



**ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE
PROPOSED CIVIL SERVANTS HOUSING SCHEME FUND HOUSING
PROJECT IN KIAMBU TOWN, KIAMBU COUNTY.**



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In Accordance with

Environmental Management and Coordination Act (EMCA), 1999

And

Environmental Management and Coordination (Amendment) Act,

EMCA, 2015.

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CLIENT BACKGROUND

The Ministry of Transport, Infrastructure, Housing and Urban Development was established under the newly promulgated Kenyan Constitution, 2010 which came into action on 27th, August, 2010. The ministry plays a leading role of developing/facilitating and sustaining/maintaining world class transport, infrastructure, maritime economy, public works and housing for sustainable socio-economic development.

The ministry has a total of five (5) State Departments, namely;

1. State Department for Transport,
2. State Department for Infrastructure,
3. State Department for Housing and Urban Development,
4. State Department for Maritime and Shipping Affairs, and
5. State Department for Public Works.

Under the Ministry, the State Department for Housing and Urban Development is mainly responsible for managing the housing policy, developing and managing affordable housing, managing buildings and construction standards and codes, and managing civil servants housing scheme, among other key functions.

The Civil Servants Housing Scheme Fund is under the Housing and Urban Development department, and was established from the National Housing Policy in 2004 through the enactment of The Civil Servants (Housing Scheme Fund) Regulations, 2004. The Regulations came into force on 1st September, 2004 with a key objective of promoting/facilitating the development of housing units for civil servants.

The Civil Servants Housing Scheme Fund has developed Ngara, Kilimani, Kileleshwa and Nyeri Road Housing Projects in Nairobi. The proposed housing project in Kiambu is among the many ongoing and proposed housing projects which includes;

- i. Kisumu Shauri Moyo project -250 Units
- ii. Machakos housing project -250 Units
- iii. Kiambu housing project -200 Units
- iv. Embu Housing Project -300 Units
- v. Nyeri Housing Project -200 Units

The Scheme also develops housing projects based on public private partnerships in most parts of the country. The first phase of such projects is proposed implementation/being implemented in the following sites;

- | | | |
|------|------------------------------|---------------------------------|
| i. | Shauri Moyo Estate, Nairobi | -2,000 Units |
| ii. | Starehe Estate, Nairobi | -6,400 Units |
| iii. | Park Road Estate, Nairobi | -1,800 Units |
| iv. | Muguga Green Estate, Nairobi | -Mixed Use Development project |
| v. | Hobley Estate, Mombasa | -Mixed Use Development project. |

Apart from developing housing projects for the civil servants, the Fund also offers civil servants' housing mortgages through its State Officers House Mortgage Scheme Fund (SOHMSF) programme.

EXECUTIVE SUMMARY

The Ministry of Transport, Infrastructure, Housing and Urban Development, herein referred to as the proponent, through the State Department for Housing and Urban Development's Civil Servants Housing Scheme Fund proposes to construct housing blocks comprising of one, two and three bedroomed housing units complete with parking slots for each block within its existing Indian Bazaar government pool houses scheme located along Kiambu town – Kanunga Road opposite the Administration Police Interdenominational Community Church (A.P. chapel). The development is to be established on GPS coordinates of Latitude 1°17'54"S and Longitude 36°83'09"E at an altitude of 1679.0 meters above sea level. The proposed development is to be developed on government land within which the current residential housing scheme/estate stands. The proposed housing project will be for the supply of houses for residential use available to civil servants only, and parking slots for the residents. The proposed development aims at providing affordable, modern and stylish houses, backed by high end infrastructure, within Kiambu Town for civil servants; accommodation services acquired for income generation to the Ministry of housing and ensuring for the continuous supply of housing services to the Civil servants to help reduce the high housing demand and shortage currently experienced in the country. The proposed project site neighbours BGM, an Administration police camp, Administration Police interdenominational community church, G.K prison, Kiambu Fire and Rescue Service station, residential buildings on either side, an agricultural farm for the prison, and a small stream flowing from West to East through the prison farm.

The proposed development is important since it supplements the housing development efforts in Kenya which remains a key challenge as the shortage is very high as compared to the supply; facilitates housing provision and acquisition by the government employees; provides employment opportunities during all project phases ranging from designing, planning, construction, operational and decommissioning to all the people involved in such activities; generates revenue to the national and county governments from various levies charged for the project during its pre and post implementation stages; enhances the business and economic growth of the entire Kiambu area, county and the national economies; improves income earning capacities of the local people from the area improving their social and economic lives as well as conserving and managing the environment sustainably and promoting environmentally friendly development in coexistence with the natural environment integrated throughout its Environmentally sustainable designs.

The proposed housing development will consist of a total of two hundred and fifty (200) housing units designed into eight (8) residential building blocks detailed into thirty (30) one bedroom units per block each with a floor space area of 46M², twenty (20) two bedroom units per block, each with a floor space area of 74M², ten (10) three bedroom units per block, parking slots for both the residents and the visitors, basement parking, footpaths, and access roads for easy navigation within the compound. Both the designs and plans³ of the housing blocks and all other facilities has put into consideration various environmental aspects that will ensure that the proposed project coexist freely with the surrounding natural environment.

The main project activities will be clearance of vegetation in the proposed areas to a small extent, demolition of the existing buildings and fence pillars, decommissioning of the demolished areas, excavation (earthworks) of the proposed site, construction of the residential building blocks foundations to the required depth and standards, the construction of the houses, construction of the footpaths, access roads, storm water drainage system, access conduits, retaining walls within the scheme, occupancy (operation) of the housing units, and their decommissioning thereafter, only, if need be. The project activities will have minimal environmental impacts of vegetation loss as a result of vegetation clearance, dust emission (air pollution) during earthworks, noise pollution from machines, vehicles, equipment movement and other noise emitting construction activities and water pollution (to a negligible extent) due to excavations and liquid wastes originating from within the site. Various mitigation measures on how to mitigate these impacts plus other unforeseen impacts has been proposed and drawn in the provisional Environmental and Social Management and Monitoring Plan (ESMMP) for implementation by the contractor and project proponent to ensure that the proposed development project don't affect the environment but ensure environmentally friendly sustainable development.

The EIA process was based mainly on past literature review, extensive desktop study and field investigation on July, 2017, key informants interview and questionnaire surveys, Review of relevant policies, laws, regulations, legal and institutional frameworks regarding air, water and environment, drafting of an Environmental and Social Management and Monitoring Plan (ESMMP) encompassing all project phases and factors of noise, air and water pollution, and the general impacts on the surrounding environment of the proposed development project and its activities were all considered to ensure for environmental protection. In order to ensure compliance

with the relevant legislations and environmental protection, Environmental Impact Assessment Project Study Report was undertaken pursuant to the requirements stipulated by the National Environmental Management Authority (NEMA) under the Environmental Management and Coordination Act (1999) that requires all development projects listed under Schedule II (8) of the EMCA Act, 1999, to undergo an Environmental Impact Assessment Study to determine its potential adverse impacts and thereby devise appropriate mitigation measures.

Introduction

Most urban centres in Kenya especially Nairobi faces the never ending problem of housing shortage which stands at 250,000 housing units per annum as per the Ministry of Lands and Housing statistics, and affordable, convenient parking facilities. This has called for different approaches in order to arrive at an amicable solution to the problems.

- The proposed development project is projected to increase affordable housing supply, significantly influence land use and spur development in the areas around Kiambu,
- Result in high property value escalation due to the forecasted high demand of land and properties around the area,
- Improved business investment for investors wishing to invest in the area as a result of the development being undertaken and finally,
- Promoting environmentally friendly housing designs and plans that will change future housing designs and development but promote sustainable development and environmental conservation.
- The project activities involving construction inputs ranging from construction materials, labour, machineries, equipments among others will create many job opportunities to many local people, promote business and economic growth, enhance exchange of expertise and technical knowhow among the different categories of workers working at the site as well as promote intercultural interactions which are important for cohesion and project implementation.

The proposed development project is in line with the requirements of Constitution of Kenya, 2010, National Housing Policy, 2004 and Kenya Vision 2030, all which puts emphasis on infrastructural development especially in housing sector given the per annum urban housing shortage of approximately 250,000 housing units currently experienced in most urban centres. The policies

and development plans requires that Kenyan residents have access to clean, healthy and secure environment for posterity. These legal frameworks also recognise the efforts and contribution of government initiatives in provision of housing services and in helping solve the problem of housing shortage and parking facilities provision in the country. In regards to this, the proposed development project is intended to improve the economic and social welfare of people by enhancing access to jobs, affordable housing, affordable parking facilities, education, and health services which is in line with the goals and targets of various legal frameworks on housing development and parking facilities provision. The expected negative impacts of the construction and operation activities of the proposed housing, access roads, footpaths, and parking slots development to nearby communities and the natural environment around such areas include disturbances to the natural environment through vegetation clearance, soil erosion, landscape changes, noise pollution, underground water pollution, dust pollution as a result of excavation works, concrete mixing involving cement and lime, exhaust fumes from on-site heavy vehicles, machinery, equipment, tractors and trucks, noise pollution from various project activities and interference with animal and plant life. These will be mitigated through the implementation of the drafted ESMMP

Project Justification

The proposed housing project development in Kiambu town is key in enabling both government civil servants, foreign and Kenyan residents access affordable housing/dwelling places and their associated facilities in a healthy, clean and secure environment as stipulated by the relevant national legislations, working together with the national government as a private investors/developers to provide affordable housing and its associated facilities to help solve the problem of housing shortage that currently stands at approximately 250,000 housing units per annum as per the statistics of the Ministry of Lands and Housing, thus contributing towards the national and global goal of eliminating the problem and helping accomplish Kenya's legislative, development goals and plans, and policy frameworks like the national housing policy goals on provision of affordable housing in secure, clean and healthy environment.

Apart from contributing to the achievement of national legal and policy requirements on housing development, the proposed development earns the country revenue used for the development of various key development sectors by the national and county governments, promotes the business

and economic growth of many people (through selling of food to construction workers etc.), creates employment opportunities to many people who will provide skilled, semi-skilled and casual labour during project implementation process, increasing income earning capacities of involved local people improving their economic and social status, and provision of affordable housing to civil servants around Kiambu and Nairobi counties at large.

The project is in line with the requirements, targets, and goals of different development goals, legal, and policy frameworks (Vision 2030's Social and economic pillars, National Housing Policy of 2004, and the Constitution of Kenya, 2010) on infrastructural development which calls for the provision of affordable housing units and access by Kenyans and Non-Kenyan residents to clean, healthy and secure environment, and the objectives of the Civil Servants Housing Scheme Fund on facilitation of access to proper housing by the government employees.

Proposed project works and project report scope

The study investigates the anticipated environmental impacts of the proposed development in line with the Environmental (Impact and Audit 2003 Regulations). The report will cover and provide the following information:

- i. Baseline data of the location of the project, including physical area, human and social aspects of its surrounding environment that may be affected.
- ii. The activities that shall be undertaken during project implementation process; designing, planning, construction, operation and decommissioning phases.
- iii. Review of the policy, legal, regulations and the administrative/institutional frameworks.
- iv. The nature of the project entailing what the project is all about and its construction activities.
- v. The materials to be used, products and by-products, including wastes to be generated and methods of disposal.
- vi. The potential environmental impacts of the project and the mitigation measures to be put in place during construction, operation and decommissioning phases.
- vii. An Action Plan for the prevention and management of possible accident and injuries at the proposed project site.

EIA Objectives

The overall objectives of carrying out this EIA study is to fulfill the requirements of the Government of Kenya on environmental regulations stipulated in the Environmental Management and Coordination Act of 1999, and the project proponent's desire to safeguard the environment and make sure that the proposed project lives true to the desire of environmental sustainable development which encompasses environmental protection, conservation and management.

The specific objectives are:

- i. To identify potential positive and negative environmental impacts of the proposed project construction activities,
- ii. To assess the significance of these project construction activities' impacts,
- iii. To assess the relative importance of the impacts of alternative plans, designs, technology and sites,
- iv. To propose mitigation measures for the significant negative impacts of the project on the environment and to propose measures for improving the positive impacts (if any),
- v. To generate baseline data for implementation, monitoring and evaluation of how well the mitigation measures are being implemented during the project cycle;
- vi. To present results of the EIA study in such a way that they can guide informed decision-making by the licensing authority, NEMA, the proponent and the public.

The methodology

The methodology used in conducting and writing of this EIA report consisted of the following:

- i. A site reconnaissance and visual survey to determine the baseline information of the project area;
- ii. Comparative study of the proposed project with the existing land uses in the neighbourhood;
- iii. Review of the project documents (approved project plans, designs, land agreements) and discussions with the proponent;
- iv. Assessment of the site to detail the various existing and likely impacts of the project on the environment;
- v. Assessment of health and safety issues, and environmental conservation concerns ;
- vi. Seeking public views (immediate neighbours) through interviews and questionnaire administration on the project impacts and suitability in the area;

- vii. Proposing measures to prevent hazards; and.
- viii. Extrapolating and inferring environmental conditions and responses from baseline information or from other similar cases where actual data is lacking; and preparation and submission of the EIA study report.

In undertaking the EIA study, the experts employed a participatory approach that entailed a range of research methods including desktop review, field study, data synthesis and reporting.

Study Area

The proposed project site is located in Kiambu Town along Kiambu – Kanunga road on GPS coordinates of 1⁰17'54"S and 36⁰83'09"E at an altitude of 1679.0 m above sea level in Kiambu County. The proposed project site borders an Administration Police Camp, Administration Police Interdenominational Community Church (A.P. Chapel), G.K. Prison, Kiambu Rescue Service and Fire station, residential blocks, prison agricultural farm, and finally, a small diverted stream flowing from West to East. The proposed project site is accessible through the tarmacked Kiambu – Kanunga road off Kiambu – Nairobi road into the property's light blue main gate and compound. The proposed site is situated on a government piece of land currently hosting the India Bazaar government pool housing.

Policy, Legal and Institutional Framework

The proposed civil servants residential housing construction activities are guided and governed by a number of laws and policies of the country and region. The government has long been concerned with environmental conservation and protection of human health. It has therefore put in place all the frameworks necessary for the legislative and regulatory controls of environmental management. EMCA, 1999 was enacted to comprehensively address environmental issues which were being governed differently by the various Sectoral Acts in place.

Among the key objectives of the Policy Paper on Environment and Development (Sessional Paper No. 6 of 1999) are:

- i. To ensure that from the onset, all development policies, programmes and projects take environmental considerations into account,
- ii. To ensure that an independent Environmental Impact Assessment (EIA) report is prepared for any industrial venture or other development before implementation,

- iii. To come up with effluent treatment standards that will conform to acceptable health and safety guidelines.

Environmental and Social Management and Monitoring Plan (ESMMP)

Environmental management is a crucial segment of any development in view of the global concept of sustainable development. Therefore, the preparation of Environmental and Social Management and Monitoring Plan (ESMMP) is a must to fulfil the multifocal aspect of the statutory compliance, social and economic concern. The ESMMP involves the protection, conservation and sustainable use of the various elements of the environment. The ESMMP for the proposed project provides all the details of project activities, impacts, mitigation measures and expected costs during implementation, operation and decommissioning phases. With proper environmental management procedures in place and adhered to, there should be minimal negative impacts of concern emanating from it.

Key areas that require mitigation measures include impacts on occupational health and safety and risk management, solid and liquid waste disposal, dust, noise, soil erosion etc. Environmental and Social Management and Monitoring Plan is the key to ensure that the environmental quality of the area does not deteriorate due to the construction activities under study. There are negative impacts associated with the proposed project due to low development in the area and its proximity to a few sparsely located residential homes and businesses within the area. These are anticipated mostly during the project implementation and operational phases in the project cycle, and will include the following:

Anticipated Environmental Impacts and Mitigation Measures

The positive benefits associated with developing the proposed housing project and its associated facilities is:

- i. To ensure for the provision of affordable and sustainable housing units to the Kenyans and Non-Kenyan residents,
- ii. To facilitate easy access of housing services by the government employees as one of its mandates (Civil Servants Housing Scheme Fund) under National Housing Policy.
- iii. To ensure constant supply of affordable housing units to help solve the problem of housing shortage experienced in Nairobi (shortage of 250,000 housing units per annum),

- iv. Upgrading and face-lifting the existing government housing projects to the present required standards and increasing the housing capacity held within such areas.
- v. To ensure that environmental conservation and protection aspects are prioritized in project designing and implementation,
- vi. To ensure that the infrastructural development goals and targets envisioned in different legal, policy and long term development plans are achieved through private sector/investment contribution to country's infrastructural development.
- vii. Employment opportunities' creation to the local people.

There are also negative impacts associated with this kind of project which are;

- i. Increased solid and liquid waste production from the proposed project activities like the used cement bags and waste water.
- ii. Increased noise nuisance from heavy lorries, machineries, equipments, vehicles, trucks transporting the materials and other inputs to the site, excavating tractors and construction activities like steel metal fabrication/processing within the site and the project's general operation.
- iii. Air pollution by dust particles and gaseous emissions from movement of material transporting vehicles, excavation works by tractors and other equipments, concrete mixing, exhaust fumes from vehicles, trucks, tractors, machineries and standby power backup generator when in operation.
- iv. Risk of fires, injury and accidents during excavation works, construction, operation and decommissioning phases.
- v. Irresponsible waste handling.
- vi. Insecurity within the proposed project site.
- vii. Influx of people within the area due to created job opportunities which can propagate bad social behaviors such as irresponsible sexual behaviors, drug abuse, and theft among ill behavior motives.

Mitigation measures:

- i. Putting in place effective and efficient waste disposal systems. Solid wastes shall be collected in bins; a licensed waste handler by NEMA shall then collect the wastes

- periodically and dispose at approved waste receptacles. Wastes accumulated shall be placed in a skip awaiting collection.
- ii. The proponent shall provide acceptable and standard sanitary conveniences to the workers during construction period; the sanitary facilities are connected to the existing sewerage line connection which will act as a reservoir for liquid waste.
 - iii. All machines shall be regularly serviced through oiling of movable parts, hooting shall be controlled to ensure that there are minimum amounts of noise pollution.
 - iv. The roads shall be wetted regularly to suppress dust, and speed limits observed in and around site.
 - v. Maintenance of equipments, machines, tractors and trucks will be periodic to reduce exhaust gaseous emissions into the atmosphere.
 - vi. Accident prevention is vital, Personal Protective Equipment (PPE's) shall be provided for all workers during the construction and operation phases, a fully serviced first aid kit shall be availed on site and also the project manager shall ensure all personnel are competent in the assigned duties.
 - vii. The proponent shall adhere to the provisions of the OSHA Act to ensure safety of all persons during construction, operation and occupation stage.
 - viii. The proponent shall hire security guards to watch over the site during construction; premises and to restrict entry of unauthorized persons within the premise during the occupation and operation stages.
 - ix. Awareness creation shall be done on HIV/AIDS, drug abuse, theft, fighting and other social habits to the workers and the surrounding communities.

Conclusion

The construction of the proposed housing project and its associated facilities is expected to pose negligible negative environmental impacts of dust, noise pollution (to negligible extent), injuries, and traffic snarl up (minimal) on the surrounding environment which will be adequately mitigated through proper implementation of the proposed mitigation measures in the ESMMP. The proponent shall follow all the legal procedures necessary for the execution of a project of this nature and adequate mitigation measures have been proposed to avert any potential negative

impacts. It's therefore recommended to the licensing authority to proceed with issuance of the licence for the proposed development.

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ABBREVIATIONS AND ACRONYMS

AIDS:	Acquired Immuno Deficiency Syndrome.
EHS:	Environmental Health and Safety.
EIA:	Environmental Impacts Assessment
EMCA:	Environmental Management Co-ordination Act
ERP:	Emergency Response Plan
ESD:	Environmental Sound Design
ESL:	Earthcare Services Limited
ESMMP:	Environmental and Social Management and Monitoring Plan.
HIV:	Immuno Deficiency Virus.
KPLC:	Kenya Power and Lighting Company
M.A.S.L:	Meters Above Sea Level.
NEMA:	National Environmental Management Authority
OHS:	Occupational Health and Safety
OP:	Operation Policy
OSH Act:	Occupational Health and Safety Act, 2007
PPE:	Personal Protective Equipment
STI's:	Sexually Transmitted Infections.
UN:	United Nations.

1.0 INTRODUCTION

1.1 Background

The Constitution of Kenya, 2010 chapter five on Land and Environment recognises the right of every Kenyan to a clean and safe environment; Kenya's Vision 2030, in its social pillar of development appreciates the fact that Kenyans and Kenyan residents need to live in safe and secure environments while the National Housing Policy of 2004 has the responsibility of ensuring that every Kenyan has access to standard and quality affordable housing country wide. This is aimed at ensuring that the country's infrastructural development is improved to unlock the country's economic and social potential as envisioned in its long term development goals of attaining a middle income developed nation. The National Housing Policy through its Civil Servants Housing Scheme Fund has the mandate of facilitating employees to access better housing plus ensure for the development of affordable housing for civil servants.

Due to rapid urbanization and high population increase in Nairobi and its environs, the demand for housing services has been high while the supply has been low creating a shortage gap of approximately 250,000 housing units per annum for housing sector. The national government recognises the contributions and roles of private sector and investors in housing sector in offsetting this shortage and ensuring sustainable supply of affordable and quality housing to the civil servants.

The proposed development project is in line with these national legal, policy and development goals as it aims at constructing and supplying more affordable and quality housing units and their associated facilities' services to the Kenyan residents living in Kiambu and its neighbourhoods. The project is also viable as it will result in the escalation of property values around Kiambu, income generation to both the proponent through investment and service delivery, and the locals through businesses, earn the national government revenue for economic growth and infrastructural development, create employment opportunities to the locals, economic and business growth, urbanisation, improvement in social and economic status of the local communities' members and promote entrepreneurial culture among the aspiring entrepreneurs to start investing.

Therefore for the proposed project to realize its dreams of initiation of supplying affordable and quality housing services to the civil servants and spurring economic growth and infrastructural

development in Kiambu and its environs, it is advisable that the project proponent be allowed to implement the proposed project but be guided by the existing stipulated legal and policy regulations.

1.2 Definition of Technical Terms

The following words or phrases shall be limited to the meaning indicated against them:

Environment includes the physical factors of the surroundings of human beings including land, water, atmosphere, climate, sound, odours, taste, the biological factors of animals and plants and the social factor of aesthetics and includes both the natural and the built environment.

Environmental management includes the protection, conservation and sustainable use of the various elements or components of the environment.

Environmental Monitoring means the continuous or periodic determination of actual and potential effects of any activity or phenomenon on the environment.

Noise means any undesirable sound that is intrinsically objectionable or that may cause adverse effects on human health.

Overburden soil means soil and/or soft rock above materials to be excavated, removed and replaced.

Pollution means any direct or indirect alteration of the environment so as to affect any beneficial use adversely.

Project includes any project, programme or policy that leads to projects which may have an impact on the environment.

Project report means a summary statement of the likely environmental effects of a proposed development.

Proponent means a person proposing or executing a project, programme, or undertaking that can affect the environment.

Reuse is the use of a product more than once in its original form, for the same or a new purpose.

Waste means any matter discharged, emitted or deposited in the environment in such volume, composition or manner likely to cause an alteration of the environment.

1.3 Project Objectives

The proposed development project has the responsibility of supplying affordable and quality housing services aimed at promoting infrastructural development of the area and country at large.

However, the other objectives of this project are:

- i. Provision of affordable and quality housing for civil servants,
- ii. Upgrading and face-lifting the existing housing infrastructures within the area to the required modern standards,
- iii. Increasing the number of housing units to accommodate more occupants thus helping in bridging the housing shortage gap within the area and country at large.
- iv. Helping bridge the housing shortage gap by contributing to housing development in the country,
- v. To promote economic growth and infrastructural development through housing development and service provision,
- vi. To generate revenue to the national government for economic development,
- vii. To improve the social economic welfare status of the local community members around Kiambu area and its nearby environs,
- viii. To provide parking yards for the construction work heavy vehicles (concrete trucks) and machineries (tractors) transporting the concrete and loading the materials into the compartments when not in use during the project implementation and to the house owners when in operation (occupation) stage.
- ix. Income generation to the people involved in various project implementation stages.
- x. To boost business growth within the locality as a result of sprouting businesses meant to serve the new development workers and occupants.
- xi. To promote ecologically and environmentally friendly and sound building designs, plans and implementation process that will ensure for environmental conservation, management and protection.

1.4 Justification

The proposed serviced housing project and its associated facilities is key in enabling the Kenyans and Kenyan residents access affordable houses in healthy and secure environment as stipulated by the relevant national legislations; working together with the national government as a private

developer to provide affordable housing; and help solve the problem of housing shortage that currently stands at approximately 250,000 housing units per annum as per the statistics of the Ministry of Lands and Housing, thus contributing towards the national and global goal of eliminating the problem and helping accomplish Kenya's legislative, development goals and plans, and policy frameworks like the National Housing Policy goals on provision of affordable housing in secure, clean and healthy environment.

The designing and planning of the housing blocks and their associated facilities has put into consideration the environmental and ecological designing aspects that are meant to be in harmony with the surrounding natural environment and promote environmental protection. This conforms to the requirements of sustainable development in coexistence with the surrounding environment.

Apart from contributing to the achievement of national legal and policy requirements on housing development, the proposed development earns the country revenue used for the development of various key development sectors by the national and county governments, promotes the business and economic growth of most people (through selling food to construction workers), creates employment opportunities to many people who will provide skilled, semi-skilled and casual labour during project implementation process, increasing income earning capacities of involved local people improving their economic and social status, and provision of affordable housing to civil servants around Kiambu and its neighbourhoods.

The implementation of this project is posed to have minimal environmental impacts on the surrounding environment and the Environmental and Social Management and Monitoring Plan for managing the expected impacts has been drafted and compiled inclusive of all environmental conditions and the expected negative environmental impacts from the project activities. It is therefore logical that the project be allowed for implementation given its immense benefits to the country's economic and social growth, development, provision of affordable and sustainable housing units, business growth and the improvement of local people's social and economic life status, and conservation of the environment which by far outweighs the project's negative impacts which are mitigatable upon proper implementation of the proposed Environmental and Social Management and Mitigation Plan (ESMMP). The project is in line also with the requirements, targets, and goals of different development goals, legal, and policy frameworks (Vision 2030's Social and economic pillars, National Housing Policy of 2004, and the Constitution of Kenya,

2010) on infrastructural development which calls for the provision of affordable housing units and access by Kenyans and Kenyan residents to clean, healthy and secure environment.

1.5 EIA Objectives

The overall objectives of carrying out this EIA study is to fulfil the requirements of the Government of Kenya on environmental regulations and the project proponent's desire to safeguard the environment and make sure that the proposed project activities live true to the desire of environmental sustainable development.

However, the specific objectives of the EIA study are:

- i. To identify potential positive and negative environmental impacts of the proposed project activities,
- ii. To assess the significance of these impacts,
- iii. To assess the relative importance of the impacts of alternative plans, designs and sites,
- iv. To propose mitigation measures for the significant negative impacts of the project on the environment,
- v. To generate baseline information for monitoring and evaluation of how well the mitigation measures are being implemented during the project cycle, and
- vi. To present results of the EIA study in such a way that they can guide informed decision-making.

1.6 Scope of the study.

The study investigates the anticipated environmental impacts of the proposed development in line with the Environmental (Impact and Audit 2003 Regulations). The report will cover and provide the following information:

- i. Baseline data of the location of the project, including physical area that may be affected.
- ii. The activities that shall be undertaken during the development project implementation process; construction, operation and decommissioning phases.
- iii. Review of the policy, legal and the administrative/institutional framework.
- iv. The nature of the project.
- v. The materials to be used, products and by-products, including wastes to be generated and methods of disposal.

- vi. The potential environmental impacts of the project and the mitigation measures to be put in place during construction, operation and decommissioning phases.
- vii. An Action and Mitigation Plan for the prevention and management of possible accidents at the proposed project site.

1.7 Methodology

The methodology used in conducting and writing of this EIA study report consisted of the following:

- i. A site reconnaissance and visual survey to determine the baseline information of the proposed project;
- ii. Comparative study of the proposed project with the existing land uses in the neighbourhood;
- iii. Review of the project documents and discussions with the proponent;
- iv. Assessment of the site to detail the various existing and likely impacts of the project on the environment;
- v. Assessment of health and safety issues and conservation concerns ;
- vi. Seeking public views (immediate neighbours) through interviews, discussion and questionnaire administration on the project impacts;
- vii. Proposing measures to prevent hazards; and.
- viii. Extrapolating and inferring environmental conditions and responses from baseline information or from other similar cases where actual data is lacking; and preparation and submission of the EIA Project report.

In undertaking the EIA study, the experts employed a participatory approach that entailed a range of research methods:

Desktop Review

This involved desk studies and review of all relevant available documents on the project activities, design, plans and components from the client. The team also reviewed all the available and relevant national and international legal environmental documents, standards and guidelines. In addition, national and county level (planning) documents (such as Vision 2030, The 2010 Constitution, Nairobi County Integrated Development Plan, National Housing Act and Policy, The Civil Servants (Housing Scheme Fund) Regulations 2004, and the Amendment Regulations of 2015,) relevant to the project area were reviewed. Area maps and plans were similarly reviewed.

Field Study

The study relied mainly on research (qualitative and quantitative) and public forum. Reconnaissance and field visits to the proposed project site in Kiambu Town to obtain more data and consult the stakeholders and the public about the proposed project. This established the nature of the surroundings which included existing infrastructure, economic and social set up of the local communities whose normal daily activities will be and/or are likely to be affected by the project, as well as collecting their views on the proposed project. Similarly, observations entailed documentation on the physical characteristics of the area including the biological environment. Interviews and questionnaire administration for public participation were carried out with neighbours to the project as well as those most likely to be affected by the project. Additional consultations with project contact person Mr. Abuga provided essential background and baseline information on the proposed project.

Data Synthesis

The data collected was analysed and used to prepare a comprehensive Environmental and Social Management and Monitoring Plan (ESMMP) encompassing the potential impacts, mitigation measures and monitoring indicators which form part of this report.

Reporting

The main output of this study is an EIA study report comprising of executive summary, assessment methodology, project description, study area, legal and institutional framework, project anticipated impacts and an Environmental and Social Management and Monitoring Plan (ESMMP).

2.0 PROJECT DESCRIPTION, DESIGN, PROCESSES, WASTES AND PRODUCTS

2.1 Nature of the Project

The proposed housing project and its affiliated facilities to be developed are mainly for use by the civil servants. The development will comprise of several blocks of residential flats in different categories of one, two, and three bedrooms.

The housing blocks are to be developed in a place where the residents and guests will enjoy peaceful tranquil and relaxed environment with nature walkways, breath fresh air freshened by area's natural vegetation, and enjoy an exquisite natural environmental beauty.

The development brings with it recreational facilities, well landscaped gardens, parking slots, access roads, footpaths, and modern infrastructure. The project will also see the housing blocks and their associated facilities connected to the infrastructures in the area like the existing sewer line, road network, electric power grid, construction of parking slots and the storm water drainage systems in the area all developed as per the stipulated standards of the Physical Planning Act of 1996, The Public Health Act and The County Council's standards. In order to ensure for environmental conservation and efficiency in their operations, the housing flats and blocks, and their associated facilities have been environmentally soundly designed to promote environmental management, protection and conservation.

2.2 Site Description

The proposed housing project site currently has been cleared with only one block left near the gate, the block will be used as a site office when construction kicks. The site has been levelled in preparations for the construction activities that are expected to start ones NEMA grants a go ahead license. The site neighbours an Administration Police Camp, Administration Police Interdenominational Community Church (A.P. Chapel), G.K Prison, Kiambu Fire and Rescue Service station, residential houses, Prison agricultural farm, a small stream flowing from West to East through the agricultural farm and the Kiambu – Kanunga road to which its main gate adjacent to. The site is bare after clearance of the vegetation. The proposed site is fenced with wire mesh reinforced with concrete pillar with a light blue gate as the main gate and entry point into it. The site is accessible through the Kiambu – Kanunga road off Kiambu – Nairobi road.



Photo 1: The site adjacent Kiambu - Kanunga road, the neighbouring administration police interdenominational community church sign post/gate and the site neighbouring residential flats in the area.

2.3 Project Description

The proposed development consists of two hundred and fifty (200) housing units, designed into eight (8) residential housing building blocks composed of one, two, and three bedroom housing units, six parking slots, access roads and a footpath and their ancillary services. The housing blocks and their associated facilities will consist of the following detailed sections respectively;

Layout:

The development will have an appropriate mix of 1, 2 and 3 bedroom housing units, in five storey blocks that offer affordable housing units. Each unit will have a private access for privacy purposes but will share a main common staircase passage located within the building. Each housing unit will be designed into lounge, pantry, kitchen, balcony, laundry room, passage, washrooms (depending with the type of unit, i.e. one, two or three bedroom), and bedrooms (numbers varying according to the type of the unit).

The floor layout plans are designed in a way that the one bed roomed units will each occupy an area of $46M^2$, two bed roomed units covering an area each of $74M^2$ and the three bedroomed housing units covering undisclosed area in a five storey building flats.

Circulation:

Access roads and footpaths will be constructed to ensure for the smooth navigation of the vehicles and residents within the property compound. These will be enhanced by the parking slots designed to be constructed along these routes to ensure for easy and convenient parking of vehicles, vehicle movement and human movement within the area. The entire property compound will have a total six parking serving both the residents and the guests with one being a flood parking bay capable of hosting many vehicles at ago.

2.5 Design

The design of various structural, engineering and physical works to be used will be in line with the requirements of the Physical Planning Act of 1996, Public Health Act standards and requirements for sanitary works, the Nairobi City Council physical planning standards, National Construction Authority and regulations for structural and building development, and the Housing policy requirements and standards.

Critical areas of design which will consider these regulations and standards will be;

- i. The structural and engineering planning standards and requirements in designing of the building walls, foundations, and the strengthening of various building slabbings and wall.
- ii. The plumbing works within the buildings involving fixing and piping connections for sewerage, water and gas (if any).
- iii. Engineering works involving designing of electrical connection within the buildings, designing the elevator area, storm drainage and sewerage drainage systems within the buildings.
- iv. Mechanical, structural, construction and civil works should be designed and carried out accordingly,
- v. The general designing of the different sections of the houses is to the required planning standards and requirements.

2.6 Area Accessibility

The main mode of transport into the project area is by road as it is served by major road networks within Kiambu County. The main means of transport to the area includes vehicle, motor bike, foot, air among others.

The following are the main road networks connecting the project area to the surrounding areas;

- i. The Kiambu – Nairobi road. The site is situated a few metres from where the site is located.
- ii. The Kiambu – Kanunga road off the Kiambu – Nairobi road. The road serves the property as it is the main road which is adjacent to the site’s main gate linked with a footpath.

The project area is also linked to main airports in the country like the Jomo Kenyatta International Airport and Wilson Airport via the Kiambu - Nairobi road through the Eastern and Northern Bypasses which takes only a few minutes time. The project implementation will mainly entail the undertaking of processes like demolition of the existing buildings, decommissioning the resulting land surface, clearing of grown vegetation in the area, removal of overlaying/overburdening soil through excavation, levelling the ground, construction of the buildings foundations, concrete slabs, walls, ceiling boards, roofing; inspection and issuance of occupation certificate; occupation and operation of the housing blocks.

2.7 Project Construction activities and inputs

The construction activities will involve the construction of the hoarding structures to cordon off the proposed site from the general public, earthworks (vegetation clearance and ground excavation) in selected areas, and the construction of building foundations. The subsequent construction activities shall include the following:

- i. Assembling of the material inputs, equipments, trucks and machineries required for the proposed construction activities.
- ii. Hiring the required personnel like the EHS Officers, engineers, human resource persons, security guards, site workers (skilled, semi-skilled and casual laborers) among others.
- iii. Clearing of the construction site of debris including the overburden soil.
- iv. Commencing the construction activities according to the laid out project implementation timeframe, plans and designs.
- v. Making the final touches on the finished areas.
- vi. Connection to the necessary services such as electricity, sewerage and water.
- vii. Occupation and the operation of the housing scheme after the acquisition and issuance of an occupancy certificate as required by the Physical Planning Act of 1998 standards and regulations.

The proposed construction activities are expected to commence only after the issuance of an EIA report study license by the regulating authority in charge, (NEMA).

Inputs

The proposed development will utilize the following material inputs during the proposed construction activities:

- i) **Land:** - This is where the proposed buildings' foundation works will be carried out, storm drainage systems, sewerage works and underground electric cabling will be undertaken. The required land has already been identified, (The India Bazaar Government Pool Houses).
- ii) **Labour:** Qualified engineers, surveyors, foremen and draughtsman, skilled and semi-skilled, casual labourers, health and safety officers shall be involved in the implementation of the proposed project. The proponent shall source local labour as necessary during the entire project cycle.
- iii) **Fuel:** The machines to be used, trucks, tractors, equipments and Lorries will require fuel to run them during the excavation works, material input supply and transportation process, concrete mixing, and inspection.
- iv) **Material inputs:** The material inputs for the buildings' construction work include cement, sand, tiers and struts, water, stainless steel metal and glass, aggregates (rocks, gravel, soil etc.), electrical wires for electricity connection, cast iron, versatile tiles for floors, building stones for the construction of the foundation, aluminium glass for doors and windows, window cills, UPVC waste drain pipes for drainage systems, hoop irons for walls reinforcement, hardcore materials, inspection plates at the bends, tar and ballasts for the construction and tarmacking of the bays, different colour paints for walls, fibre board clad for reinforcing masonry block work wall, PCC coping for building pillars, window casements, water tanks and water pipes, roofing tiles/materials, spades, wall, glass and steel metal drilling machines, timber, barbed wire, hand held tools applicable to the proposed development project among other materials. During the operation phase of the proposed development, key material inputs for use will be water and air. The contractor will ensure that no material inputs will be delivered to the site without being tested and accompanied by a compliance certificate including the readily supplied materials like cement.

During the time of the EIA study field visit, preparations had not begun as the site still had the occupied existing building. The proposed site is still in its original natural condition with the existing developments and natural vegetation within the area remaining intact.

2.8 Project proposed works

The project will be implemented in phases starting with the most critical project works and the most needed facilities/structures.

The proposed project works will include;

- i. General designing and planning of the proposed housing units and their associated facilities,
- ii. **Construction work** which will involve mainly provision of dump roof course under all external walls, construction of building slabs, treating of soils under slab and around external foundation for termite control, construction of building foundations and finishing window cills before internal plastering.
- iii. **Civil work** which will involve mostly stabilizing of soils on cut embankment,
- iv. **Structural work** which will involve implementing all works to Structural Engineer's details, determining the depth of the building foundation and wall reinforcement,
- v. **Mechanical works** which will mainly include all plumbing and drainage works, all floors accessible service ducts, inspection plates in all bends, deep seal or anti-vac to all fittings connected to the SVP's and waste pipes, encasing of underneath drain pipes, testing of pipes before plastering, and the coordination of mechanical and electrical works, air conditioning, air extraction system, telecommunication mast installation, mechanical ventilations in the washrooms,
- vi. **Electrical works** which will involve laying of all conduits, and coordination of electrical and mechanical works, CCTV connections, ICT and wireless internet connections,
- vii. **Fire work** which will consist of installation of fail safe sprinkler system, fire hydrant & extinguishers, fire suppression in control rooms and fully zoned fire detection & alarm system.

- viii. Control Systems installation including water supply control & fault detection system, power supply control & fault detection system including generators, lighting control & fault detection system , air conditioning, air quality, ventilation control & fault detection system, fire sprinkler, detection & alarm control & fault detection system.
- ix. Mobilisation of required equipments, machineries, labour, and plants for soil excavation, levelling, compacting and material transportation, concrete mixers and transporting trucks,
- x. Identification, acquisition, supply and transportation of the required construction materials to the site,
- xi. Proposed site vegetation clearance, excavation (earthworks) works, land filling and levelling of the ground,
- xii. Masonry work, concrete mixing, plumbing and steel metal processing (fabrication),
- xiii. Roofing works, landscaping, gardening and
- xiv. Occupation of the buildings upon the inspection and issuance of an occupation certificate.

2.8 Products and by-products

The expected product from this development project is affordable housing units, and their associated facilities with all the designed sections and partitions as per the design and approved project plans. The expected by-products from the project are left over concrete slabs, excavated overlaying soil wastes from the site, solid and liquid wastes from sanitary facilities, used cement bags, used oil from equipments, trucks and machineries which does not constitute significant by-products. However, the product of this study is an Environmental Impact Assessment study project report to be submitted to the National Environment Management Authority for review, decision making and licensing.

2.9 Waste

There will be liquid, solid and gaseous wastes at the project site. These will be from project activities during construction, operation and decommissioning phases. Wastes during the operation phase will include used papers, cement bags, cans, organic wastes, plastic wastes, containers and effluent wastes from sanitary facilities while wastes from decommissioning of the project will include salvaged equipment, sign boards, left over steel metals, concrete slabs among others.

Waste management

The principle objective of waste management program is to minimize the pollution of the environment as well as to utilize the waste as a resource. This goal should be achieved in a way that is environmentally and financially sustainable.

- i. **Solid Waste Management:** Solid wastes that are anticipated include paper from the cement bags, concrete slabs, organic wastes, sawdust, plastic paper bags and metals used during construction. The technologies for the management of the solid wastes will incorporate the segregation of the waste at the source, collection into a central location (skip) then transportation of the wastes for final disposal at designated garbage dump sites by a NEMA licensed waste handler.
- ii. **Liquid waste:** This will include effluent from toilets and bathrooms at the construction site, housing units and their associated facilities during operation. At the proposed site, waste water from the site construction activities will be channelled through constructed storm drainage system into the connected existing sewer line in the area for proper disposal and which has been constructed to the required standards as per the Physical Planning regulations and Public Health Act requirements. Sanitary facilities like the bathrooms and pit latrines will also be used for the management of liquid waste which shall be decommissioned at the end of project cycle. Used oil and grease from workshops shall be stored in plastic containers for safer disposal or be taken back to respective dealers.
- iii. **Demolition wastes:** These are wastes from demolished structures are. They include stones, concrete slab, cement plaster, steel metals and plumbing material wastes from water connection pipe. These shall be recycled, re-used elsewhere while the non-reusable ones shall be taken to approved dumpsites run by NEMA licensed waste handlers who have complied with the Environmental Management and Coordination (Solid Waste Management Regulations) Act of 2006 requirements.

2.10 Decommissioning phase

This will mark the end of the project life and will involve the demolition of project structures and facilities, removal of concrete slabs and rehabilitation of the resulting site in phases as per the outlined rehabilitation plan to a near original state as required by the laws of the land.

3.0 STUDY AREA AND BASELINE INFORMATION

Kiambu County is one of the 47 counties in the Republic of Kenya. It is located in the central region and covers a total area of 2,543.5 Km² with 476.3 Km² under forest cover. Kiambu County borders Nairobi and Kajiado Counties to the South, Machakos to the East, Murang'a to the North and North East, Nyandarua to the North West, and Nakuru to the West. The county lies between Latitudes 00 25' and 10 20' South of the Equator and Longitude 360 31' and 370 15' East.

3.1 Administrative units

The county is divided into twelve (12) sub-counties namely Limuru, Kikuyu, Lari, Gatundu South, Gatundu North, Githunguri, Kiambu, Ruiru, Thika, Juja, Kiambaa, and Kabete. The sub-counties are further sub-divided into 29 divisions, 95 locations and 236 sub locations. The proposed project site is situated within Kiambu Town, Kiambu County.

3.2 Physical environment

3.2.1 Topography:

Kiambu County has four topographical zones of Upper Highland, Lower Highland, Upper Midland and Lower Midland Zone. The Upper Highland Zone is found in Lari Constituency and it is an extension of the Aberdare ranges that lies at an altitude of 1,800-2,550 metres above sea level. It is dominated by highly dissected ranges and it is very wet, steep and important as a water catchment area. The lower highland zone is mostly found in Limuru and some parts of Gatundu North, Gatundu South, Githunguri and Kabete constituencies. The area is characterised by hills, plateaus, and high-elevation plains. The area lies between 1,500-1,800 metres above sea level and is generally a tea and dairy zone though some activities like maize, horticultural crops and sheep farming are also practised. The upper midland zone lies between 1,300-1,500 metres above sea level and it covers mostly parts of Juja. The landscape comprises of volcanic middle level uplands. The lower midland zone partly covers Thika Town (Gatuanyaga), Limuru and Kikuyu constituencies. The proposed project site is located within an area of Altitude 1679.0M².

3.2.2 Soils:

The county is covered by three broad categories of soils which are: high level upland soils, plateau soils and volcanic footbridges soils. High-level uplands soils are from volcanic rocks and are very

fertile. Their fertility is conducive for livestock keeping and growth of various cash crops and food crops such as tea, coffee, horticultural products, pyrethrum, vegetables, maize, beans, peas and potatoes. These soils are found in the highlands, mostly in Gatundu South, Gatundu North, Githunguri, Kiambu, Kiambaa, Lari, Kikuyu, Kabete and Limuru Constituencies. Low fertility soils are mainly found in the middle zone and the eastern part of the county which form part of the semi-arid areas. The soils are sandy or clay and can support drought resistant crops such as soya beans and sunflower as well as ranching. These soils are mostly found in parts of Juja, Thika Town, Ruiru, Kabete, Limuru, Gatundu North and Gatundu South Constituencies.

Most parts of the county are covered by soils from volcanic footbridges. These are well drained with moderate fertility. They are red to dark brown friable clays, which are suited for cash crops like coffee, tea and pyrethrum. However, parts of Thika Town, Ruiru, Juja and Lari constituencies are covered by shallow soils, which are poorly drained, and these areas are characterized by low rainfall, which severely limits agricultural development. However, these areas are suitable for ranching and growth of drought resistant crops. The project area is predominantly covered by red volcanic soil most suitable for proposed development *activities*.

3.2.3 Geology

The area lies between 1,200-1,360 metres above sea level. The soils in the midland zone are dissected and are easily eroded. Other physical features include steep slopes and valleys, which are unsuitable for cultivation. Some parts are also covered by forests. The project area is characterised by gently undulating to highly incised valleys favourable for the proposed development activities. The dominant rock type in the proposed project area is volcanic rocks of variable composition.

3.2.4 Drainage:

Water in the county is from two principal sources- surface and sub-surface which accounts for about 90 percent of the county's water resource. The county has four sub-catchments areas, namely, Nairobi River Sub-catchment which occupies the southern part of the county with the major rivers being Nairobi, Gitaru, Gitahuru, Karura, Ruirwaka, and Gatharaini; Kamiti and Ruiru Rivers Sub-catchment which has eight permanent rivers which include Riara, Kiu, Kamiti, Makuyu, Ruiru, Bathi, Gatamaiyu and Komothai; The Aberdare plateau that supports Thiririka

and Ndarugu Rivers sub-catchments has mainly Mugutha, Theta, Thiririka, Ruabora, Ndarugu and Komu streams flowing from Nairobi, Kamiti, Ruiru, Thiririka, and Ndarugu sub-catchments to form Athi River sub-catchment; the Chania River and its tributaries comprising of Thika and Kariminu Rivers which rise from the slopes of Mt. Kinangop in the Aberdares range; and Lastly, the Ewaso Kedong sub catchment which runs in the North-South direction and occupies the western part of the county with many several streams that form swamps. These sources of water will be crucial in water provision for the proposed construction activities. A stream passes near the proposed site though it won't be affected by the proposed development activities.

3.2.5 Climate, Rainfall, Temperature and Disaster Risk Vulnerability Profile

The county experiences bi-modal type of rainfall. The long rains fall between Mid-March to May followed by a cold season usually with drizzles and frost during June to August and the short rains between Mid - October to November. The annual rainfall varies with altitude, with higher areas receiving as high as 2,000 mm and lower areas of Thika Town constituency receiving as low as 600 mm. The average rainfall received by the county is 1,200 mm.

The mean temperature in the county is 26° C with temperatures ranging from 7°C in the upper highlands areas to 34°C in the lower midland zones. July and August are the months during which the lowest temperatures are experienced, whereas January to March is the hottest months. The county's average relative humidity ranges from 54 percent in the dry months and 300 percent in the wet months of March up to August. The proposed project site adopts the existing climatic conditions of the entire area and the county in general.

3.3 Biological environment

3.3.1 Flora

The main forests types in the county are natural/indigenous and plantation forests. Exotics are mainly planted in private farm forests. The county has six obiliz forests with the major ones being Kieni and Kinale forests occupying an area of 426.62 Km². The main products from gazetted forests are poles for transmission of electricity and construction, timber and firewood. On the other hand, main products from un-gazetted forests (Farm Forests) include poles, timber (sawn timber), charcoal (mainly from wattle trees) and firewood, honey, and fruits. The proposed project area is

clear. However, upon completion of the project activities the affected areas will be restored to their near original states as required by the stipulated laws.

3.3.2 Fauna

Kiambu County has few wildlife resources. Kinare forest has a dense forest with elephants, hyenas, bush baby, baboons, colobus monkeys, dik-dik, bush pigs, tree and ground squirrels, porcupines and many species of birds such as weaver, guinea fowls, sparrow among others. The county has also a variety of animal species like mammals, birds, reptiles, insects and arthropods. The project area has various animal species of birds, insects, reptiles and small insects however, the proposed project site does not have any significant endemic animal species that will be affected in any way by the project activities save for a few insects present in the area.

3.4 Land Use and Zoning

The size of arable land in the county is 1,878.4 Km², the non-arable land is 649.7 Km² and 15.5 Km² is under water mass. The average holding size of land is approximately 0.36 Ha on small scale and 69.5 Ha on large scale. 85 percent of the population with land in the county have title deeds to their land and there are no recorded cases of incidences of landlessness. The remaining 15 percent have not received their title deeds due to unfinished land adjudication process. The project area is zoned under mixed use development of agricultural, commercial and residential allowing for the project implementation as it is in line with the zoning stipulations of the Physical Planning Act of 1998.

3.5 Infrastructure

3.5.1 Roads, Railway & Airports.

The county has a total of 2,033.8 km of roads under bitumen standards, 1,480.2 km under gravel surface and 430.1 km under earth surface. It also has 131 km of railway line and four railway stations in Ruiru, Thika, Kikuyu and Limuru towns. The project area is well served with various road networks like the Kiambu – Kanunga road and the Kiambu - Nairobi road plus many other access roads that lead into and out of the entire Kiambu Town and the project area specifically. This makes the area accessible by foot, vehicle, motorcycle, and bicycle among other notable means of transport.



Photo 2: The Kiambu - Kanunga road passing adjacent to the proposed project site serving as the main project site access route.

Post and Telecommunication

Kiambu County is well covered by mobile network which is estimated at 98 percent while the landline coverage is at 214 connections in the entire county. There are 19 post offices and 14 sub-post offices which are fairly distributed within the county. It has 149 cyber cafes and eight private courier services located in the urban centres of Thika, Ruiru, Karuri, Kiambu, Limuru and Kikuyu. The proposed project area is well connected to major telecommunication services.

Communication network

The project area is well served with various communication networks which have strong implication on the socio- economic development activities. The project area is also well served with mobile phone and telephone services like Orange, Safaricom and Airtel.

3.6 Energy Access and Electricity supply

The county gets the bulk of its energy supply from the Kenya Power and Lighting Company (KPLC). The main source of cooking energy in the county is firewood which accounts for about 47.3 percent, while paraffin is the major source of lighting fuel, national grid electricity connection stands at 98 percent of all trading centres with only 4 percent of public institutions currently not connected. However, connection to individual homes is low. The project area is well connected to the KPLC national power grid which is expected to be supplemented by the Automatic generator during the construction activities and power blackouts.

3.7 Water

The county has nine (9) licensed Water Service Providers (WSPs) Companies namely: Limuru Water and Sewerage Company, Kikuyu Water and Sewerage Company, Kiambu Water and Sewerage Company, Karuri Water and Sewerage Company, Githunguri Water and Sewerage Company, Ruiru- Juja Water and Sewerage Company Limited, Gatundu South Water and Sanitation Company, Karimenu Water and Sanitation Company and Thika Water and Sewerage Company Limited. About 90 percent of the county's water resources comprise of both surface and ground water resource potential. 35 percent of the population have access to potable water. The project area is connected to the Kiambu Water and Sewerage Company water pipeline for water services. This is to be supplemented by the extra supply from the nearby main county council drilled borehole within the site compound during low supply seasons.

3.8 Socio-Economic profile

3.8.1 Sanitation

Garbage disposal around the urban centres within the county of Kiambu cover a small percentage of waste/garbage collection as only 2.6 percent of the total population has facilities for waste disposal, about 0.7 percent of the total population uses private firms, 29.1 percent use garbage pits, 29.6 percent use farm gardens, 12.1 use public garbage heap and 25.9 percent opt to burn the waste/garbage. Solid waste is collected and disposed by the Kiambu County Council while the affluent waste (waste water) is disposed into the sewerage line network in the project area.

3.8.2 Housing

The housing type by wall materials in Kiambu County is mainly characterized by stone, brick/block, mud/wood and corrugated iron sheet. According to 2009, Kenya Population and Housing Census, 48.3 percent of all homes in the county are stone –walled, 4.9 percent are brick/block, and 4.8 percent are mud/wood. There are 74.6 percent of the houses that have cemented floors and 87.5 percent have corrugated iron sheets. Only 0.1 percent has used other forms of roofing materials.

3.9 Education

The county has about 1,595 ECD centres out of which 1,063 are private and 532 are public. It has 934 primary schools which are equally distributed between the private and the public where each category has 467 schools. There are 303 secondary schools out of which 227 are public and 76 are Private. The County has one public University, Jomo Kenyatta University of Agriculture and Technology, and five private universities which include Gretsia University, Mount Kenya University, St. Paul's University, Kiriri Women's Science and Technology University and Presbyterian University of East Africa and a number of tertiary colleges.

3.10 Health

There are a total of 364 health facilities across the county. Under the public facilities, the county has one level-five hospital, three level-4 hospitals, and four level-three hospitals. There are 20 level-two (Health Centres) and 54 level-ones also known as dispensaries. Private health facilities include 17 Mission Hospitals, five nursing homes, 36 dispensaries and 169 private clinics. The doctor/population ratio in the county is 1:17,000 and the nurse/population ratio stands at 1:1,300. The most prevalent diseases in the county are Flu which accounts for 35.3 percent, Malaria 18.6 percent, Respiratory Tract Infections (RTI) at 9.7 percent, and Ear Nose and Throat Infections 3.1 percent. The county has low infant mortality rate, which stand at 48/1,000, under five mortality rates, which stands at 58/1,000 and high rate of delivery which stands at 80.4 per cent. The county immunization coverage stands at 90 percent. Family planning methods acceptance currently stands at 85 per cent in the county.

3.11 Solid waste management

Garbage disposal around the urban centres within the county of Kiambu cover a small percentage of waste/garbage collection as only 2.6 percent of the total population has facilities for waste disposal, about 0.7 percent of the total population uses private firms, 29.1 percent use garbage pits, 29.6 percent use farm gardens, 12.1 use public garbage heap and 25.9 percent opt to burn the waste/garbage. The Nairobi City Council carries out solid waste management services in the project area and is liable for collection, transportation and disposal of the solid wastes to the NEMA approved dumpsites.

3.12 Economic set-up

Mining

Mining involves extraction of minerals from the ground/earth. The main mining activities include natural gas exploitation in Lari constituency by Carbacid Company Limited and extraction of ballast, hardcore, gravel, murrum, sand and building stones in Juja, Gatundu South and Gatundu North Constituencies.

Industries

The county has most industries located in Thika and Ruiru Constituencies. These industries are Bidco Oil Industries, Thika Motor Vehicle dealers, Thika Pharmaceutical Manufacturers Limited, Devki Steel Mills, Broadway Bakeries, Kenblest Industry, Kel Chemicals, Thika Rubber Industries Limited, Macadamia Nuts, Campwell Industry and Kenya Tanning Extracts Limited, Clay Works, Spinners and Spinners and Bata Shoe Factory. The agro-processing industries include Farmers' Choice Ltd, Kenchic Co. Ltd, Brookside Dairies, Githunguri Dairies, Ndumberi Dairies, Limuru Milk and Palmside Dairies, among others.

Tourism

The county does not have national parks or game reserves but tourist sites which includes Kinare Forest in Lari Constituency, Chania Falls and Fourteen Falls in Juja Constituency, Paradise Lost and Mugumo Gardens in Kiambaa Constituency, Mau Mau Caves, Gatamaiyu Fish Camp and historical sites in Gatundu and Githunguri Constituencies. Kiambu County has few wildlife resources. Kinare forest has a dense forest with elephants, hyenas, bush baby, baboons, colobus monkeys, dik-dik, bush pigs, tree and ground squirrels, porcupines and many species of birds such as weaver, guinea fowls, sparrow among others. The county has 682 unclassified hotels and 694 bars and restaurants which are well distributed within the county.

Trade industry

The county has a total of 2,517 trading centres with 6,634 registered retail traders and 750 registered wholesale traders. There are also a number of urban centres including Thika Town; Kiambu, Karuri, Kikuyu, Limuru, Gatundu and Ruiru.

Financial institutions

There are a total of 17 commercial banks with branches well distributed within the county. In addition, there are eight microfinance institutions, one building society, four village banks and 12 insurance companies.

3.13 Social set-up

The county is a cosmopolitan and multicultural city with people of different ethnicity, and cultures from different parts of the country. Major languages used are English and Kiswahili; and many local languages. There are also numerous entertainment spots like night clubs, pubs and bars. High poverty levels remains a big challenge given the large parity between the wealthy people and the poor; high levels of HIV/AIDS prevalence; high crime and robbery rates ;poor waste disposal and management; high rates of pollution; high cost of living; inadequate and improper housing standards; health problems in terms of access to services and facilities; poor infrastructures; high unemployment levels; street families; terrorism threats; drugs ,alcohol and substance abuse and ; vulnerable and orphan children.

3.14 Population and Demographic set up

According to the 2009 Kenya Population and Housing Census, Kiambu County population for 2012 was projected to be 1,766,058 with 873,200 males and 892,857 females. This is expected to reach 2,032,464 people by the end of 2017. The county has a high population growth rate estimated at 2.81 percent. In terms of gender, the sex ratio of male to female is approximately 1:1.02. According to the 2009 Population and Housing Census, the county had an urban population of 936,411 in 2009 which was projected to be 1,018,773, 1,108,380 and 1,172,453 in 2012, 2015 and 2017 respectively.

3.15 Crop and Livestock Production

Agriculture is the predominant economic activity in the county and contributes 17.4 per cent of the county's population income. It is the leading sub sector in terms of employment, food security, income earnings and overall contribution to the socio-economic well-being of the people. Coffee and tea are the main cash crops in the county. The county has a total arable land of 1,878.4 Km² of which a total of 21,447 Ha is under food crops and a total of 35,367.41 Ha is under cash crops. Currently the average farm size under small scale farming is 0.36 Ha and 69.5 Ha under large scale farming. The main storage facilities of the food crops are the National Cereals and Produce Board

silos, on-farm storage, granaries and also in-house storage. According to 2009 Population and Housing Census, the numbers of livestock in the county were as follows: 230,294 cattle, 120,056 Sheep, and 89,817 goats. In addition, there were 2,600,837 poultry, 46,493 pigs, 13,662 donkeys and 127 camels.

3.16 Community Organizations/Non-State Actors

There are many cooperative societies, Non-Governmental Organizations (NGOs), Self-Help, Women & Youth groups within the Nairobi County.

Cooperative Societies

The county has 254 active co-operatives societies and 22 dormant ones. The total membership is 258,198 and the annual turnover is approximately KShs. 5,069,560,000. Types of co-operatives found in the county include dairy co-operatives, savings and credit co-operative societies, marketing co-operatives, coffee co-operatives, transport SACCOs and housing SACCOs among others.

Non-Governmental Organizations

The county has about 38 Non-Governmental Organisations that operate in the entire county. Majority of them, concentrate in the fight against HIV and AIDS, children welfare and women empowerment.

Self-help, Women and Youth Groups

Registered Community Based Organisations (CBO's) are estimated to be more than 10,000. The groups are engaged in a wide variety of activities which include: Micro-finance, HIV and AIDS, Drugs and substance abuse campaign, Environmental conservation, Training and advocacy and other income generating activities. The county has over 3,746 active women groups and 1,664 youth groups.

4.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

4.1 National Legal Framework

4.1.1 The Constitution of Kenya, 2010

The Constitution of Kenya Article 42, on the environment provides that every person has the right to a clean and healthy environment which includes the right to have environment protected for the benefit of the present and future generations. Article 69, of the Constitution provides for the establishment of systems of environmental impact assessment, environmental audit and environmental monitoring. The Constitution also states that the State shall eliminate processes and activities that are likely to endanger the environment and the State shall utilize the environment for the benefit of the people of Kenya. The Constitution of Kenya clearly states that every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources. The proposed housing project construction activities will ensure that ecological processes are not severely interrupted. Appropriate mitigation measures have been put in place to ensure that the proposed development implementation, operation and decommissioning activities do not adversely affect the surrounding environment.

4.1.2 Vision 2030

Kenya Vision 2030 is the country's new development blue print covering the period 2008 to 2030. The blue print aims at transforming Kenya into a newly industrializing "middle-income country providing a high quality life to all its citizens by the year 2030". The Vision is based on three "pillars"; the economic, the social and the political. The adoption of Vision 2030 came after the successful implementation of the Economic Recovery Strategy for Wealth and Employment Creation (ERS) which has seen the country's economy back on the path to rapid growth since 2002 when Gross Domestic Product (GDP) grew from a low of 0.6% and rising gradually to 6.1% in 2006, one of the foundations for Vision 2030 is infrastructure. The Vision aspires for a country firmly interconnected through a network of roads, railways, housing, ports, airports, water and sanitation facilities, and telecommunications. In this Vision to ensure that the main projects under the economic pillar are implemented, investment in the nation's infrastructure is given the highest priority. The proposed project development activities will contribute positively in enhancing the

housing sector development and provision of quality housing services in the country aimed at propelling the country to a middle-income country as envisioned in Vision 2030.

4.1.3 Policy on Environment and Development

This is presented as the Sessional paper No. 6 of 1999 on Environment and Development. The overall goal is to integrate environmental concerns into the national planning and management process and provide guidelines for environmentally sustainable development. Under section of the document, provision of portable water and water for sanitation is viewed as being central to satisfying basic human needs. It is indicated that the current water development programmes focus almost entirely on water delivery with little concern for demand management and conservation. Water resources have an extremely high value, and effective mechanisms for managing and conserving water could result into economic benefits as well as sustainable use of this vital resource.

Some of the key objectives of the policy are:

- i. To protect water catchments;
- ii. To ensure all development policies, programmes and projects take environmental considerations into account, and
- iii. To enhance, review regularly, harmonize, implement and enforce laws for the management, sustainable utilization and conservation of natural resources.

Under this policy, broad categories of development issues have been covered that require sustainable approach. The policy recommends the need for enhanced re-use/recycling of residues including water and wastewater as well as increased public awareness raising and appreciation of clean environment. It also enhances participation of stakeholders in the management of natural resources within their respective localities. The project proponent is encouraged to practise waste water and materials recycling and re-use. Storm drain systems will be constructed for proper disposal of storm water into the existing drainage network while the liquid waste water from the housing blocks and their respective facilities will be channelled to the sewerage waste pipeline for safe disposal.

4.1.4 Environmental Management and Co-ordination Act, 1999 and Environment Management and Coordination (Amendment) Act, 2015

Environmental legislation in Kenya is provided in over 77 statutes. In order to provide a structured approach to environmental management in Kenya, the EMCA Act was enacted on January 14th 2000 as a framework law and contains provisions for the ESM of the proposed and ongoing Projects respectively in Kenya. With the coming into force of the EMCA, the environmental provisions within the sectoral laws were not superseded; instead the environmental provisions within those laws were reinforced to better manage Kenya's ailing environment.

Section 58.(1) Of the Act states "Notwithstanding any approval, permit or license granted under this Act or any other law in force in Kenya, any person, being a proponent of a project, shall, before financing, commencing, proceeding with, carrying out, executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the Second Schedule to this Act, submit a project report to the Authority, in the prescribed form, giving the prescribed information and which shall be accompanied by the prescribed fee". Environmental Management and Coordination Act 1999 provide a legal and institutional framework for the management of the environmental related matters. This EIA project study report has been written pursuant to section 58 (1) of this Act.

4.1.5 EMCA Related Regulations

Environmental (Impact Assessment and Audit) Regulations, 2003

The Environmental Impact Assessment and Audit Regulations, 2003 are subsidiary regulations of EMCA, 1999 and stipulate the steps to be followed in undertaking an EIA study. The Regulations highlight the stages to be followed, information to be made available, role of every stakeholder and rules to be observed during the EIA process. This EIA project study has been conducted as per the provisions and guidelines of the Environmental Impact Assessment and Audit Regulations, 2003; has been planned, designed, compiled and implemented based on the very regulations. It shall again be maintained and guided by the same regulations and an environmental audit study will be done periodically to monitor compliance with the set environmental standards.

EMCA (Water Quality) Regulations, 2006

The above regulation was promulgated on September 4th 2006 and became effective on July 1st 2007. This regulation provides for the sustainable management of water used for various purposes in Kenya. Its provisions are;

4(1) Every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act.

(2) No person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution.

Part IV Section 24 states that “No person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive wastes, or other pollutants or permit any person to dump any such matter into water meant for fisheries, wildlife, recreational purposes or any other uses”. According to these regulations, “Every person shall refrain from any action which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act”.

The proponent shall take care and precaution not to pollute underground water or even surface water in anyway and if a pollution incidence occurs the contractor/project proponent should notify the authority immediately. Use of oils on site should be carefully done to control spills on the surface. Servicing of machines/trucks/equipments/vehicles/lorries should be done at designated service bay. The waste water from the project site to be disposed into the existing sewer line within the area.

EMCA (Waste management) Regulations, 2006

The Waste Management Regulations were promulgated on September 4th 2006 and became effective on July 1st 2007. This regulation is comprehensive and covers the management of various kinds of waste in Kenya.

Various clauses relevant to the project are:

Section 4 (18): No owner or operator of a trade or industrial undertaking shall discharge or dispose of any waste in any state into the environment, unless the waste has been treated in a treatment

facility and in a manner prescribed by the Authority in consultation with the relevant lead agency. Minimal waste is expected from the undertaking.

Section 4(2) and 6 explain that the waste generator must collect, segregate (hazardous waste from non-hazardous) and dispose waste in such a facility that shall be provided by the relevant local authority.

Section 5 provides for methods of cleaner production (so as to minimise waste generation) which includes the improvement of production processes through conserving raw materials and energy.

In section 14 (1) every trade or industrial undertaking is obliged to install anti- pollution equipment for the treatment of waste emanating from such trade or industrial undertaking.

The proponent shall ensure that the garbage collector contracted has a valid license from the National Environment Management Authority (NEMA). To comply with this, the contractor shall take precaution not to dump wastes in areas not designated as dumpsites and, all waste disposed off as per the Waste management regulations. Wastes from sanitary facilities to be channeled and disposed to the existing sewer line connected to the property and built to the required Kenyan standards as stipulated in the Public Health Act and the Physical Planning Handbook.

EMCA (Noise and Excessive Vibration Pollution Control) Regulations, 2009

In May 2009, the Minister for Environment and Mineral Resources promulgated the above regulations for management of noise and excessive vibration. The general prohibition states that 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. The regulations further provide factors that will be considered in determining whether or not noise and vibration is loud, unreasonable, unnecessary or unusual.

For fixed installations, excessive vibration under these regulations is defined as any vibration emanating from the source and exceeds 0.5cm/s. Rules 5 and 6 of the regulations define noise levels for various types of activities that generate noise. The first schedule to the regulations defines permissible noise levels measured 30m from the boundary fence of a project. A noise license will be required during the construction, and operational phases of the project and a noise survey conducted once operation is recommended for presentation to the authority. The proponent

shall be required to implement these measures, ensure that all lorries, trucks, steel fabrication activities, vehicles, machineries and equipments are in good working condition to reduce noise levels.

EMCA (Air Quality) Regulations, 2013

The objective of these Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. The general prohibitions state that no person shall cause the emission of air pollutants listed under First Schedule (Priority air pollutants) to exceed the ambient air quality levels as required stipulated under the provisions of the Seventh Schedule (Emission limits for controlled and non-controlled facilities) and Second Schedule (Ambient air quality tolerance limits). The proponent shall implement the mitigation measures provided in the ESMMP to prevent air pollution from excavation works, concrete mixing (premix) using cement, exhaust emissions from trucks, machineries and vehicles which are the leading sources of particulate matter emission in the air.

4.1.6 Other Environment, health and safety, physical planning related laws

Water Act, 2002

Water in Kenya is owned by the Government, subject to any right of the user, legally acquired. However; this Act regulates conservation and management of all water resources within the republic, and related purposes. In section 3 of part II, it states that every water resource is vested in the State, subject to any rights of user granted by or under this Act or any other written law. The Act also provides for establishment of a Water Resource Management Authority, whose aim is to manage and coordinate conservation and utilization of water resources at national scale. The Act will thus play a central role in guiding the exploitation and conservation of the existing limiting and scarce water resource throughout the project life especially for the adjacent water stream flowing through the G.K. prison's agricultural farm. The project site is connected to the Kiambu County Council, Kiambu Water and Sewerage Company main pipelines and has connections to the Kiambu County Council main borehole pipeline for water supplementation.

The Penal Code CAP 63

Chapter XVII on "Nuisances and offences against health and convenience" contained in the penal code strictly prohibits the release of foul air into the environment which affects the health of the

persons. It states, “Any person who voluntarily vitiates the atmosphere in any place so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighbourhood or passing along a public way is guilty of a misdemeanour.” Waste disposal and other project related activities shall be carried out in such a manner as to conform to the provisions of the code.

National Housing Policy of Kenya (Sessional Paper No. 3 of 2004)

The National Housing Policy was mainly intended to facilitate increased investment by the formal and informal private sector, in the production of housing for low and middle-income urban dwellers. The overall goal of this Housing Policy is to facilitate the provision of adequate shelter and a healthy living environment at an affordable cost to all socio-economic groups in Kenya in order to foster sustainable human settlements. This is meant to minimise the number of citizens living in shelters that are below the habitable living conditions. It will also curtail the mushrooming of slums and informal settlements especially in the major towns.

Among the key objectives of its implementation is promotion of inclusive participation of the private sector, public sector, community based organisations, Non-Governmental Organisations, co-operatives, communities and other development partners in planning, development and management of housing programmes. The National Housing Policy statement Encourages increased involvement of licensed private developers in land development, construction and infrastructure provision with adequate safeguards to protect consumers and increase the supply of developed land for lower-income groups by giving incentives to private developers to cross-subsidise them.

The Civil Servants (Housing Scheme Fund) Regulations 2004 and the Amendment 2015.

The regulation has resulted in the formation of Civil Servants Housing Scheme Fund (CSHSF) which is an initiative by the government to facilitate its employees to own houses. This is in line with the Housing Policy which calls for employers to facilitate their employees to access housing. Among its key objectives, the Fund is expected to either provide housing loan facilities to civil servants for the purpose of either purchasing or constructing a residential house, develop houses for civil servants, or raise funds for the implementation of its key stated objectives. The proposed development project is in line with the number two (2) key objective of this Fund and the National Housing Policy on housing development for occupation by civil servants.

Occupational Health and Safety Act No.15 of 2007 and the 2007 Subsidiary legislation (Cap 514)

This Act of Parliament was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith. Its relevant clauses and stipulations relevant to the proposed project are;

- i. Part II of the Act provides the General Duties that Occupiers must comply with in respect to health and safety in the workplace. Such duties include undertaking S&H risk assessments, S&H audits, notification of accidents, injuries and dangerous occurrences, etc.
- ii. Part III of the Act provides the Administrative framework for supervision of the Act.
- iii. Part IV deals with the enforcement provisions that the DOSHS has been provided with under the Act. It discusses the instances when Improvement and Prohibition Notices can be issued as well as the powers of OSH officers.
- iv. Part V of the Act requires all workplaces to be registered with the DOSHS. The Occupier has to apply for registration of their project with the DOSHS on completion of installation of the crusher and before the operational phase of the project.
- v. Part XI of the Act contains Special Provisions on the management of health, safety and welfare. These include work permit systems, PPE requirements and medical surveillance. All sections of this part of the Act will be applicable to this project during the operational phase.
- vi. Part XIII of the Act stipulates the fines and penalties associated with non-compliance of the Act. It includes those fines and penalties that are not included in other sections of the Act and will be important for an Occupier to read and understand the penalties for non-compliance with S&H provisions.
- vii. Part XIV of the Act is the last section of the Act and contains miscellaneous provisions which are not covered elsewhere. Most of the sub-sections under this part of the Act will be applicable to mining projects and it is in the interest of an Occupier to read, understand and ensure compliance with it.

Some of the important subsidiary legislations which operationalized the Act and are applicable to the proposed project are described below.

i) (Safety and Health Committee) Rules 2004

These rules came into effect on April 28th, 2004 and require that an Occupier formalize a Safety and Health (S&H) Committee if there are a minimum of 20 persons employed in the work place. The size of the S&H Committee depends on the number of workers employed at the place of work. For a Proponent and Contractor, the Occupational Safety and Health Act and the Safety & Health Committee Rules 2004 are important as they require compliance with the following measures:

- i. Posting of an Abstract of the Factories and Other Places of Work Act in key sections of each area of the workplace;
- ii. Provision of first aid boxes in accordance with Legal Notice No. 160: First Aid Rules of 1977;
- iii. Ensuring that there are an appropriate number of certified first aiders trained by a DOSHS approved institution and that the certification of these first aiders is current;
- iv. Provision of a General Register for recording amongst other things all incidents, accidents and occupational injuries;
- v. Appointment of a S&H Committee made up of an equal number of members from management and workers based on the total number of employees in the company;
- vi. Training of the S&H Committee in accordance with these rules;
- vii. Appointment of a S&H management representative by the Proponent;

The Safety & Health Committee must meet at least quarterly, take minutes, circulate key action items on bulletin boards and may be required to send a copy of the minutes to the DOSHS local office. Appropriate record keeping including maintenance of all current certificates related to inspection of critical equipment, machineries, vehicles, trucks, tractors and the back-up generator. Such inspections need to be undertaken by a competent person certified by the Director of the DOSHS.

ii) (Noise Prevention and Control) Rules

These rules have set minimum and maximum exposure limits beyond which workers and members of the public should not be exposed to noise without adequate means of protection. The rules also have limits for exposure out of workplaces. The rules have several recommendations on a comprehensive noise control program for workplaces that includes a requirement for medical examination of workers who are exposed to noise. The rules have also set the minimum noise

levels that should emanate from a facility to public/neighbouring areas by day or by night. The proponent should provide functional mouth, nose and ear muffs for those working in noise sections and keep on renewing their noise and vibration permit from NEMA.

iii) Medical Examination Rules, 2005

These rules provide for Occupiers to mandatorily undertake pre-employment, periodic and termination medical evaluations of workers whose occupations are stipulated in the Second Schedule of the Act and the First Schedule of the Regulation. The workers are to undergo medical evaluations by a Designated Health Practitioner (DHP) duly registered by the DOSHS. Exposure to airborne crystalline silica present negative impacts to human health, the workers exposed to the dust will be required to undergo medical examinations in accordance with the above Rules. The project proponent is required to ensure that construction workers are examined medically and appropriate gears availed to them while at site, like earmuffs, helmets, overalls and respiratory gears.

iv) Fire Risk Reduction Rules, 2007

These rules were promulgated by the Minister for Labour on April 16th 2007 and apply to all workplaces. The rules apply to this sector project in several ways as enumerated below;

Rule 16 requires a Proponent to ensure that electrical equipment is installed in accordance with the respective hazardous area classification system. It is also a requirement that all electrical equipment is inspected after six months by a competent person and the Proponent is required to keep records of such inspections.

Rules 29 – 31 refer to the installation and maintenance of firefighting systems in workplaces. Fire extinguishers are to be mounted at least 60cm above ground while a fire hose reel must be located within a radius of 30m. Fires can arise from electrical fault at the campsite. Workers safety will be given priority during the construction and operation phases of the project cycle. The proponent shall adhere to the provisions of OSHA, 2007 and the subsidiary rules and regulations under it.

The Work Injury Benefits Act (WIBA), 2007

The WIBA Act provides for compensation to employees for work related injuries and diseases contracted in the course of their employment and for connected purposes as follows;

Section 7(a) of the Act, on the obligations of the employer, requires an employer to obtain and maintain an insurance policy with an insurer approved by the State in respect of any liability that the employer may incur under this Act to any of his employees.

Section 10(1) States that 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 this Act. It also states expressly that an employer is liable to pay compensation in accordance with the provisions of this Act to an employee injured while at work.

On First Aid covered in section 45(1), an employer is supposed to provide and maintain such appliances and services for the rendering of first aid to his employees in case of any accident as may be prescribed in any other written law in respect of the trade or business in which the employer is engaged.

The Public Health Act CAP 242

Part IX, section 115 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires local authorities to take all lawful, necessary, reasonable and practicable measures to maintain areas under their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. During the project construction and operation, the management must comply with the provisions of this Act in terms of connecting, constructing waste water and sanitary facilities to the required standards and ensuring that the site is safe from nuisance or pollution of any nature.

The Land and Environment Court

The Land and Environment Court is established under the Environment and Land Court Act, 2011 (No. 19 of 2011). It is empowered by law, given the status of the High Court and has the jurisdiction to hear and determine disputes, actions and proceedings concerning acquisition of land as well as matters pertaining to the environment.

The County Government Act Cap 265

Section 163 allows councils to control or prohibit all businesses, factories and workshops which, by reason of smoke, fumes, chemicals, gases, dust, smell, noise, vibration or other cause, may be

or become a source of danger, discomfort or annoyance to the neighbourhood, and to prescribe the conditions subject to which such businesses, factories and workshops shall be carried on. The same section allows municipal councils to prohibit, control and regulate trade and trading activities within their jurisdiction.

The Kiambu County Council By-Laws

Project is under jurisdiction of Kiambu County Council. The council operates by laws to govern all aspects of management and is also at liberty to use the various pieces of legislation to enforce conservation and pollution control measures at the Council. Council by laws relevant to conservation, the general nuisance by laws is quite pertinent. They include:

Deposit of Rubbish

Any person who shall without authority deposit or cause or permit to be deposited any soil, vegetation, refuse or debris or any land in the council shall be guilty of an offence.

Noise

Any person who, in connection with any building operations, demolition or road construction work, causes or allows to be caused noise which is so loud, continuous or repeated as to operations constitute a nuisance to the occupants of any premises in neighbourhood, shall be guilty of an offence.

Approval of Building Plans

After the site has been successfully identified, plans must be drawn and submitted for approval by the local authority. Amongst other requirements, the plan must have:

- Proper drainage system,
- An approved incinerator or legal waste disposal facility,
- Proper sanitary facilities, and
- Adequate natural and artificial light and ventilations.

Occupational Certificate

After the plans are approved and construction work completed the premises must be inspected by the Local Authority for the purpose of confirming whether the site complied with the approved

plans then an occupation certificate issued as provided by the public Health Act and Building Code. The proposed project is under the jurisdiction of Kiambu County Council hence all the stipulated rules and regulations will be strictly followed.

The Physical Planning Act of 1996 CAP 286

The Act allows for prohibition or control over the use and development of land and building in the interest of proper and orderly development of an area. Section 30 states that any person who carries out development without permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective local authority.

Section 36 states that if in connection with a development application, a local authority is of the opinion that the proposed development activity will have injurious impact on the environment; the applicant shall be required to submit together with the application an environment impact assessment (EIA) report. EMCA, 1999 echoes the same by requiring that such an EIA is approved by the National Environmental Management Authority (NEMA) and should be followed by annual environmental audits. The proposed project's construction and operation activities must be granted license by the relevant local authority as the EIA study process is in order with section 36 of this Act.

Traffic Act Cap. 403

In Section 51, only proper fuel should be used in vehicles. Similarly, vehicles should be well maintained to prevent any fumes/exhaust that could pollute the environment. All vehicles transporting construction materials will be granted permits to allow them transport materials to the construction site plus all the equipment, machinery and heavy vehicle drivers will possess up to date driving licenses and certificates identifying them and the type of machineries/vehicles/equipments/tractors they are authorised to operate.

The Building Code 2000

The building code under Septic and conservancy tanks, section 202 allows for installation of septic tanks/ conservancy tanks where a sewer system has not been provided that the proponent abides

with the provisions under the set table. The area where the project is to be located has an existing sewer line for waste water from sanitary facilities and other facilities for safe and proper disposal.

Energy Act

80.(1) A person shall not conduct a business of importation, refining, exportation, wholesale, retail, storage or transportation of petroleum, except under and in accordance with the terms and conditions of a valid license. The proponent shall acquire the Energy Regulatory Commission (ERC) license to transport and store petroleum at the proposed site before main project activities commence. The proposed project site is connected to the national Kenya Power and Lighting Company grid for electricity supply for use during project implementation activities and process.

4.1.7 The Lands Act, No. 6 of 2012

Part II Section 8 provides guidelines on management of public land by National Land Commission on behalf of both National and County Governments. This law in Section 8(b) stipulates that the Commission shall evaluate all parcels of public land based on land capability classification, land resources mapping consideration, overall potential for use, and resource evaluation data for land use planning. Section 8(d) stipulates that The Commission may require the land to be used for specified purposes subject to such conditions, covenants, encumbrances or reservations as are specified in the relevant order or other instrument.

In managing public land the Commission is further required in Section 10(1) to prescribe guidelines for the management of public land by all public agencies, statutory bodies and state corporations in actual occupation or use. In these guidelines management priorities and operational principles for the management of public land resources for identified uses shall be stated. This in essence means that the Commission shall take appropriate action to maintain public land that has endangered or endemic species of flora and fauna, critical habitats or protected areas. As well the Commission shall identify ecologically sensitive areas that are within public lands and demarcate or take any other justified action on those areas and act to prevent environmental degradation and climate change.

Part VIII of the Act provides procedures for compulsory acquisition of interest in land. Section III (1) states that if land is acquired compulsorily under this Act just compensation shall be paid in full to all persons whose interest in the land have been determined. The Act also provides for

settlement programmes. Any dispute arising out of any matter provided for under this Act may be referred to the Land and Environment Court for determination. The proposed project site is entirely government land.

4.3 National Institutional Framework

4.3.1 National Environment and Management Authority

The responsibility of the National Environmental Management Authority (NEMA) is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principle instrument of government in the implementation of all policies relating to the environment. In addition to NEMA, the Act provides for the establishment and enforcement of environmental quality standards to be set by a technical committee of NEMA known as the Standards and Enforcement Review Committee.

5.0 PUBLIC CONSULTATION AND PARTICIPATION

5.1 Objectives of Public Consultation and Participation

Public involvement is a fundamental principle of the EIA process. Public participation was mainly conducted by use of questionnaires (open and closed ended) and an organised public participation forum which provided important information on key impacts, baseline information, project negative impacts and their potential mitigation measures. Interviews and discussions with key personnel like the project contact person around the area necessitated the acquisition of vital information for the successful EIA study process. This ensured for an open and transparent process as it took into consideration the views of the project affected people and those meant to benefit from the project around the area.

Photo 3: Photo showing public forum as part of the participations and discussions



Public consultation and participation aimed at;

- i. Facilitate consideration of project alternatives, mitigation measures and trade-offs;
- ii. Ensure that important impacts are not overlooked and benefits are maximized;
- iii. Reduce conflict through early identification of contentious issues;
- iv. Provide an opportunity for the public to influence project activities in a positive manner;
- v. Improve transparency and accountability of decision-making; and increase public confidence in the EIA process and the proposed project's undertaking process.

5.2 Methodology

5.2.1 Site Reconnaissance

Site reconnaissance was conducted on 10th October at the proposed site located within Kiambu town in order to identify and gather more information after NEMA's direction for a deeper public participation on the biophysical and socio-economic environmental characteristics of the area. Questionnaires were administered during the site reconnaissance and a meeting held which was attended by the area Senior chief, assistant chief and site neighbours from residential homesteads, Kiambu rescue and fire station, the Indian Bazaar residents, the Administration police camp, administration police interdenominational community church (A.P. Chapel), businesses, G.K. Prison and other residents living in the area who are likely to be affected by the proposed project activities. Interviews and discussions were also conducted and involved mostly key informants lead by the project contact person.

5.2.2 Findings

Site survey showed that there were few residential homesteads, business premises (car park, repair and car wash centre), community church centre (A.P. Chapel), G.K. Prison and offices (Kiambu rescue and fire station), which were located a few metres from the project site and who might be affected by the project construction activities. The expected project impacts to the nearby residential area are negligible and mitigatable through proper implementation of the provided ESMMP.

5.3. Summary of major concerns raised

Table 1 Summary of issues of concern that arose during public participation.

Issue	Suggested measures/considerations
Risk to Public safety (Accidents/Injuries).	Fence the construction site by erecting of hoarding structures. Provision of protective clothing. Placing of proper safety signage. Erecting a perimeter wall.

	<p>Awareness creation.</p> <p>Training on first aid and fire safety skills through first drills.</p>
<p>Fugitive dust during excavation and transportation of raw materials to the site.</p>	<p>The contractor shall water the soil on the roads leading from and to the construction site to minimize dust.</p> <p>Have speed limit clearly marked on the road for drivers to follow.</p> <p>Excavation process must minimize dust to acceptable limits for residential zones.</p> <p>Air monitoring sampling shall be done on quarterly basis.</p> <p>Stopping the construction work for an amicable solution to the problem.</p> <p>Studying the wind direction and the construction activities be carried out as per the wind direction; the design consideration ensuring minimization of windblown fugitive dust.</p> <p>Use of dust tarpaulins round the construction site to trap dust.</p>
<p>Noise pollution.</p>	<p>Provision of PPE's like earmuffs to workers to protect them from excessive noise pollution that is very harmful to their health.</p>

	<p>Conduction of regular noise monitoring and evaluation tests to ascertain the levels of noise produced at the site.</p> <p>Awareness creation among workers on the risks of noise pollution on their health and importance of using PPE's like earmuffs.</p> <p>Conduction of regular medical check-ups for workers at the site to ensure that workers don't suffer in silence.</p> <p>Proper and regular servicing and maintenance of construction machineries, vehicles, trucks, equipments and tractors.</p> <p>Working strictly within the required and stipulated time period of 8-5pm.</p>
<p>Ground and surface water pollution</p>	<p>Ensuring that the construction machines have suitable central dust collectors and filters.</p> <p>Re-using of the waste water from construction activities.</p> <p>Channelling of the waste water from the construction site to the storm water channels for safe disposal.</p> <p>Recycling of the waste water for use again in the construction activities.</p> <p>Conduction of monitoring and evaluation for water purity and pollution levels at the site.</p> <p>Awareness creation on the importance of conserving and managing water, using water</p>

	<p>sparingly and recycling or re-using water at the site.</p> <p>Use of water tarpaulins for trapping dusts entering water.</p>
Water shortage	<p>Proper piping in the area.</p> <p>Ensure for timely and prior relocation of the water piping connection in the area before the start of the construction activities.</p> <p>Awareness creation to the site and area residents of the impending project construction activities.</p>
Disruption of utility services (electricity, sewerage connections and water piping in the area)	<p>Notifying the relevant utility service providers/authorities prior to the commencement of the Proposed project’s construction activities.</p> <p>Proper planning on the areas and services to be affected and the best ways to curb the resultant negative impacts from such activities.</p> <p>Timely and prior relocation of the utility services connections in the area to ensure that the project affected persons are not affected by the proposed project development activities.</p>
Displacement of current site occupants	<p>Building in phases to accommodate the residents that are to be affected by the project.</p>

	<p>Provision of alternative settlement areas to the project affected people currently living in the area.</p> <p>Relocating the to-be affected project persons to temporary safer areas before the commencement of the project construction activities.</p> <p>Provision of early notification or communication to the project affected persons before the actual construction activities start.</p> <p>Proper compensation to the project affected persons and those meant to be displaced for good.</p>
<p>Alteration of natural vegetation/destruction of farm crops within the site.</p>	<p>Compensating the people whose farm crops have been affected by the project activities.</p> <p>Timely and prior notification to the project affected persons of the pending project activities.</p> <p>Conducting stakeholder consultations before the start of construction activities.</p> <p>Rehabilitation of the to-be affected areas to the near original state as stipulated by the Kenyan environmental regulations, policies, laws and standards.</p> <p>Conservation and protection of the indigenous endemic (if any) vegetation of value to the surrounding communities for future use.</p>

<p>Loss of businesses / employment.</p>	<p>Notifying people before the commencement of the construction process.</p> <p>Compensation to the affected business people and those who have lost employment opportunities.</p> <p>Provision of alternative employment /business opportunities to the affected people to ensure for their continuity and longevity.</p> <p>Awareness creation and stakeholder consultations to educate people on best business practices.</p>
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The stakeholders when consulted pledged their full support for the project citing various benefits that could accrue from the same such as employment opportunities, easy and convenient access to goods and services, improved economic growth, modern infrastructural facilities, better housing, accommodation of more people/households, among others. A few project neighbours who had concerns were consulted and assured that all their concerns will be properly addressed and where possible, their involvement will be required for a transparent and accountable project implementation process.

6.0 ENVIRONMENTAL AND SOCIAL IMPACTS AND THEIR MITIGATIONS

6.1 Introduction

The construction and operation of the proposed housing project will generate both positive and negative social, economic and environmental impacts. This report makes proposals for monitoring and management of these impacts during the life cycle of the project. During the construction and operation of the proposed development, the main responsibility for the incorporation and monitoring of mitigation measures will lie with the project proponent, project manager and the contractors.

6.2 Positive Impacts

- i. During the project construction and operation, the locals will benefit from direct employment in provision of skilled, semi-skilled and casual labour where necessary.
- ii. Some construction materials like aggregates, sand, rocks, gravels, shall be sourced from the area thus boosting the local economy.
- iii. Creation of employment opportunities for many during the construction and operation stages.
- iv. Economic growth of the country through revenue generation from operational activities
- v. Improved income generation levels for the locals working in the area resulting in improved livelihoods.
- vi. Growth of small businesses like food kiosks, groceries providing daily meals to construction workers.
- vii. Exchange of technical knowhow as many local people will learn how to use and do different jobs upon proper training.

6.3 Impact Classification

Existing Impacts

- i. Clearance of vegetation to pave way for construction
- ii. Displacement of civil servants living in the former bocks that were demolished

Anticipated Significant Impacts

The impacts of the proposed project activities on the environmental elements are both positive and negative. The magnitude of each impact is described in terms of being significant, minor or permanent, short-term or long term, specific (localized) or widespread, reversible or irreversible. Most of the impacts have been addressed in the proactive design of the project and other mitigation measures can only be guaranteed through active and responsible management committed to the propositions of the environmental and social management and monitoring plan.

The adopted assessment criteria of the significant impacts are as shown in the table below:

Table 2 Assessment criteria of significant impacts.

Key	Type of impact	Key	Type of impact.
++	Major positive impact.	+	Minor positive impact.
--	Major negative impact	-	Minor negative impact.
0	Negligible/zero impact	NC	No change
Sp	Specific/localized	W	Widespread.
R	Reversible	Ir	Irreversible.
Sh	Short term.	L	Long term.
T	Temporary	P	Permanent

On the basis of information gathered during both the desktop and field reconnaissance, the potential environmental impacts of the proposed project are as tabulated below;

Table 3 Potential environmental impacts.

Environmental Impact	Type of Impact
Contamination of air quality with emissions (gaseous, dust particulate matter).	Sh, T, --,Sp
Increased noise levels leading to nuisance to the residents.	Sh, T, Sp,--

Irreversible Noise Induced Hearing Loss for immediate employees.	--, Ir,Sp
Loss of soil cover, flora and habitat for some fauna.	-,Sp,R
Poor aesthetics.	P,Ir,Sp, --
Risks of people and animals falling into the excavated foundation sites.	Sp,-
Increased waste.	-
Accidents due to unsafe work practices, incompetency or occupational hazards.	-.Sh,
Risk to public safety i.e. to onlookers.	-
Water pollution by contaminants in the storm water and migration of fines into the nearby water bodies.	-,Ir
Risk of accidents due to increased vehicular movement in the area.	--, Sh, Sp
Loss of jobs leading to Stress, anxiety and frustrations.	-, Sp
Irresponsible social behaviour.	-,Sp
Creation of jobs for locals and Improved infrastructure.	P, L, ++

6.4 Environmental and Social Negative Impacts during pre-construction stage

6.4.1 Social Impacts

- i. Creation of employment opportunities for many during the construction and operation stages.
- ii. Economic growth of the area, country and county in general through revenue generation.
- iii. Spread in anti-social behaviour due to inter-racial and tribal interactions resulting in the spread of diseases like HIV/AIDS.
- iv. Increase in insecurity cases due to mingling of different people of different cultures.
- v. Transfer of technical knowhow between the locals and the experts working at the site.
- vi. Growth in small businesses within the area.

6.4.2 Environmental Impacts

- i. The proposed housing blocks' site is occupied with existing housing units.
- ii. The area was being prepared through excavation to create space where the houses will be constructed and where the materials would be stored.
- iii. Dust from the excavations meant to prepare the site for construction activities.
- iv. Noise from the construction activities.

6.5 Negative impacts during construction (assembling) phase

6.5.1 Social impacts and environmental impacts

Dust emission/Air pollution

The large number of machines, vehicles, construction activities like transportation of materials, excavation, will generate dusts and gaseous emissions as well as the trucks and tractors using fossil fuels. The pollutants generated by these activities are considered to be harmful to human health and other biotic communities.

Potential mitigation measures

- i. Water will be sprinkled on the access road and within the site to minimize amount of dust emitted.
- ii. The proponent will be responsible for maintaining construction equipments to minimize exhaust fumes released to the atmosphere.
- iii. Construction equipments, machineries and vehicles will be turned off when not used for extended periods of time.
- iv. Use of low sulphur or no sulphur diesel fuel.
- v. Stockpiles of the finished products (finest aggregates) for concrete mixing and construction will be constantly kept damp by the action of water misting through the utilization of water sprinklers or covering with tarpaulins.
- vi. Provision of mouth plugs and other gears to the workers to protect them from inhaling the dangerous gases.
- vii. Conduction of regular monitoring and evaluation of air pollution levels in the project area.

Noise and Vibrations

The noise will be produced mostly during the construction and operation phases. This noise may reach a peak of 50-80 dB (A) one metre away from the source and constitute a hazard to the workers and an environmental nuisance to human receptors from the residential households in the vicinity of the project site. However, this noise lasts for only 5-10 seconds. In the case of this project, the immediate residential homesteads are further than 30 meters away from the project site. Therefore, it can be readily established that the noise produced by the construction activities will not cause any nuisance to these identified human receptors. However a noise survey is recommended immediately operations begin, sampling positions will be at the site and from the neighbouring residential homes. The results will be submitted to the authority for review.

In the proposed construction site, noise emission will be generated by the following activities:

- i. Operation of the proposed housing units,
- ii. Material transportation into the site,
- iii. Loading and offloading of materials at the site,
- iv. Starting of the automatic diesel generator,
- v. The vehicular, truck and tractor movement within the site.
- vi. Excavation operations.
- vii. Heavy machineries and equipments at the site.

Noise and vibration can cause irreversible damage to human beings if not controlled.

Potential mitigation measures

- i. The machines and equipment should be serviced regularly.
- ii. Workers and other persons who will be near the construction areas to have PPE such as earmuffs, gumboots, overalls, helmets and earplugs.
- iii. Sensitize drivers to switch off vehicle engines when not in use and to avoid unnecessary hooting and revving of vehicles.
- iv. Machinery and transport vehicles should be well maintained to minimize noise resulting from friction.
- v. All works to be done during day time only.
- vi. Workers should be provided with PPE such as earmuffs and earplugs when operating noisy machinery and when in a noisy environment.

- vii. During the project duration, noise monitoring exercises will be carried out as part of the ESMMP.
- viii. Permits for excess noise and vibration shall be obtained from the local NEMA office.

Impacts on flora & fauna

The vegetation on the site had been cleared, they included grown avocado and mango, some indigenous trees, grass, wild invasive weeds/vegetation, small bushes although there is no endemic indigenous flora at the site hence environmental impact on the floral value of the site need not be considered as substantial. There are, however, no animal species in the area which can be considered to be endemic in nature save for birds and insects hence no specific habitats or niches that will be affected.

Potential mitigation measures

- i. Re-vegetate stockpiles that will not be used for some time.
- ii. Once the final landform is established during rehabilitation, re-vegetate areas to stabilise the landform and to give the vegetation maximum time to establish.
- iii. Once the project lifespan ends, during decommissioning the proponent shall replant the field with grass and trees.

Surface drainage

The drainage of the general site is necessary to enhance effective flow of the much-anticipated surface run-off from impermeable areas within the site.

Potential mitigation measures

- i. Drainage around areas where hazardous materials are handled or stored should be captured and treated to ensure that there is no movement of these substances into the environment.
- ii. Drainage works will be constructed to mimic natural drainage patterns.
- iii. Accumulated storm water from surface run-off and waste water from construction site shall be pumped to prevent mosquitoes breeding, water related diseases such as bilharzia and accidents such as drowning.

Solid waste

During the project cycle, wastes (both solid and liquid) will be generated which will require disposal in an appropriate and environmentally acceptable manner. If solid waste is not removed promptly away from the generation points it accumulates in to large heaps posing a health hazard

Wastes which will be generated include the following:

- i. General construction waste (e.g. scrap metal, concrete),
- ii. Excavated materials from earthworks (e.g. pile foundations),
- iii. Material and equipment wrappings,
- iv. Chemical wastes generated by general site practices (e.g. vehicle maintenance/servicing);
and
- v. Liquid wastes generated by site workers during occupation.

Potential mitigation measures

- i. Bins shall be placed in designated areas and be well labelled.
- ii. Sorting of solid wastes before disposal should be practiced.
- iii. Solid wastes which cannot be reused at the site to be collected by a licensed waste handler at regular intervals.
- iv. A storage skip shall be provided for storing accumulated waste temporarily before collection by a waste handler.
- v. All waste shall be handled, stored and transported as per the provisions of Waste Management Regulations of 2006.

Liquid waste

Effluent from toilets, urinals and bathrooms shall be channelled to the existing sewer line in the area.

Other types of liquid waste such as waste water with cement during construction, storm water and waste water from the car wash area will be directed into surface drains and into main county council storm drains.

- i. The tank should be emptied periodically depending with the volumes.
- ii. Water entering the tank should be minimized by using water wastage reduction means such as press only taps for taps and washbasins.

Oil waste pollution

Petroleum oils and grease used in vehicles and construction machinery may spill or leak on/into the ground thus into the soil or water system within the neighbourhood. Also petroleum product stored at the site may leak causing contamination of underground water.

Potential Mitigation measures

- i. The designated garage/workshop section should be of hard surface and fitted with oil interceptor.
- ii. All vehicles must be serviced at the service bay which is built to the required specifications.
- iii. The fuel tank and the fuel pump area should be constructed as per the requirements and the Various Kenyan Standards that have been published for the safe and environmentally sound management of petroleum related installations under the Physical Planning Act of 1996.

Hazardous waste material management.

Hazardous materials are known to pose serious risks if released to the environment. The management of hazardous materials must therefore include the appropriate storage of these materials, and preparation for leaks and spills to ensure that the risk of hazardous materials being released into the environment is minimized.

Potential mitigation measures

- i. Provide high-performance grease traps and oil traps near workshops and places where vehicles, trucks, tractors and machineries are parked.
- ii. Locate storage areas away from waterways or areas prone to flooding.
- iii. Line bunded storage areas with impervious materials.

- iv. Oil, grease and petroleum spillage must not be cleaned up by hosing, sweeping or otherwise releasing such contaminant into waterways. Equipment and soil contaminated by fuels, lubricants, hazardous materials and clean up substances which cannot be salvaged must be disposed of in an approved waste facility.
- v. Develop contingency plans to address spills and leaks.

Visual intrusion

The construction and operation of the proposed development project, other facilities and structures, their appearances will inevitably stand out of the existing natural surroundings, thereby creating a visual impact.

Potential mitigation measures

- i. Re-vegetation through tree and grass planting, flower gardening and landscaping will be encouraged on the fertile soil stockpiles.
- ii. On completion of all works, the worked area shall be restored through grading, soil spreading, landscaping, tree and vegetation planting.

Occupational Health and Safety (OHS)

As provided for in the Occupational Safety and Health Act of 2007; the safety of those in the workplace should be given the weight it deserves. Foods for the construction site workforce are usually provided by mobile individuals most of whom operate without license. This can compromise health of the workers especially if such foodstuffs are prepared un-hygienically.

The following will be given priority.

- i. Proper personal protective equipment i.e. safety boots, helmet, goggles, respiratory equipment and gloves shall be used at all times on the site as condition warrant and workers trained on the proper use of tools.
- ii. The proponent shall use barriers and guards as necessary to protect employees and visitors from physical hazards. Danger warning or **CAUTION** will be put at strategic places.
- iii. Firefighting equipment will be strategically placed and all employees trained on how to use them.
- iv. Sanitary facilities shall be provided and cleanliness ensured as per set standards.
- v. A fully equipped first aid kit shall be provided and be managed by qualified persons.

- vi. Individual food vendors preparing food for the workers at the site shall be controlled and monitored to ensure that food is hygienically prepared.
- vii. Proper treatment of drinking water.

Accident prevention

The following rules will be observed to avoid accidents both during construction and operation of the proposed housing project;

- i. Ensure that the operational manuals are available and accessible for every vehicle, equipment /machinery.
- ii. The proponent will ensure that all buildings, fixed plants and mobile equipments are fitted with fire-fighting equipments, such as fire extinguishers, fire blankets.
- iii. Properly maintain all machinery and equipment to prevent premature failure or possible accidents.
- iv. Develop an emergency response plan.
- v. Maintain appropriate fire-fighting equipments at work site.
- vi. Only properly trained employees to operate equipment or machinery and proper instructions in their safe operation shall be provided.

Impacts on traffic

Additional traffic density which will occur during the construction and operation phase of the proposed project. Lorries and trucks accessing the site may be expected to contribute towards the high level prevailing traffic along the access road.

Mitigation Measures

- i. Maximum speed limit within the construction site will be 40km/hr for both operation and personal vehicles.
- ii. Speed limits and all other road signs and traffic rules shall be strictly observed.
- iii. Vehicles will be used for the purposes to which they are intended only.
- iv. Deployment of traffic Martials to control the traffic flow to avoid vehicle congestions.

Disaster management

Emergencies and disasters are a reality of everyday life. Workers/people must therefore be sensitised and prepared on how to react to either emergencies or disasters during the assembling

and operational phases of the project. Absence of such plans may be risky since there would be no guidelines on how to handle or control emergencies if they occur.

Mitigation Measures

- i. The proponent should initiate and develop effective Emergency Response Plan (ERP) to cater for various eventualities such as fire outbreaks, and other accidents/incidents that are likely to occur.
- ii. ERPs must be properly documented and made available to all.
- iii. Regular drills should be conducted on possible incidences.

6.6 Negative Impacts during Post-construction (assembling) (operation and maintenance phase)

6.6.1 Social Impacts

Security

Security of the site and those working within it is of utmost significance.

Potential mitigation measures

- i. Being vigilant of undesired characters and restrict the area from any trespassing.
- ii. The project site should be secured using hoarding structure or a perimeter wall to keep away trespassers and also be gated thus only authorized personnel access the site.

Socio-Economic Aspect

The decommissioning of the project activities will lead to loss of jobs and income to workers in addition to loss of revenue to the proponent, the central government and the local council.

Mitigation measures

- i. The workers should be given adequate notice and all the dues due to them settled in good time.

6.6.2 Environmental Impacts

In case the project has to be decommissioned, there will be many waste materials resulting from the stoppage of project's operations which will include metal equipments like concrete building slabs, scrap metals, machinery and equipment.

Mitigation Measures

- i. Remove all the underground facilities e.g. pipes, underground storage tanks and electric cables.
- ii. All the equipment and scrap metals should be removed from the site.
- iii. Backfill any surface openings.
- iv. Restore/rehabilitate the site to acceptable standards.
- v. All the wastes to be disposed by NEMA authorized waste handler and to NEMA approved dump sites.

Increased HIV/AIDS and other Sexually Transmitted Infections (STIs)

The proposed development project operation will result to immigration of people from outside the local areas in search of employment opportunities. Therefore, this increase of people in the project area may lead to increased incidences of sexually transmitted diseases which may exacerbate HIV/AIDS situation among the locals.

Potential mitigation measures

- i. Avail condom dispensers at site to the construction staff and the latter occupants.
- ii. Strengthen advocacy through awareness training in HIV/AIDS and other Sexually Transmitted Infections to the community.
- iii. Encourage the use of preventive measures like condoms.
- iv. Provide Counselling and testing for HIV/AIDS at the construction site.

7.0 PROJECT ALTERNATIVES

7.1 The proposed site

The findings and recommendations are based on the proposed site characteristics, materials, topography which favors the construction of the proposed project and the proposed technologies to be used in the implementation of the proposed project. Even though there are residents within the area, the proponent shall exercise pre-caution during the project implementation period. As such, the proposed site is fully recommended for use as the proponent will adhere to the mitigation measures for safe operations.

7.2 No Project Alternative

This means that the status quo remains and the landlord will have to contend with the land being underutilized. The State Department for Housing and Urban Development through the Civil Servants Housing Scheme Fund will have to look for another new project for the implementation which will involve fresh surveys and studies which will be more costly and time consuming as compared to implementing the proposed development project on the identified existing site. This will be of extra cost to the proponent and will additionally waste time for the planned construction period as well as result in loss of the expected benefits to the country and the local communities around the project area. Given the important project goal of developing affordable housing units for use by the civil servants and the general public important in reducing the high housing shortage in the country, the proposed project has no any viable alternative as the problem has to be solved through such noble initiatives.

7.3 Site Alternatives

The proposed project site has no any other alternative site given the present site's unique characteristics, accessibility due to its nearness to the Kiambu – Kanunga road, good topography, good red soil composition and geology factors mostly considered during site selection. The site also situated at a convenient place for the civil servants currently living there and working within the Kiambu Town. Therefore, it is recommended that the chosen site be the one to be used for the construction of the proposed development project to increase the number of households accommodated and ensure for reduced housing shortage.

7.4 Alternative Technology

There is no viable alternative technology or material for the construction and operation of the proposed housing project and its associated facilities apart from the proposed technologies to be used.

7.5 Alternative Construction materials

The proposed project site is the best alternative site since it will utilize the parcel of land fully, result in income generation for the landlord and create employment for the local people during all project phases among other benefits. There is no alternative construction materials to the proposed materials of water, sand, aggregate (rocks, gravel, ballast, etc), steel metals, red volcanic soil and cement, among other notable construction materials, given that they are the recommended, quality and standard required materials for the proposed development project construction.

8.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

Environmental management is a crucial segment of any development in view of the global concept of sustainable development. Therefore, the preparation of Environmental and Social Management and Monitoring Plan (ESMMP) is a must to fulfil the multifocal aspect of the statutory compliance, social and economic concern. The Environmental and Social Management & Monitoring Plan for the proposed project provides a logical framework within which identified negative environmental impacts can be mitigated and monitored. The ESMMP is a very important output of this EIA report since it provides the framework or checklist for project monitoring and evaluation, the ESMMP has been carefully considered for the entire project, taking cognizance of project planning and design, construction, operation and maintenance, and decommissioning. The ESMMP outlined below has addressed identified potential negative impacts and mitigation measures for the proposed development and if it's adhered to, it's considered sufficient to take care of environmental concerns and it shall be modified at the first environmental audit to accommodate unforeseen impacts if any.

Table 4 Environmental and Social Management and Monitoring Plan.

Environmental /Social Issue/ Aspect	Anticipated Environmental Impact	Management/Mitigation Measure	Monitoring Measure	Responsibility	Mitigation Period	Cost Estimate/ Year
Air Quality	Contamination of air quality with emissions (gaseous, dust)	<ul style="list-style-type: none"> • Water will be sprinkled on the access road to minimize amount of dust emitted. • The proponent will be responsible for maintaining construction equipment and machinery to minimize exhaust. • Construction equipment and vehicles will be turned off when not used for extended periods of time. • Use of low sulphur or no sulphur diesel. • Speed limits should be marked and positioned on the haulage roads for drivers to follow. • Personal protective equipments must be provided to the workers working at areas involving dust evolution. 	<ul style="list-style-type: none"> • Review log sheets and ensure regular servicing of the vehicles and machineries. • Regular misting of haulage road. • Records of provision of PPE. • Use of PPE in areas involving dust evolution. 	Project Manager, Civil Servants Housing Scheme Fund.	Operation and decommissioning stages.	To be estimated by the project engineer in charge.
Noise Nuisance	Increased noise levels leading to nuisance to the	<ul style="list-style-type: none"> • The machines and equipment shall be serviced regularly. 	<ul style="list-style-type: none"> • Review log sheets and ensure regular servicing of the 	Project Manager,	Operation stage	To be estimated by the project

	residents and employees	<ul style="list-style-type: none"> • Sensitize drivers to switch off vehicle engines when not in use and to avoid unnecessary hooting and revving of vehicles. • Workers should be provided with PPE such as earmuffs and earplugs when operating noisy machinery during construction. 	<p>vehicles and machines.</p> <ul style="list-style-type: none"> • Records of PPE provided per staff likely to work in a noisy environment during project construction. 	Civil Servants Housing Scheme Fund.	Construction stage.	engineer in charge.
Removal/Alteration of vegetation	Loss of soil cover and; Loss of habitat for some fauna.	<ul style="list-style-type: none"> • Avoid removal of vegetation on areas which are not active. • No indigenous trees shall be felled. • Re-vegetate the field with grass after project expiry. 	<ul style="list-style-type: none"> • Grass cover on the field after project expiry and decommissioning. 	Project Manager, Civil Servants Housing Scheme Fund.	Operation stage and decommissioning stage.	
Risk to Health and Safety (Occupational and public)	Accidents due to unsafe work practices, incompetency or occupational hazards. Risk to public safety i.e. on lookers.	<ul style="list-style-type: none"> • Proper personal protective equipment i.e. safety boots, helmet, goggles, respiratory equipment and gloves to be used at all times on the site as condition warrant and workers trained on the proper use of tools. • The proponent shall use barriers and guards as necessary to protect employees and visitors from physical hazards. Danger warning or 	<ul style="list-style-type: none"> • Records of issuance of PPE to workers. • Ensure use of PPE by workers during construction. • Presence of a perimeter fence. 	Project manager, EHS officer- Civil Servants Housing Scheme Fund.	All phases.	To be estimated by the project engineer in charge.

		<p>CAUTION will be put at strategic places in national languages (Kiswahili and English) e.g. “No Entry of unauthorised staff”, “Flammable materials”, “Danger”</p> <ul style="list-style-type: none"> • Firefighting equipment will be strategically placed and all employees trained on how to use them. • Sanitary facilities shall be provided and cleanliness shall be ensured as per set standards. • A fully equipped first aid kit shall be provided and shall be managed by qualified persons. • Proper treatment of drinking water. • Adherence to OSHA Act, subsidiary legislations, EMCA Act and Public Health Act. • Hire competent staff depending with the type of the job. 	<ul style="list-style-type: none"> • Presence of a fully stocked first aid kit. • Presence of firefighting appliances and maintenance records. • Provision of clean drinking water for staff. • Presence of OSHA Act, 2007 • Abstract and relevant legislation onsite in a general register 			
Accident / Injury prevention	Improper use of machines; and unsafe work procedures.	<ul style="list-style-type: none"> • Properly maintain all machinery and equipment to prevent premature failure or possible accidents. • Develop an emergency response plan. 	<ul style="list-style-type: none"> • Presence of operation manuals and accessibility 	Project Manager/EHS officer-	All phases	To be estimated by the project

		<ul style="list-style-type: none"> • Maintain appropriate fire-fighting equipment at a work site. • Only properly trained employees to operate equipment or machinery and proper instructions in their safe operation shall be provided. 	<ul style="list-style-type: none"> • to machine and plant operators. • Maintenance schedule and records for all plants and equipments at the campsite. • A written Emergency response plan available for all employees on site. • Appropriate signage. 	Civil Servants Housing Scheme Fund.		engineer in charge.
Surface drainage and water pollution by oil substances	Water pollution by contaminants in the storm water and migration of oil based substances into the water bodies.	<ul style="list-style-type: none"> • Ensure hazardous materials are handled and stored in a good manner, to ensure that there is no movement of these substances into the environment. • Drainage works should be constructed to mimic natural drainage patterns. 	<ul style="list-style-type: none"> • Proper storage facility for hazardous materials if any. • Handle all hazardous materials as per the Hazardous 	Project manager, - Civil Servants Housing Scheme Fund.	Operation stage.	To be estimated by the project engineer in charge.

		<ul style="list-style-type: none"> • The designated garage/workshop section should be of hard surface and fitted with oil water interceptor. • All vehicles must be serviced at the service bay which is built to specifications of a service bay. • The fuel tank and the fuel pump area should be constructed as per the requirements of the Various Kenyan Standards have been published for the safe and environmentally sound management of petroleum related installations under the Physical Planning Act of 1996. 	<p>Substances Rules of 2007.</p> <ul style="list-style-type: none"> • Paved refuelling section with a canopy oil water interceptor. • A well designed garage and service pit with Oil Water interceptor. 			
Increased Solid waste generation	Poor aesthetics and environmental pollution.	<ul style="list-style-type: none"> • Have a proper waste collection, separation, and disposal program. • Dispose all waste as per the Waste management regulations of 2006. • Bins to be placed in designated areas and be well labelled. • Contract a licensed waste handler to collect solid wastes which cannot be reused at the site. 	<ul style="list-style-type: none"> • Waste management schedule. • Recycling of waste. • Contractual documents of a licensed waste handler on site. 	Civil Servants Housing Scheme Fund Management.	Construction, Operation and decommissioning stage.	To be estimated by the project engineer in charge.

<p>Increased traffic density</p>	<p>Risk of accidents due to increased vehicular movement.</p>	<ul style="list-style-type: none"> • Maximum speed limit within this area will be 40km/hr for both operation and personal vehicles. • Speed limits and all other road signs and traffic rules shall be strictly observed. • Vehicles will be used for the purposes to which they are intended only. 	<ul style="list-style-type: none"> • Speed limit signs. 	<p>Project manager- Civil Servants Housing Scheme Fund.</p>	<p>Operation stage.</p>	<p>To be estimated by the project engineer in charge.</p>
<p>Disruption of Utility Services (Electricity, Water and Sewerage services).</p>	<p>Interference with the water, electricity and sewerage connections within the area.</p>	<ul style="list-style-type: none"> • Early notification or communication to the relevant authorities in charge of such utilities of an impending development project. • Relocation of such utility services connections within the area to safer areas to prevent their destruction. • Provision of alternative temporary areas for such utility services connection during the project implementation. • Provision of alternative utility services to the area residents during the project implementation process to avoid cutting off completely the 	<ul style="list-style-type: none"> • Sustainability and satisfactory access to such services by the area residents. • Monitoring the frequency by which the area residents complains about their access to such services. 	<p>Project Manager, Civil Servants Housing Scheme Fund.</p>	<p>Entire project implementation process.</p>	<p>To be estimated by the project engineer in charge.</p>

		residents from accessing such services conveniently.				
Displacement of Current Site Occupants.	Displacement of the current occupants of Indian Bazaar during demolitions.	<ul style="list-style-type: none"> • Provision of alternative temporary settlement areas for the to-be affected project persons. • Relocating the project affected people to safer areas as the construction activities proceed. • Compensating the project affected persons adequately to enable them survive through the project implementation period. • Awareness creation and stakeholder consultation to ensure that every project affected person is well informed of the intended construction works. • Early notification of the to-be affected project persons of the impending construction works in the area. 	<ul style="list-style-type: none"> • Acquisition of an alternative, temporary settlement area for the affected project persons. • Successful relocation of the affected project persons to a new settlement area. • Positive feedbacks and the satisfaction of the relocated project affected persons with the relocation process. 	Project Manager, Civil Servants Housing Scheme Fund.	Pre and post project implementation phases.	To be estimated by the project manager in charge.
Social Economic Impacts.	Creation of employment		<ul style="list-style-type: none"> • Improved living standards 		Operation stage.	To be estimated by the project

			<ul style="list-style-type: none"> • Economic empowerment 			engineer in charge.
	Loss of jobs / businesses leading to Stress, anxiety and frustrations	<ul style="list-style-type: none"> • The contracted workers and casuals should be given adequate notice and all the dues due to them settled. • Encourage them to look for jobs elsewhere. • Encourage remittance towards NSSF. 	<ul style="list-style-type: none"> • Records of NSSF remittance. 	Civil Servants Housing Scheme Fund.	Decommissioning stage.	To be estimated by the project engineer in charge.
	Irresponsible social behaviour, HIV and AIDS prevalence	<ul style="list-style-type: none"> • Conduct sensitization to the staff and community on drug abuse, irresponsible sexual behaviours, HIV and AIDS, Stress management, and voluntary counselling and Testing. • Provide adequate information in form of signage, leaflets within the construction site. • Provide Condoms within the plant site. 	<ul style="list-style-type: none"> • Community sensitization meetings done. • Voluntary counselling and testing centre within the workplace. • Provision of Condoms advisory by a qualified personnel 	Civil Servants Housing Scheme Fund.	Operation.	
Security	Insecurity within the plant site due to	<ul style="list-style-type: none"> • Strategically install lighting. • Employ reputable security guards to guard the property in a 24-hour basis. 	<ul style="list-style-type: none"> • Security lighting fixtures. 	Project manager,	Construction and	To be estimated by the project

	high value machines on site.	<ul style="list-style-type: none"> Document any suspicious movement within the facility and its environs. 	<ul style="list-style-type: none"> Presence of 24/7 Security guards. Register at the gate of all persons entering and leaving the construction site. 	Civil Servants Housing Scheme Fund.	operation stage	engineer in charge.
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9.0 PROJECT DECOMMISSIONING

9.1 Introduction

Decommissioning is an important phase in the project cycle and comes last to wind up the operational activities of a particular project. It refers to the final disposal of the project and associated materials at the expiry of the project.

9.2 Environmental Impacts

In case the site has to be decommissioned, there will be many waste materials resulting from the stoppage of project operations which will include building materials, scrap metals, machinery and equipment. Decommissioning procedure should include tests of residual materials – if any- at the project site and propose proper reinstatement of site.

Mitigation Measures

- i. Remove all the underground facilities e.g. pipes, underground storage tanks and electric cables.
- ii. All the equipment and scrap metal should be removed from the site.
- iii. Backfill any surface openings.
- iv. Remove all fixed and mobile plants.
- v. Adopt the three R's of waste management initiatives, Recycle, Reuse and Renew.
- vi. Remove all temporary and permanent structures unless required for an agreed future use.
- vii. Remove surplus roads, water reservoirs and hard standing areas where necessary.
- viii. Restore/rehabilitate the site to acceptable standards as agreed with the landlord.
- ix. All the wastes to be disposed by NEMA authorized waste handlers and to approved disposal sites.
- x. All useful materials to be transported to the next point of use.

The table below shows the proposed decommissioning plan during decommissioning phase:

Table 5 EMP for Decommissioning.

Objective/Recommended Mitigation Measure	Recourse/Personnel	Time Frame	Cost
1. Demolition Waste management			

<p>a) All building materials, machinery, plants and equipments not being used for other purposes must be removed to the contractors yard, recycled and reused as much as possible</p>	<p>Contractor/proponent.</p>	<p>Decommissioning phase.</p>	<p>To be estimated by Engineer in charge</p>
<p>b) Disposal of wastes should be to an approved dumping site and method applicable.</p>	<p>Contractor/proponent.</p>	<p>Immediately.</p>	<p>To be estimated by the project manager in charge or contracted NEMA registered waste handler.</p>
<p>2. Project Site Rehabilitation</p>			
<p>a) Initiate a landscape maintenance program that will revitalize the site vegetation better than was before</p>	<p>Contractor/proponent</p>	<p>Continuous</p>	<p>To be estimated by the project/site landscape architect (if any).</p>

10.0 CONCLUSION AND RECOMMENDATIONS

10.1 Introduction

This study has established that the proposed development project will generate many positive but negligible negative environmental impacts during and after operation. However, most of these negative impacts are easy to mitigate using the proposed mitigation measures. It is important to involve all stakeholders during the implementation of the project.

10.2 Conclusion

This EIA study has demonstrated that the proposed project will generate minimal negative environmental impacts during construction as well as during operation phase. However, most of the identified impacts are of low magnitude and the benefits of project option far outweigh those of no project option. The EIA study established that the identified negative impacts can adequately be mitigated by the suggested mitigation measures and recommends that the project be licensed by the Authority ensuring that the ESMMP is adhered to. It is anticipated that the project will be able to sustain the environmental imperatives of its activities and reduce them considerably in pursuit of environmental sustainable social development practice.

10.3 Recommendations

It is recommended that all suggested mitigation measures in the ESMMP be implemented during the entire project cycle. Additionally;

- 1) Construction to commence only when the NEMA licence has been obtained.
- 2) The project should utilize local manpower during construction and give equal opportunities to women to enhance project ownership and acceptance by the local community.
- 3) Conduct an initial environmental audit of the facilities as per the NEMA requirements to monitor the environmental compliance.
- 4) Safety within the living and working environment is of great importance, it is recommended that all provisions of OSHA, 2007 be adhered to. An annual Safety and Health Audit should be conducted.
- 5) Warning/informative signs should be erected at the construction site to remind all employees of the rules and regulations that they are required to observe.

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12.0 APPENDICES

Annex A– Environmental Questionnaires for public participation.

Annex B – List of Individuals consulted during public participation.

Annex C –The proposed housing development layout architectural plans/designs.

Annex D – Public forum minutes.