energy efficiently		Continuous	500, 000.00
	6. Explore the possibility of using renewable sources of energy such as wind and solar energy as per the provisions of the 2012 Energy (Solar Photovoltaic Systems) Regulations		One-off	
High water demand	**1.** Promptly detect and repair water pipes and tank leaks	Project Manager & Mechanical Engineer	Continuous	10, 000.00 month
	2. Residents to conserve water e.g., by avoiding unnecessary toilet flushing.			
	3. Ensure taps are not running when not in use			

	4. Install water conserving taps that turn-off automatically when water is not being used		One-off	
	5. Install a discharge meter at water outlets to determine and monitor total water usage			
	6. Create water conservation awareness as well as installing rain water harvesting structures into place		Continuous	
Increased health and safety impacts	**1**. Implement all necessary measures to ensure health and safety of workers and the general public during operation of the housing project as stipulated in Factories and Other Places of Work Act Cap 514	Project Manager, Mechanical Eng. & Developer	Continuous	100, 000.000
Increased general safety and security impacts	**1.** Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.	Security Officer, Project Manager & Police	Continuous	
Increased Pressure on Infrastructure	**1.** Coordinate with other planning goals and objectives for region	Architect, Manager, and the Developer	Continuous	100, 000.00
	2. Upgrade existing infrastructure and services, if and where feasible.		Continuous	
Insecurity	**1.** Ensure there is an appointed security provision company at the site operating 24 hours	Security Officer, Project Manager & Police Security Officer	Continuous	Part of the general budget
	2. Body-search the workers on entry, to avoid getting weapons on site, and leaving site to ensure nothing is stolen.			
	3. Ensure only authorized personnel get to the site			
Air Pollution	**1.** Suitable wet suppression techniques need to be utilized in all exposed areas	Site Safety Officer	Continuous	10, 000.00 per month
	2. All unnecessary traffic must be strictly limited on site speed controls are to be enforced	Site Safety Officer; Proponent and EIA Experts	Continuous	
	3. Use of unleaded fuel to be encouraged		Continuous	
Emergence of new environmental concerns	**1**. Undertake an environmental audit within 12 months after operation commences as required by law		Continuous	Quoted earlier

8.3 Decommissioning Phase

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

Table 13: Environmental Management/Monitoring Plan for the decommissioning phase

Recommended Mitigation Measures	Responsibility	Time Frame
1. Demolition waste management		
1.All buildings, machinery, equipment, structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible	Contractor, Proponent	One-off
2.All foundations must be removed and recycled, reused or disposed of at a licensed disposal site		
3.Where recycling/reuse of the machinery, equipment, implements, structures, partitions and other demolition waste is not possible, the materials should be taken to a licensed waste disposal site		One-off
4.Donate reusable demolition waste to charitable organizations, individuals and institutions		One-off
2. Rehabilitation of project site		
1. Implement an appropriate re-vegetation programme to restore the site to its original status	Contractor, Proponent	One-off
2. Consider use of indigenous plant species in re-vegetation		One-off
3. Trees should be planted at suitable locations so as to interrupt slight lines (screen planting), between the adjacent residential area and the development.		Once-off

8. CONCLUSIONS AND RECOMMENDATIONS

The objective of the study was to provide not only the client with significant and sufficient information about the proposed project but also the authority. It is hoped that this information will be used to evaluate whether the proposed project is likely to have significant negative socio-economic and cultural impacts that outweigh the positive impacts. It is anticipated that the proposed development project would bring substantial benefits to the local communities within the project area.

After the mitigation proposed in this study, it is unlikely that this project will have significant adverse social and environmental impacts if only the mitigation measures are adequately put in place. Most negative impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the Project such that the overall benefits from the Project will greatly outweigh the few adverse impacts.

The consultant proposes the following recommendations:

- The proponent should consider implementing all the proposed measures in this report.
- In regards to increase in HIV&AIDS prevalence, trainings and awareness creation on HIV&AIDS should be conducted.
- In light of the COVID pandemic, all protocols as directed by the MoH should be strictly adhered to.
- The project proceeds as planned with the mitigation measures integrated in its implementation.
- During project implementation period ensure systems for management are in place including; health safety procedures, waste management plans among other plans that may be necessary.
- During the operation phase, proper handling of waste is highly recommended. Plans for dealing with various waste streams should begin at the design and planning stages of the proposal.
- Strict adherence to the proposed mitigation measures and the EMP
- Apply for and acquire all relevant licenses and permits necessary for the implementation and operation of the residential housing.

9. APPENDICES

i. Appendix I: Experts practicing license
ii. Appendix II: Proponent Registration Certificate and PIN Certificate
iii. Appendix III: Land ownership documents
iv. Appendix IV: Project plans and designs
v. Appendix V: Bill of Quantities
vi. Appendix VI: Public Consultation Questionnaires
vii. Appendix VII: Public Consultation Minutes
viii. Appendix VIII: NEMA Payment Invoice and Receipts
ix. Appendix IX: Sample Public Meeting Public Notices
x. ESIA Study Terms of Reference Approval

10.1 Appendix I: Experts Practicing License

FORM 7 (r.15(2))

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/18295

Application Reference No: NEMA/EIA/EL/23981

M/S **DEVLINK RESOURCES CONSULTANTS**
(individual or firm) of address
P.O. Box 76065 - 00508 NAIROBI

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts** registration number **2355**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **12/30/2022** Expiry Date: **12/31/2023**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001: 2015 Certified

FORM 7 (r 15(2))

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/18293

Application Reference No: NEMA/EIA/EL/23979

M/S **PATRICK KYALO KITUTA**
(individual or firm) of address
P.O. Box 76065 - 00508 NAIROBI

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
General
registration number **1275**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **12/30/2022** Expiry Date: **12/31/2023**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

10.2 Appendix II: Proponent Registration Certificate and PIN Certificate

10.3 Appendix III: Land Ownership Documents

10.4 Appendix IV: Project Plans and Designs

10.5 Appendix V: Bill of Quantities

10.6 Appendix VI: Public Consultation Questionnaires

10.7 Appendix VII: Public Consultation Minutes

10.8 Appendix VIII: NEMA Payment Invoice and Receipts

10.1 Appendix X: Public Consultation Forms