National Housing Corporation

County Government of Homa Bay

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED HOMA BAY AFFORDABLE HOUSING PROJECT PHASE I WITHIN HOMA BAY MUNICIPALITY OF HOMA BAY COUNTY.

For

NATIONAL HOUSING CORPORATION,
P.O. BOX 30257 - 00100, GPO NAIROBI.
Tel: +254 33312147/9,
Mobile No: 0724256403 / 0735993030,
Fax: +254 (020) 311318.
Email: info@nhckenya.go.ke

GPS Coordinates: Lat.: -0.522787^0, Long: 34.462385^0, Elev: 1157m.

EIA Lead Expert.
Mwongera Murungi.
National Housing Corporation.
TEL: +254 33312147 / 9
Email: mmurungi@nhckenya.go.ke

NEMA LEAD EXPERT LICENSE: 0892.

 Housing the Nation! December, 2022.

CERTIFICATION.

This is to certify that this Environmental and Social Impact Assessment (ESIA) was commissioned by the proposed project proponent: National Housing Corporation (NHC) in partnership with the County Government of Homa Bay (CGHB). The ESIA was carried out by an In-House; ESIA Team of professionals drawn from NHC and CGHB, led by a National Environment Management Authority (NEMA) registered Environmental Impacts Assessment (EIA) Lead Expert. This Environmental Impact and Social Assessment has been professionally done and documented in accordance with the Environmental Management and Coordination Act (EMCA), 1999 and the Environmental Impact Assessment and Audit Regulations 2003.

We the undersigned, certify that the particulars given in this ESIA study report are correct to the best of our knowledge: We further certify that this report was prepared based on the information provided by the proposed project proponent – National Housing Corporation, the County Government of Homa Bay as well as that collected from site observations, research and various consultations during the ESIA process. It is therefore an accurate and truthful representation of the findings at the time of the exercise.

NAME: Mwongera Murungi.	**Reg. Status**: Lead Expert.	**Reg. Cert No**: 0892

SIGNATURE:……...

DATE:……...

POSITION: EIA LEAD EXPERT / LAND USE & HOUSING PLANNER – NHC.

PROPOSED PROJECT PROPONENT - NATIONAL HOUSING CORPORATION.

I certify that all the information provided and documented in this ESIA study report without any prejudice is accurate to the best of my knowledge.

NAME:……...

SIGNATURE:……DATE:…….

DESIGNATION:…….

ACKNOWLEDGMENT.

The ESIA project team would like to appreciate the National Housing Corporation (NHC) management and the County Government of Homa Bay for initiating the Environmental and Social Impacts Assessment (ESIA). The team is thankful to the project architects, quantity surveyors, the project engineers and all the other professionals involved in the project for their support in the ESIA process. The team is earnestly grateful to all the other stakeholders and particularly the general public, neighbours, lead agencies, Non-Governmental Organization (NGOs) / Community Based Originations (CBOs) *inter alia* who contributed in any way in the ESIA process.

TABLE OF CONTENTS.

LIST OF TABLES.

LIST OF FIGURES.

ACRYONYMS.

ADP	Annual Development Plan
AHP	Affordable Housing Programme
BoD	Board of Directors
BOWEC	Building Operations and Works of Engineering Construction.
BQs	Bills of Quantities
CBD[1]	Central Business District
CBD[2]	Convention of Biological Diversity
CBOs	Community Based Organizations
CCTV	Closed Circuit Television
CDE	County Director of Environment
CDM	Clean Development Mechanism
CECM	County Executive Committee Member
CECs	County Environmental Committees
CGHB	County Government of Homa Bay
CIDP	County Integrated Development Plan
CPP	Consultation and Public Participation
DOSHS	Directorate of Occupational Safety and Health Services
EA	Environmental Audit
EDCP	Effluent Discharge Control Plan
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act, 1999
EMP	Environmental Management Plan
EOC	Emergency Operations Coordinator
EPS	Expanded Polystyrene
ERA	Environmental Risk Assessment
ERP	Emergency Response Plan
ESIA	Environmental and Social Impacts Assessment
FBOs	Faith Based Organizations.
GDP	Gross Domestic Product.
GOK	Government of Kenya
GPS	Global Positioning System
GSDU	Governors Service Delivery Unit
HIV/AIDS	Human Immunodeficiency Virus Infection and Acquired Immune Deficiency Syndrome
HOMAWASCO	Homa Bay County Water and Sanitation Company Limited
IAP	Interested and Affected Parties
ICT	Information Communication and Technology
ILO	International Labour Organization
JI	Joint implementation
JV	Joint Venture
KPC	Kenya Power Company
LED	Light-Emitting Diode
LM	Leopold Matrix

LPG	Liquefied Petroleum Gas
M&E	Monitoring and Evaluation
MA	Managing Agent
MC	Management Company
MCA	Member of County Assembly
MDGs	Millennium Development Goals
MoHB	Municipality of Homa Bay
MP	Member of Parliament
NCA	National Construction Authority
NCCAP	National Climate Change Action Plan
NCCRS	National Climate Change Response Strategy
NEAP	National Environment Action Plan
NECC	National Environmental Complaint Committee
NEMA	National Environment Management Authority
NET	National Environmental Tribunal
NGOs	Non-Governmental Organizations
NHC	National Housing Corporation
OSH	Occupational Safety and Health
PA[1]	Project Agreement
PA[2]	Personal Assistant
PDP	Part Development Plan
PPEs	Personal Protective Equipment
PPP	Public-Private Partnerships
SDGs	Sustainable Development Goals
SDHUD	State Department for Housing and Urban Development
SEA	Strategic Environmental Assessment
SEAP	Social Environmental Action Plan
SMMEs	Small, Medium and Micro Enterprises
SPAs	Service Provision Agreements
SRU	Risk Management Committee
STD	Sexually Transmitted Diseases
STI	Sexually Transmitted Infections
SUO	Sewer Use Ordinance.
TMP	Traffic Management Plan
ToRs	Terms of Reference
TPS	Tenant Purchase Scheme
UNFCCC	United Nations Framework Convention on Climate Change
USSD	Unstructured Supplementary Service Data
VAT	Value Added Tax
VCT	Voluntary Counselling and Testing
VOC	Volatile Organic Compounds
WASREB	Water Services Regulatory Board
WIBA	Work Injury Benefits Act
WRA	Water Resources Authority
WSPs	Water Service Providers

EXECUTIVE SUMMARY.

The National Housing Corporation (NHC) is a statutory body established by an Act of Parliament Cap. 117. The primary mandate of NHC is to play a principal role in the implementation of the Government's Housing Policies and Programmes. NHC has entered into a joint venture via a project agreement with the County Government of Homa Bay on Affordable Housing Development Project. The proposed development will have a total of four hundred (400) affordable housing units, comprising bedsitter/Studio units in four blocks, one-bedroom units in seven blocks and two-bedroom units in seven blocks and five shops within the blocks. Pursuant to the requirement of the Environmental Impact Assessment Regulations, 2003, this Environmental and Social Impact Assessment (ESIA) has been undertaken to provide assessment of the nature and extent of potential environmental and social impacts associated with the construction, operation and decommissioning of the proposed project.

Objectives of the ESIA Study Report.

- To adequately identify and evaluate the significant environmental impacts of the proposed project and their significance to the environment.
- To examine and propose recommendations on the various mitigation measures to be taken in order to ensure possible negative impacts of the project are minimized.
- To establish compatibility of the proposed facility with the neighbouring uses as well as local environmental conditions
- To examine and analyse the environmental costs and benefits associated with the proposed project.
- To investigate and select the best project alternatives from various options available.
- To incorporate Environmental Management Plan (EMP) and Monitoring Plans during the implementation (construction) and operational phases of the proposed project.
- To engage the stakeholders on the proposed project as a means of creating awareness and for their public participation in the project proposal.
- To compile and submit to NEMA an ESIA study report as a statutory requirement for application of an EIA License for the proposed project.

Main Project Activities

The main project activities throughout the project cycle will include, but not limited to the following:

1. Preconstruction activities – project planning

2. Procurement of construction materials,

3. Site preparation, including setting out of building works,

4. Excavation works for main building works,

5. Construction of building foundation works,

6. Construction of superstructure works,

7. Installation of internal fittings, internal/utility services,

8. Development of vehicle parking, and walkway network,

9. Development of electricity supply,

10. Plumbing and drainage water supply, and rainwater harvesting,

11. Landscaping,

12. Final inspection of works,

13. Residential activities,

14. Solid wastes and waste water management,

15. Cleaning,

16. General repairs and maintenance,

17. Decommissioning of housing scheme project.

EIA process and report

The EIA Study Report has been prepared pursuant to section 58 of the Environmental Management And Coordination Act (EMCA), 1999 and in accordance with part II of the Environmental (Impact Assessment and Audit) Regulation, 2003, legal notice No. 101.

The EIA process key activities included; preliminary assessment, literature review, field reconnaissance survey, interviews, directs observations, report writing and documentation. The potential environmental impacts of the proposed project and corresponding possible mitigation measures are summarized in table 1 below:-

Table 1: Summary of Environmental Impacts and Mitigation Measures.

NO.	Impact.	Mitigation.
	Construction Phase.	
1.	Risk of non-compliance with statutory requirements.	• It is recommended to submit the proposed project architectural drawing to the County Government of Homa Bay for approval before commencement of the project. • It is recommended to apply and pay for water supply and sewer connection to Homa Bay County Water and Sanitation Company Limited (HOMAWASCO). • It is recommended to conduct an EIA for the proposed project and submit the EIA study report and obtain an EIA License from NEMA before the commencement of the proposed project. • It is recommended to ensure that a copy EIA License and the EIA study report is filed at the project site at all times during the construction phase. • It is recommended to register the proposed project with NCA before the commencement of the project. • It is recommended to register the proposed project construction site with DOSHS as a workplace before commencement of the project. • It is recommended to submit the architectural drawings to DOSHS for approval. • It is recommended that the contractor nominate a safety supervisor for the construction and submit the nominees' name to DOSHS. • It is recommended to strictly adhere to the general and construction phase EIA License Conditions.
2.	Potential damage to public facilities and utilities.	• It is recommended that the contractor meet the cost where the relevant approving authority may require the contractor to pay such deposit or give such security, as it may require covering the costs of the repair of any damage which may be caused by such work. • It is recommended for the contractor to make good the damage to the damage to such public facilities and utilities to the satisfaction of the relevant regulatory / lead agency.
3.	Restriction of accessibility and general inconvenience to the public.	• It is recommended to develop plans for employee/trades parking, materials delivery and storage, and truck staging that optimize usage of the available space on site or other private property as applicable. • It is recommended to contain construction works, materials and equipment on site. • It is recommended to develop plans to communicate effectively with stakeholders including the neighborhood, the general public, and other appropriate jurisdictions. If feasible website and other social media tools are encouraged as effective communication tools.

NO.	Impact.	Mitigation.
		• It is recommended to coordinate activity with other major projects and events affecting the neighborhood transportation network including roadways, highways and walkways. • It is recommended to develop silt/dust control implementation plans. • It is recommended to commit to responding to neighborhood concerns and to resolving complaints reasonably in a timely manner. • It is recommended to develop traffic Management Plans & Works Schedule
4.	Risk to flora and fauna.	• It is recommended to clear the unused materials from the site at the end of the construction phase to allow for the regeneration of vegetation. • It is recommended that after construction has been concluded to restore the land through appropriate landscaping. • It is recommended that the employment of appropriate soil conservation measures to reduce the erosion effect.
5.	Risk of land degradation.	• It is recommended if feasible to schedule excavation during low rainfall periods to reduce erosion impact. • It is recommended to excavate immediately before construction instead of leaving soil exposed for extended time (months/years). • It is recommended to control concentrated flow and run-off to reduce the volume and velocity of water from work sites. • It is recommended to install windbreaks where wind erosion is a concern.
6.	Noise and excessive vibrations pollution.	• It is recommended to provide the workers with appropriate and sufficient Personal Protective Equipments (PPEs) like earplugs to protect them from the noises generated and enforce their use. • It is recommended that the vehicles utilized during construction are well serviced; speed limits should also set to reduce noise pollution. • It is recommended that the machinery and vehicles used be those that produce minimum noise and vibrations otherwise they should be fitted with noise reduction fittings. • It is recommended to notify the neighbours of the impending construction and what to expect during the construction hours.
7.	Risk of air pollution.	• It is recommended to provide the workers with appropriate and sufficient Personal Protective Equipments (PPEs) like respiratory masks to reduce the amounts of dust they inhale and enforce their use.

NO.	Impact.	Mitigation.
		• It is recommended that the contractor regulate the speed at which construction site associated vehicles move to reduce the dust emission • It is recommended to water the site where /when necessary at least twice a day to reduce the propagation of dust. • It is recommended to adequately maintain machinery used during the construction to enhance fuel efficiency and reduce emissions. • It is recommended that the contractor come up with a dust suppression plan. • It is recommended that the excavated soil be used to fill up open dug up pits, areas (Cut and fill) and the surplus disposed off or enclosed and watered to suppress the dust it may produce during windy days.
8.	Potential for occupational safety and health compromise.	• It is recommended to enforce PPEs usage by workers at the required time for the required purpose. • It is recommended to provide adequate fully stocked first aid kits at the site and designate trained first aiders. • It is recommended that the contractor ensure that all equipment and machinery are used for the prescribed function or purpose only. • It is recommended to ensure that all persons handling different machineries and equipments understand the technical operations in addition to providing instruction manuals for the various equipment and machinery. • It is recommended to have an incident(s)/accident(s) register on site. • It is recommended to provide relevant emergency signage at the site, adequate lighting and barriers where need be. • It is recommended that the contractor obtains WIBA insurance for construction workers at the construction site.
9.	Negative social impacts.	• It is recommended to give the local residents priority in employment to avoid conflicts and enhance project acceptance. • It is recommended to put in place formal communication mechanism between workers, contractors and the neighbours which will address among other complaints raised. • It is recommended to create awareness and sensitization on matters HIV/AIDS and sexually transmitted diseases. • It is recommended to make available stocked condom dispensers on the construction site. • It is recommended that the contractor/proponent to provide security system and personnel onsite.

NO.	Impact.	Mitigation.
10.	Risk of water pollution.	• It is recommended that no construction camps be put within 50 m of drainage line and standing water source. • It is recommended that no mixing of concrete occur within 50 m of a watercourse. • It is recommended that appropriate containment structures be provided. • It is recommended that all fuel storage be appropriately bunded. • It is recommended that to provide ablutions facilities for construction worker.
11.	Increased heavy traffic in area.	• It is recommended to erect warning/informative signs (billboards at the site). These should indicate the operation hours (start and completion times); the signs should be positioned where it is easily viewed by the public and most motorists. • It is recommended that construction vehicles use designated routes, and enter and exit the site at designated and controlled points only. • It is recommended to erect speed bumps with corresponding signage to give warning and direct the traffic as necessary. • It is recommended that where necessary, walkways will be protected by the placement of temporary barriers. • It is recommended to develop and implement a traffic management plan • It is recommended that to further mitigate the negative impacts due to traffic by the contractor and proponent adherence to Homa Bay County government traffic by-laws and Kenya traffic laws. • It is recommended that the traffic along connecting routes be controlled during the construction phase and especially when large trucks are turning into the site. • It is recommended that all project vehicles adhere to speed limits determined by the contractor or the legal speed limit, whichever is lower, and be enforced and subjected to monitoring by the contractor.
12.	Solid waste generation.	• It is recommended for provision of material segregation bins and skips for waste generated to facilitate salvaging, recycling, reusing, and disposal of waste. • It is recommended that recycling and waste collection areas are kept neat, clean, and marked. • It is recommended to contract NEMA licensed waste collector and Licensed transporter for waste disposal.

NO.	Impact.	Mitigation.
	Operational Phase.	
1.	Visual impacts.	• It is recommended to incorporate in the design stage features that will reduce visual intrusion and enhance seamless integration into the surrounding area. • It is recommended that the proposed project wall cladding match with the existing architecture in the area. • It is recommended to include landscaping in the proposed project design to enhance the blending in of the proposed project to its surrounding.
2.	Risk of Non-compliance with the statutory requirements.	• It is recommended to adhere to general and operation phase EIA License conditions. • It is recommended to have well-maintained document records to efficiently maintain reports and optimize licenses. • It is recommended to have clearly defined roles and responsibilities that outline the EMP implementation protocol.
3.	Solid waste generation.	• It is recommended to contract a NEMA registered licensed waste handler to collect and dispose off the wastes at NEMA designated sites. • It is recommended to put measures to ensure frequent and regular waste collection. • It is recommended that the residents be provided with NEMA approved plastic waste bags on regular basis; the bags should be branded bags and color-coded. • It is recommended to have a designated waste collection point where all residents will deposit their wastes. • It is recommended that the waste chambers are appropriately located within the development but away from the main gates
4.	Effluent waste generation.	• It is recommended that the proponent ensure frequent effluent system maintenance and prompt repairs and unblocking of system. • It is recommended to ensure that storm water and effluent are separately channelled into the respective systems to avoid overloading the sewer system. • It is recommended that the proponent apply for authorization from HOMAWASCO for connection to the public trunk sewer line. • It is recommended to develop an Effluent Discharge Control Plan (EDCP) for the operation of the proposed project.
5.	Increase energy consumption and demand.	• It is recommended if feasible for the installation and use of solar powered street and common area lighting. • It is recommended that the proposed project housing units design incorporates energy-efficient fixtures like energy-saving lighting system.

NO.	Impact.	Mitigation.
		• It is recommended the proposed project design incorporates large window for natural lighting and ventilation to reduce energy cost.
6.	Increased water demand and consumption.	• It is recommended for the storage of water for consumption in tanks. • It is recommended if feasible to do roof water harvesting • It is recommended to putting in place a leak detection mechanism like regular checks and routine maintenance and prompt repairs this will help save considerable amounts of water. • It is recommended that development be fitted with water-efficient fitting and installations.
7.	Increased strain on utilities and existing infrastructure.	• It is recommended to liaise with CGHB to upgrade bulk sewerage infrastructure or ensure the sewer system and the treatment plants can handle the anticipated increased population. • It is recommended to construct a bulk water storage reservoir. • It is recommended that the proponent liaise with KPC to upgrade the existing supply system to cater for increased population. • It is recommended if feasible for installation power saving mechanisms into the project like solar powered streetlights, energy saving lighting and large window that will allow sufficient natural lighting and ventilation. • It is recommended for upgrading and expansion of the project feeder roads to cater for increased traffic and improve accessibility.
8.	Surface and ground water pollution.	• It is recommended that all sewerage be channelled and contained within the effluent management systems. • It is recommended that surface runoff water should not mix with the effluent and should be channelled appropriately to run off drains. • It is recommended for regular maintenance, and prompt repair of the sewer system and run-off drains.
9.	Occupational safety and health risk.	• It is recommended that the housing units design incorporates anti slip and fall flooring. • It is recommended to put in place a fire safety system – fire extinguishers, fire hose reel connection points, and fire hydrants. • It is recommended that fire fighting water reservoir be put in place and be filled with water at all times.
10.	Negative social impacts.	• It recommended for establishment of code of conduct for the housing unit owners / resident to ensure order within the development. • It is recommended for adaptation and utilization of 'Nyumba Kumi' initiative within the proposed project to increase cohesion within project community.

NO.	Impact.	Mitigation.
		• It is recommended that the residents form an association to articulate their common issues. • It is recommended for establishment of a management company by to be transferred to unit owners after payment to ensure efficient and orderly management of the property.
11.	Population influx.	• It is recommended that the CGHB improve the access road to the project site to reduce human and traffic congestion. • It is recommended for upgrading of the drainage along the project access road network. • It is recommended that the proposed project incorporate social amenities like recreational facilities, street lighting, community hall, playfield, open spaces, and commercial centres to ease pressure on existing utilities and infrastructures. • It is recommended that the proponent incorporate water and energy-saving features in the project design to ease pressure on water and power supply needs.
Decommissioning Phase.		
Impact.		**Mitigation.**
1.	Risk of non-compliance with statutory requirements.	• It is recommended to adhere to general and decommissioning phase EIA License conditions. • It is recommended to undertake a decommissioning EIA and submit it to NEMA. • It is recommended to develop a decommissioning plan and submit it to NEMA three months before the commencement of the actual decommissioning work. • It is recommended to register the decommissioning site with DOSHS.
2.	Noise and excessive vibrations pollution.	• It is recommended to minimize noise and vibration through sensitization of drivers to avoid gunning vehicle engines or hooting especially when passing through sensitive / silent zone / areas such as school, churches, residential areas, and hospitals. • It is recommended to ensure demolition trucks are kept in good condition to reduce noise generation. • It is recommended to insulate all generators and heavy-duty equipment or place them in enclosures to minimize high noise levels. • It is recommended to avoid blasting methods during decommissioning unless it is absolutely necessary.
3.	Generation of decommissioning waste.	• It is recommended to ensure segregation of waste by separating hazardous from non-hazardous wastes for appropriate disposal. • It is recommended to provide waste collection containers be placed in accessible locations.

NO.	Impact.	Mitigation.
		• It is recommended that hazardous wastes be safely and appropriately disposed of where feasible, recycle recoverable wastes. • It is recommended to contract a NEMA licensed waste firm to collect waste from the site for dumping at an approved site.
4.	Displacement of residents and loss of investment and houses for the buyer.	• It is recommended that adequate notices to be given all Interested and Affected Parties (IAP) concerning the impending decommissioning to allow seeking of alternative housing arrangements. • It is recommended depending on the reasons for decommissioning the property owner at the residential development if feasible to be appropriately and adequately compensated for the loss of their property (ies).
5.	Occupational safety and health concerns.	• It is recommended that for issuance of appropriate Personal Protective Equipments (PPEs) for all deserving workers and to enforce their use. • It is recommended to do capacity building and training of staff/workers with respect to Occupational Health, Safety, and Environment. • It is recommended to provide a fully stocked first aid kit within the site at all times and designate qualified trained first aider(s). • It is recommended that where the workforce exceeds 20, the contractor should facilitate the formation and operation of a Safety and Health Committee, per the Health and Safety Committees Rules, 2004.
6.	Livelihood and economic losses.	• It is recommended that adequate notification to be issued to all the business associated with the development of the intention of decommissioning in good time for them to undertake relevant adjustment(s). • It is recommended that the workers / staff associated with the proposed project be notified adequately about the decommissioning plan for them to find other alternative sources of income or compensated for the loss of their means of livelihood.
7.	Dust and air emissions pollution.	• It is recommended that the contractor provide all the construction workers with proper Personal Protective Equipment and enforced their usage. • It is recommended to minimizing dust from open area sources like stokepiles, by using control measures such as enclosures and covers and watering the site and exposed soils. • It is recommended that all machinery be regularly serviced and maintained to reduce emissions. • It is recommended to control vehicle speed limits within and around the decommissioning site to minimize dust generation.

NO.	Impact.	Mitigation.
		• It is recommended to sprinkle traffic routes with water regularly.
8.	Risk of external damage of adjacent facilities and infrastructure.	• It is recommended that the demolition and all works incidental thereto shall be specifically placed under the supervision of a person experienced in the carrying out of demolition works and appointed for the purpose. • It is recommended that no demolition shall be undertaken without prior relevant written permission from competent approving authority (ies). • It is recommended that where any building is demolished to ground level and such building contained a basement, the project proponent shall provide or cause to be provided safe lateral support to the sides of such basement. • It is recommended for the contractor to make good the damage to the damage to such public facilities and utilities to the satisfaction of the relevant regulatory / lead agency.

The implementation of the proposed project remains the most viable alternative to the proponent, the local community, the county, and the national government as it will create more and standard commercial infrastructure, provide business to the contractors involved, suppliers and other small businesses and will provide employment directly and indirectly to the Kenyan population during all phases of its life cycle.

The ESIA team of experts concluded that the proposed project will provide significant gains to the project proponent, the general public, the county and national governments, through provision of modern affordable housing, accrued earning from the investment, boosting development in the area, offer temporary and permanent employment to the people of Homa Bay and Homa Bay County, improve road networks, among others. The project does not pose any serious or adverse impacts to the physical, socio-economic and biological environment. It is the opinion and conclusion of the ESIA team of experts, based on this ESIA that the proposed project is environmentally viable.

CHAPTER ONE: INTRODUCTION.

1.1. Project Background.

National Housing Corporation is a statutory body formed by an act of parliament to with the mandate to provide housing to the Nation. It is the main body that implements the government's policies, plans and agendas on matters housing. The Corporation is under the Ministry of Ministry of Transport, Infrastructure Housing, Urban Development and Public Works, State Department for Housing and Urban Development (SDHUD). The Government of Kenya (GoK) is implementing social programmes to promote long-term economic development for Kenyan citizens through its Big Four agenda amongst them the Affordable Housing Programme (AHP).

In its quest to achieve its mandate, the Corporation has entered into a Joint Venture (JV) via a Project Agreement (PA[1]) on affordable housing development project with County Government of Homa Bay (CGHB). The purpose of the Agreement is to develop Phase I of an Affordable Housing Project consisting of 400 residential houses and five (5) shops to be implemented in sectors / phases on land Title Number Homa Bay Municipality Block 1/839. The proposed project site land is exclusively owned by CGHB. The land measures approximately **2.696** Hectares (**6.662 acres**) and is situated within Homa Bay Municipality of Homa Bay County

Environmental sustainability is one of the core principles of the Corporation and hence the Corporation strives to mainstream environmental consideration in its operations. The proposed project is listed in schedule two of EMCA 1999, as those projects which should be subjected to an ESIA process prior to their commencement. Pursuant to these laws and regulations, the proposed project partners commissioned the ESIA process.

1.2. AHP Development Considerations.

The Kenya Affordable Housing Programme Development Framework Guideline makes the following provisions;

1. Off-site infrastructure.

Infrastructure provision and / or upgrades external to the proposed AHP project sites will be provided by GoK in support of the development.

2. Local content and enterprise development.

The development of local enterprise remains a key related objective of the Affordable Housing Programme. Recognizing that there will opportunities in the supply chain to provide inputs whose specifications will have been standardized for the housing projects, the Affordable Housing Programme will implement strategies that will encourage ring fencing supply of certain goods and services to allow for formalization of the informal sector as well as participation of special groups in the Affordable Housing supply chain. In addition, the use of locally produced and sourced materials and services will be encouraged for all projects.

3. Housing portal.

The National Housing Portal will be utilized in the automated management of registration of potential homeowners for the Affordable Housing Programme. Registrations will be ongoing throughout the programme and it will be possible to access the portal through a variety of platforms including Unstructured Supplementary Service Data (USSD), mobile app, mobile web and web portal.

The Portal will allow individuals to see progress towards home ownership and provide a real connection to their aspiration of home ownership.

The Portal will house: (i) the wallets of potential homeowners for payments and contributions; ii) the online National Tenant Purchase Scheme (TPS) allowing homeowners to be allocated homes through a lottery system; (iii) product data from financial institutions on mortgage offers or mortgage support; and (iv) data from property developers on availability of homes.

4. Facilities management.

This responsibility will be borne by the entity undertaking the project, depending on the selected development model, will establish the management company that will later be handed over to the management company or Housing Fund [in the case of a Tenant Purchase Scheme – (TPS)] in a particular project. (SDHUD, 2018).

1.3. Project Objectives.

The objective of the proposed project is the construction of 400 affordable housing units comprising of Bedsitter/Studios One-bed room, two-bed roomed units apartments and

five (5) shops. The proposed project will have 18 blocks of apartments. The auxiliary features will comprise open space, Communal parking, Landscaping.

The principal objective of the ESIA is to ensure adequate identification of potentially negative environmental impacts, propose workable mitigation measures and propose an environmental management and monitoring plan for the project as well as compliance with the statutory requirement for ESIA and implementation of the recommendations therein. The specific objectives are as follows;

- Provision of Affordable Housing to Kenyan Citizens.
- To adequately identify and evaluate the significant environmental impacts of the proposed project and their significance to the environment.
- To examine and propose recommendations on the various mitigation measures to be taken in order to ensure possible negative impacts of the project are minimized.
- To establish compatibility of the proposed project with the neighbouring uses as well as local environmental conditions.
- To examine and analyse the environmental costs and benefits associated with the proposed project.
- To investigate and select the best project alternatives from various options available.
- To incorporate Environmental Management Plan (EMP) and Monitoring Plans during the implementation (construction) and operational phases of the proposed project.
- To engage the stakeholders on the proposed project as a means of creating awareness.

1.4. Project Justification.

The proposed project will contribute towards provision of affordable housing in Homa-Bay, which is in line with the Kenyan Constitution, Kenya's development blueprint Vision 2030 and the current regime's Big 4 Agenda on affordable Housing. Environmental and Social Impact Assessment study is intended to systematically analyze proposed projects to determine their potential environmental impacts; the significance of such impacts and to propose measures to mitigate the negative ones. The information collected as an ESIA study report is submitted to National Environment Management Authority (NEMA) as a statutory requirement for review and issuance of the EIA License.

1.5. Terms of Reference for the ESIA.

Terms of Reference (ToRs) Developed by the ESIA project team in consultation with the proposed project proponent, the County Government of Homa Bay and approved by NEMA. The ESIA was specifically done under the following ToRs:

1. Develop Terms of Reference for the ESIA by the project proponent, in conjunction with the lead expert and NEMA for approval.

2. Carry out assessment and description of location/site, objectives, scope, and nature of the proposed project.

3. Carry out an analysis of the proposed project activities during the proposed project cycle: construction, operation, decommissioning phases.

4. Establish the suitability of the proposed project in the proposed location.

5. Review and establish all relevant baseline information as will be required by NEMA (Physical, Biological and Social Cultural and economic) and identify any information gaps.

6. Describe and analyze the policy legal and institutional framework including but not limited to Kenyan policies, laws, regulation, and guidelines; international guidelines, international conventions and treaties to which Kenya is party to, related to the proposed project, which has a bearing on the proposed project and will also serve as benchmarks for monitoring and evaluation, and future environmental audits.

7. Do an in-depth description of the proposed project and associated works together with the requirements for carrying out the works.

8. Analyze the efficacy of the designs, technology, procedures, and processes to be used, in the implementation of the works.

9. Carry out Consultation and Public Participation (CPP): Identify key stakeholders and the Interested and Affected Parties (IAP)**;** Securing written submissions from Lead Agencies; Relevant County Government Departments; and the Public (esp. neighbours) mainly through holding community meetings and public hearings (evidence for such will be kept in the form of minutes, feedback forms and questionnaires).

10. Identify and analyze proposed project alternatives including but not limited to: Scale and extent; Project site alternatives; No project alternatives; Design alternatives; Material

alternatives; Alternative processes; and Technologies alternatives and give reasons for preferring the proposed alternatives.

11. Adequately identify, predict and carry out an in-depth analysis of all actual potential and significant impacts on flora, fauna, soils, air, water, the social, cultural and community settings; the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated to be generated by the proposed project, both positive and negative throughout the project cycle.

12. Recommend sufficient mitigation measures for all the potential negative impacts identified and analyzed in TORs **11** above.

13. Identify gaps in knowledge and uncertainties which will be encountered in compiling the information.

14. Analyze materials to be used in the construction and implementation of the project, and wastes to be generated proposing alternative/appropriate options/technologies.

15. Analyze occupational health and safety issue associated with the proposed project.

16. Develop and document an Emergency Response Plan (ERP) and a comprehensive Environmental Risk Assessment for all the phases of the Proposed Project's lifecycle.

17. Analyse and incorporate climate change impacts related to the proposed project and recommend means of mainstreaming climate change consideration.

18. Give details of the total project implementation costs.

19. Develop an Environmental Management Plan (EMP) proposing the measures for eliminating, minimizing, or mitigating adverse impacts on the environment, including the cost, timeframe, and responsibility to implement the measures.

20. Design and specify the monitoring and audit requirements necessary to ensure the implementation and the effectiveness of the mitigation measures adopted.

21. Prepare a comprehensive ESIA Study Report in accordance with EMCA 1999 legislation for submission to NEMA for review, approval and issuance of EIA license for the proposed project.

22. Submit the ESIA Study Report in the prescribed procedure and format to NEMA.

1.6. Responsibilities of Parties.

These were the responsibility in regards to ESIA process.

1.6.1. The NHC's obligations shall be to;

1. Provide technical expertise including; project design, project management, marketing and sales, estate management, survey and processing sectional titles for individual units.

2. Finance the project

3. Provide Conveyance services to end buyers

4. Provide comments on master plan

5. Procure the contractor / investor for construction of the project.

6. Execute the relevant contracts and manage the contractor. (NHC & CGHB, 2022).

1.6.2. The CGHB's obligations shall be to;

1. Provide the Land at zero value for the project and secure continued legal ownership thereof,

2. Transfer the project land to NHC for purposes of preparing sectional Titles and Transfer to buyers of housing units,

3. Provide necessary approvals to facilitate project implementation at no costs,

4. Undertake and provide infrastructure (including roads, sewer, water system etc), where necessary,

5. Facilitate public participation as may be necessary,

6. Organize Small and Medium Enterprises to supply and fix identified construction Components. (NHC & CGHB, 2022).

1.6.3. Joint obligation shall be to-

1. Undertake the project feasibility study,

2. Agree on the final designs and house typologies,

3. Determine and agree on the mode of disposal of the houses,

4. Determine and identify beneficiaries for the housing units,

5. Form a joint Committee to Manage implementation of the project,

6. Obtain NEMA license for the project.

7. Market the housing units. (NHC & CGHB, 2022).

1.7. Study Approach and Methods.

The ESIA was done in house by competent NHC staff in collaboration with Homa-Bay County Staff.

1.7.1. Screening.

At this stage a determination of whether an ESIA is required for the proposed project was done to determine the level of ESIA to be undertaken. This was guided by the provisions of Legal Notice No. 31 dated 30th April, 2019, The Environmental Management and Coordination Act *(No.* 8 *of* 1999*),* amendment of the second schedule. According to the aforementioned legal notice, the proposed project is listed as a project to undergo Environmental Impact Assessment. It is classified as a High Risk Projects, under Urban Development and specifically establishment of new housing estate developments exceeding one hundred housing units. (GOK, 2019).

1.7.2. Scoping.

Scoping seeks to identify those aspects of the proposed project activities, which based on past experience literature searches could have significant impacts on the environment. Scoping was thus an important part of the impact assessment process and involved identification and narrowing down of potential environmental impacts to ensure that the assessment focuses on the key issues.

1.7.3. ESIA Project Team.

The ESIA was conducted by a team of professionals from different background relevant to the proposed project, as required by the Environmental (Impact Assessment and Audit) Regulations (2003). The team was drawn from NHC and CGHB competent staff. The composition of the team lead by a NEMA registered Lead Expert (See appendix I) as listed in the table 2 below.

Table 2: ESIA Team of Experts.

NO.	NAME.	PROFESSIONAL SPECIALISATIONS.	DESIGNATION.	INSTITUTION.	TASKS.	LICENSE NO.
1.	Mr. Mwongera Murungi.	Environmental Science & Geographic Information System & Remote Sensing.	Environmental planner/Land use and Housing - NHC	NHC	Team lead, Land use and Housing Planning, Product Analysis, Lifecycle Analysis, Geospatial Analysis, Consultation and Public Participation (Stakeholder engagement), Compliance Evaluation, Environmental Management Planning.	0892
2.	M/s. Ellyfine Moraa.	Economic	Ag. Corporate Planning Manager	NHC	Socio-economic analysis, resource mobilization	N/A
3.	Mr. Thomas Omollo Ofwa	Civil Engineer	General manger Technical	NHC	Geotechnical Survey, Structural Analysis and Reporting and Documentation / Approvals	N/A
4.	Mr. Stanley Ng'eny	Architecture	Chief Architect NHC & Project Manager	NHC	Architectural Analysis, Reporting and Documentation / Approvals	N/A
5.	Mr. Pius Omullo Ouma	Quantity Survey	Chief Quantity Surveyor NHC	NHC	Project Bills of Quantities Approval	7113
6.	Mr. Simon Kagotho	Architecture	Architect	NHC	Architectural Analysis, Reporting and Documentation / Approvals	N/A
7.	M/s. Anne Saruni	Land economist / Estate management / Valuer	Ag Senior Estates Officer	NHC	Facility Management Assessment	N/A
8.	Mr. Kenneth Samoei	Electrical Engineering	Electrical Engineer	NHC	Electrical Plans Reporting and Documentation / Approvals	N/A
9.	M/s. Ponde Norsea Bayer.	Urban and Regional Planning	Physical Planner	County Government of Homa Bay		

NO.	NAME.	PROFESSIONAL SPECIALISATIONS.	DESIGNATION.	INSTITUTION.	TASKS.	LICENSE NO.
10.	M/s. Ida Pendo Okeyo	Social Development and Management	Social Development Officer	County Government of Homa Bay	Consultation & Public Participation	N/A
11.	Mr. Joshua Sanduk	Land Survey	Land Surveyor	NHC	Site demarcation	N/A

1.7.4. Literature Review.

Literature review was conducted to acquire background information on the site and its environment as well as to identify possible environmental impacts of similar developments. The literature review comprised of, but is not limited to the following:

- Review of architectural drawings,
- Homa Bay County Integrated Development Plan, (CIDP).
- Relevant laws, policies regulations and guidelines.
- Other relevant documents and materials.

1.7.5. Field Reconnaissance Survey.

Field visits were meant for physical inspections of the project site in order to gather information on the state of environment. Several photos of the project site were taken for inclusion in this report. Public opinions were sought through Consultation and Public Participation (CPP) exercise. Questionnaires were administered to the public and interviews held with neighbours.

1.7.6. Interviews.

Interested and Affected Parties (I&APs) were consulted for their opinions on issues relating to the potential environmental and socio-economic impacts of the proposed project. Questionnaires were administered and information gathered was incorporated in the EIA Study Report.

1.7.7. Direct Observation.

Field observation assessment was undertaken to enable the determination of exact socio-economic activities within the proximity of the project site. Areas for which observation was done included settlement patterns, land use, among others.

1.7.8. Report Writing and Documentation.

The findings of the assessment were compiled into the ESIA study report in accordance with the Environmental Impact Assessment and Audit Regulations 2003 for submission to NEMA for purposes of seeking EIA License.

1.7.9. The ESIA Flow Process.

The ESIAs' approach followed the following process as below: -

1. ESIA planning stage,

2. On – site ESIA stage,

3. ESIA follow up stage.

See figure 1 below.

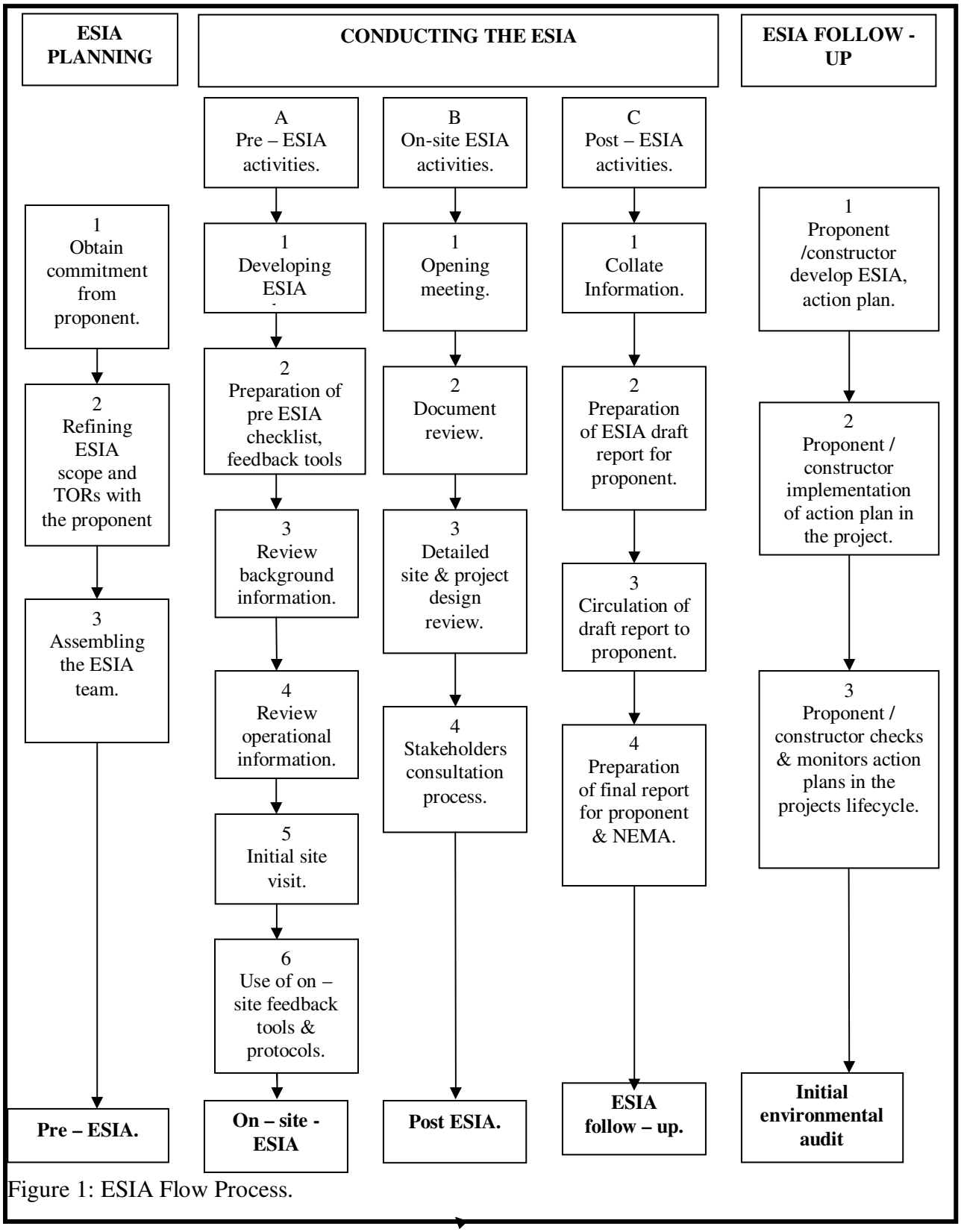

Figure 1: ESIA Flow Process.

CHAPTER TWO: PROJECT DESCRIPTION.

2.1. Proposed Project.

The proposed housing development will have a total of four hundred (400) housing units comprising 120 bedsitters/studio units in four blocks, 140 one-bedroom units in seven block and 140 two-bedroom units in seven blocks. The development will also have five (5) shops within some of the blocks. The proposed AHP housing project will be implemented in sectors / phases as indicated in table 3 below,

Table 3: Proposed project developmental phases, typologies and respective unit numbers.

	PHASE	Number of Units				
		Bedsitters/Studio	**One-bedroom**	**Two-bedroom**	**Totals**	**Shops.**
1.	Phase one Sector A	30	40	40	110	5
2.	Phase one Sector B	30	40	40	110	-
3.	Phase one Sector C	30	40	40	110	-
4.	Phase one Sector D	30	20	20	70	-
	Totals	**120**	**140**	**140**	**400**	**5**

Table 4 below gives comprehensive details of the proposed project.

Table 4: Proposed Project Details.

ASPECT		**DETAILS**
1.	Project Proponent	National Housing Corporation
2.	Category of Development.	Residential housing development under Affordable Housing Program
3.	Class of or Occupancy building	H3 - Domestic residence Occupancy consisting of two or more dwelling units on a single site.
4.	Current Land Use.	Undeveloped
5.	Type of Construction Work.	Apartment Blocks
6.	Plot No.	LR. No. Homa Bay Municipality Block 1/839
7.	Plot Location.	Homa Bay town
8.	Name of Nearest Road/Street.	Homa Bay - Kisumu Road
9.	Estimated Project Cost. (KES)	1 Billion
10.	No of residential Units	400.
11.	No of Shops	5

ASPECT		DETAILS
12.	No. of blocks	Bedsitter/Studio – 4
		One-bedroom – 7
		Two-bedroom - 7
13.	No of Floors. Per block	Bedsitters/Studio – Ground plus four
		One-Bedroom units – Ground plus four
		Two-Bedroom units – Ground plus four
14.	No of units per block	Bedsitters/Studio – 30 units
		One-Bedroom units – 20 units
		Two-Bedroom units – 20 units
15.	Plinth Area (Sq. M). Per Unit	Bedsitter/Studios units - 25.00
		One-bedroom units – 41.50
		Two-bedroom units - 61.00

2.2. Proposed Project Site and Site Ownership.

The proposed project site is located in Homa Bay town, Homa Bay County on LR. No. Homa Bay Municipality Block 1/839 Homa-Bay Town. The land measures approximately **2.696** Hectares (**6.662 acres** and is exclusively owned by the County Government of Homa Bay who will transfer the project land to NHC for purposes of preparing sectional Titles and Transfer to buyers of housing units as per the project agreement. See appendix II for the attached certificate of lease. The site is located Homa Bay Town along Awach – Kendu Bay – Homa Bay C19-Main road. It is on Geographic Positioning System (GPS) Coordinates: Latitude: -0.522787^0, Longitude: 34.462385^0, Elevation: 1157M as shown on figure 2 below. The site is approximately 1.3 km from Homa Bay town Central Business District (CBD[1]). See figure 3 below.

Figure 2: Google Map Showing the Geographic Location of the Proposed Project Site.
Source: https://earth.google.com/

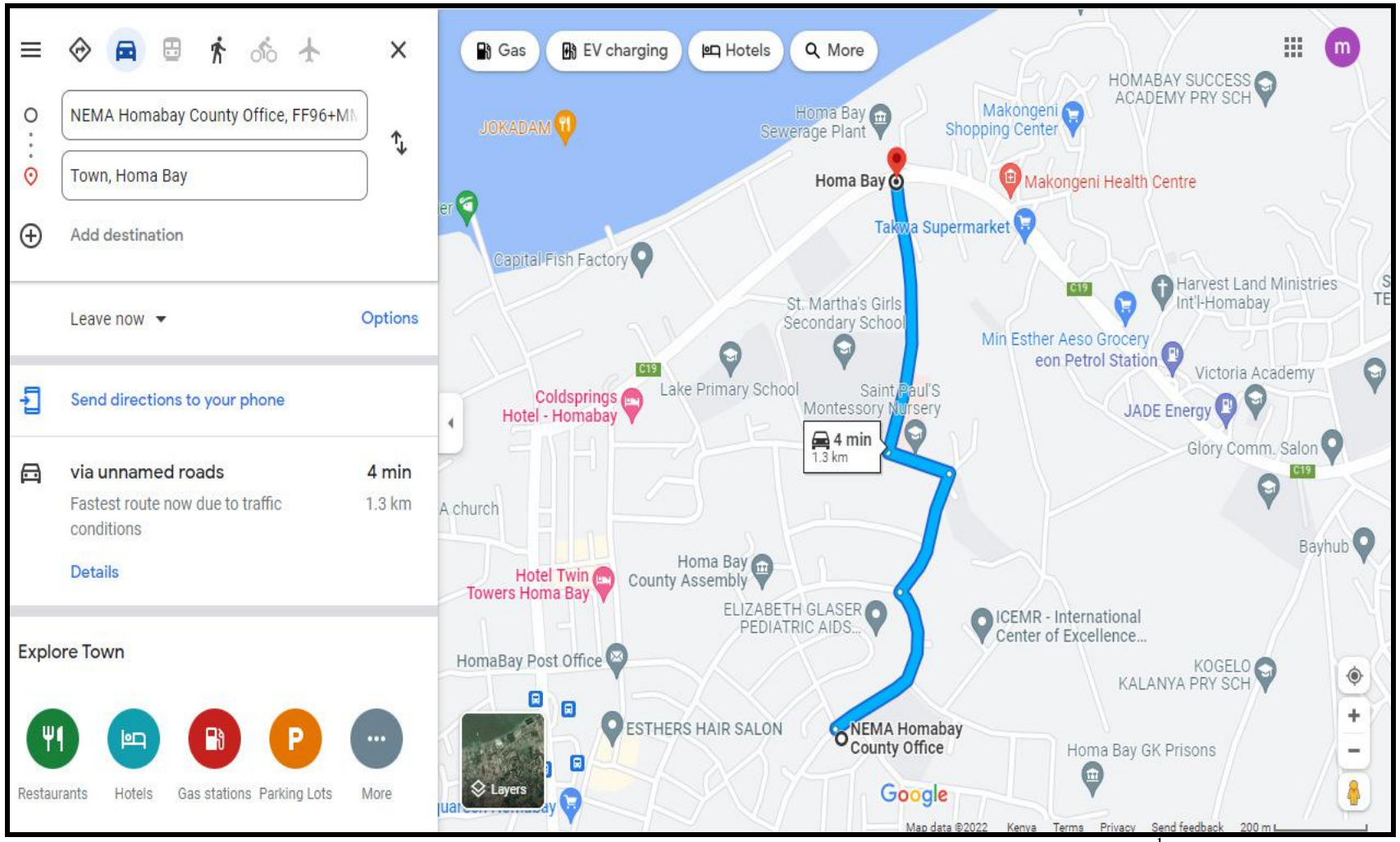

Figure 3: Google Map Showing the Distance and Direction of the Proposed Site from Homa Bay Town CBD[1].
Source: https://www.google.com/maps.

2.3. Current Status of the Project Site.

Currently the proposed project site is undevelopment. The site is secured with a barbed wire fence. The site is adjacent to Awach – Kendu-Bay – Homa Bay C19 - Main road and is with the vicinity of Lake Victoria. There exists all weather access road within the site. The site is connected to the water supply and public sewer system by Homa Bay County Water and Sanitation Company Limited (HOMAWASCO). The site is also connected to the power supply from Kenya Power Company (KPC). The general area is served by the public trunk sewer system and plans are ongoing to connect the entire development to the public trunk sewer system to the Homa Bay Sewerage Plant which is with the vicinity of the project. Figure 4 below shows the proposed project site outlook.

Figure 4: Proposed project site outlook.

2.4. Project Design Concept.

The housing units shall have the following features:

1. Bedsitter/Studio Unit Typology.

- Room
- Kitchenette
- Utility yard
- Toilet and bathroom

See figure 5 below.

Figure 5: Proposed studio unit typology layout.

2. One-bedroom Typology.

- One (1) bedrooms
- Lounge
- Kitchen
- Utility yard
- Lobby
- Toilet and bathroom.

See figure 6 below.

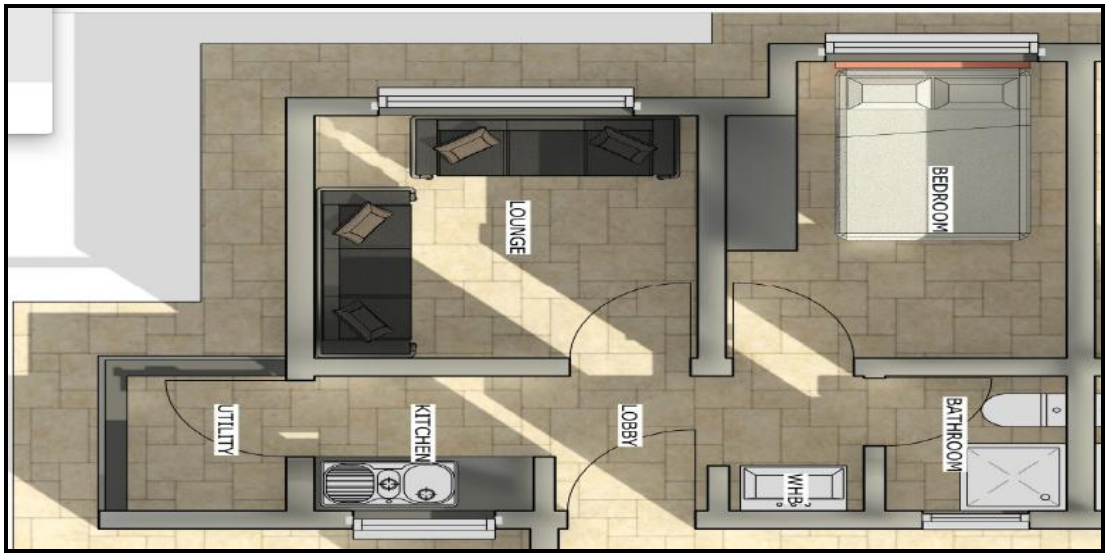

Figure 6: Proposed one bedroom unit typology layout.

3. Two-bedroom Typology.

- Two bedrooms.
- Lounge
- Kitchen
- Utility yard
- Shared toilet and bathroom.

See figure 7 below.

Figure 7: Proposed two bedroom unit typology layout.

Shops.

There will be five (5) Shops. These will be built within some of the block(s)

- Shop floor
- Store
- Water closet
- Kitchenette

The approved architectural drawings of the proposed project are in appendix XV.

2.5. Project Scope of Works.

The project will involve the following work specification.

1. Civil Works

- These works consist of paved parkings and footpaths, street lighting, boundary wall construction, landscaping, Solid waste management (waste cubical), water supply from and foul drainage to Homa Bay Water and Sewerage Company water and sewer lines respectively. (NHC, 2022).

2. Electrical.

Main power will be sourced from the Kenya Power Company (KPC) grid serving the area. The project design incorporates;

- Wiring – Will involve wiring in various individual housing unit, the gate, connection to the outdoors lighting, and lightning protection use of energy saving lamps, street lighting. (NHC, 2022).

2.6. Sustainability Enhancement Features Considerations for the proposed project.

The following will be put into consideration in the project design to enhance project sustainability.

1. Site Potential Optimization.

- Location of the proposed development within a walkable distance to a range of other destinations such as places offering goods and services within Homa Bay Municipality,
- Orientation of the apartment to create a layout that will passively take advantage of natural sunlight and wind. In practice, this would mean facing large windows in directions where the sun will come directly over them. With more natural light available, people in the building will not need to turn on electrical lights for the majority of the day and waste energy unnecessarily. If overheating and subsequent excessive use of air conditioning is a concern, you can also intersperse trees around the building to provide some shade to those areas most prone to becoming hot.
- Will apply best practices for erosion control, through both improved grading and landscaping methods;
- Use native plants for landscaping and no introduction of invasive species.

- Limit the amount of impervious surfaces, they absorb and retain more heat than areas covered in natural vegetation as well as promote more surface runoff and less infiltration

2. Water use efficiency.

Installation of water saving features, roof water harvesting and storage

3. General Mechanical Services Installations.

- Provision of service ducts for plumbing & drainage main riser/down pipes, adjacent to the sanitary fittings and accessible from common areas.
- Provision adequate space for low level bulk water storage tanks and roof space for high level bulk water storage tanks.

4. General Electrical Services Installations.

- Provision of service ducts for electrical installations and communication services

5. Adoption of natural lighting.

Construction of large windows or and adding windows, will allows residents to leave lights off longer and creates a stronger connection to nature, a tenet of biophilic design. Using natural light effectively means people won't be using electricity as often, not to mention that there are countless benefits psychologically to include natural light in as many spaces as possible, to ensure enough natural light in the houses.

6. Installation of environmentally friendly fittings and appliances

Fittings like water conserving fixtures and energy saving fittings such as energy-saving bulb, and appliances.

5. Native Plants.

Consideration for incorporating native plants into landscape improvement for their many environmental benefits. Local native plants provide food and shelter for wildlife and beneficial insects, and they contribute to the larger ecosystem without relying on valuable resources or extensive maintenance to survive. They also reflect your region's distinct terroir and can adapt to and evolve with the local climate.

6. Energy-Efficient Lighting and Appliances.

Installation of energy-efficient Light-Emitting Diode (LED) lighting in project units will lead to reduced energy consumption (and lower electricity bills). LED light bulbs typically use 25% to 80% less energy than incandescent and last a lot longer. In addition,

incandescent bulbs give off heat. In a room with many light sources, like the kitchen, this can affect the overall temperature and increase energy costs over time.

7. Natural Finishes.

Plant-based materials and low-VOC (Volatile Organic Compounds) finishes are easy and affordable ways to improve indoor air quality and overall house health.

8. Locally Harvested and Sourced Materials.

Emphasize will be made on the value in using local materials when possible — including fittings, wood and stone — both to reduce the distance the materials have to travel to reach your home and as a way to support local business — and in some cases they even reduce costs. Seeking out local materials will reduces the carbon footprint of the materials and supports the local economy

2.7. Disability Mainstreaming Features.

Disability mainstreaming considerations in the proposed project designs include:

- Reinforced concrete staircases with high balustrades and hand rails.
- All housing units are single floor units.
- Accessible doors should be so designed as to permit operation by one person in a single motion with little effort.
- Provision for well-dimensioned corridors to facilitate the passage and manoeuvring of a wheelchair. Wide corridors are useful for wheelchair users, service equipment, high traffic areas,
- Obstruction – The design will ensure that protruding elements shall be avoided,

Obstructions in the pathway should be easy to detect, and if possible, should be placed along one continuous line,

- Spaces below ramps and stairs should be blocked out completely by protective rails or raised curbs or marked with a tactile surface.
- Provision of signages to facilitate orientation mainly for the disabled, Accessible spaces and facilities should be identified by the international symbol of accessibility.
- To provide ramps wherever stairs obstruct the free passage of pedestrians, mainly wheelchair users and people with mobility problems. The maximum recommended slope of ramps is 1:20.

2.8. Input Materials.

Building materials will include sand, timber, stones, cement, water, steel, plumbing materials, corrugated iron sheets, glass and paints among others. The construction of the structure will be with convectional cut / quarry stones.

2.9. Equipment.

Typical equipment used for construction work would include hydraulic excavators, hammers and mattocks, wheelbarrows, wheel Loader, concrete placers, spades, trowels, trucks, concrete mixers, porker vibrators, baby cranes, trucks, welding machines among others.

2.10. Labor.

During construction phase, both skilled and non-skilled workers will be required. The proponent will contract a qualified construction company. Unless the project manager otherwise agrees, the contractors is to recruit locally his unskilled labour and as much as possible his skilled labour.

2.11. Waste and By-Products.

Wastes which will be generated from the site include; broken glasses, pieces of broken tiles, nails, pieces of broken wood, containers and pieces of roofing materials. The contractor will emphasize on efficiency to minimize construction wastes. The contractor shall ensure that waste is handled in compliance with the Waste Management Regulations, 2006.

2.12. Project Outputs.

The output of the proposed project will include the following;

- Eighteen (18) apartment blocks
- 120 No. Bedsitters/Studio units – Four blocks.
- 140 No. one bedroom housing units – Seven blocks.
- 140 No. two bedroom housing units – Seven blocks.
- 5 No. Shops.
- Courtyards / Open Spaces.

- Communal parkings and driveways
- Common gates with guard houses
- Refuse Chambers

2.13. Project Activities during the Pre-Construction Phase.

2.13.1. Project-Planning Phase.

This phase involves activities such as project design and planning. It also involves identification of any existing legal and regulatory requirements that may affect the project at any stage of its implementation. This will include obtaining the various permits and licenses which include County Government of Homa Bay, National Construction Authority (NCA) and NEMA approvals for the project and registration with Directorate of Occupational Safety and Health Services (DOSHS). Table 5 below gives the statutory requirements prior to commencement of the proposed project.

Table 5: Statutory Requirements Prior to Commencement of the Proposed Project.

	REGULATOR.	REQUIREMENT (S).	TIME FRAME.
1.	County Government of Homa Bay.	•Application for approval of the Architectural drawings.	Prior to project commencement.
2.	Homa Bay County Water and Sanitation Company Limited (HOMAWASCO).	•Application for connection and payment of fees for water supply and sewer services [Sewer Use Ordinance Permit – (SUO)]	Before connection to water and sewer mains.
3.	National Environment Management Authority (NEMA).	EIA License.	Prior to project commencement.
4.	National Construction Authority (NCA).	•Registration of the project	Prior to project commencement.
5.	Directorate of Occupational Safety and Health Services (DOSHS).	•Registration of the construction site. •Submit the architectural drawings for approval. •Nominate a safety supervisor for the construction and submit the nominees' name to DOSHS relevant DOSHS office	Prior to project commencement.

2.13.2. Labour.

Unless the project manager otherwise agrees, the Contractor is to recruit locally all his unskilled labour and as much as possible of his skilled labour. The Contractor will not be

permitted to house labour on the site and the Contractor must make all necessary arrangement for transportation of labour to and from the site. A watchman's camp will be permitted. (NHC, 2022).

2.13.3. Working Hours.

The working hours shall be those generally worked by good employers in the Building and Civil Engineering Trade in Kenya. No work shall be carried at night or on gazetted holidays unless the project Manager shall direct. No work shall be covered up or shall any correcting be carried out without prior approval of the project manager. (NHC, 2022).

2.13.4. Security of Works.

The Contractor shall be entirely responsible for the security of the works, stores, materials, personnel, etc., both his and Sub-contractors and shall provide all necessary watching, lighting and other precautions as necessary to ensure the security and the protection of the public. (NHC, 2022).

2.13.5. Water and Electricity Supply for the Site and the Works.

The Contractor shall provide at his own cost and risk all necessary water, electric light and power required for use in the works. The Contractor must make his own arrangements for connections to the nearest suitable water and electricity main and for metering the same. He must also provide temporary storage tanks and meter as required at his own cost and clear away when no longer required and make good on completion to the entire satisfaction of the Engineer. The Contractor shall pay all charges in connection therewith. No guarantee is given that sufficient water will be available from the main and the Contractor, must make his own arrangements for augmenting this supply at his own cost if necessary. (NHC, 2022).

2.13.6. Access to Site and Temporary Roads.

Means of access to the site shall be agreed with the project manager prior to the commencement of the works and the Contractor must allow for building any temporary access roads, culverts, bridges, roadside rainwater drains for the transport of materials,

plant and workmen including the provision of any other means of gaining access to the site. Upon completion of the works the Contractor shall remove such temporary access roads, temporary culverts, etc and make good and reinstate all works and services disturbed to the satisfaction of the project manager and the Local Authority. (NHC, 2022).

2.13.7. Plant, Tools and Vehicles.

The Contractor shall make provision all scaffolding, plant, tools and vehicles required for the proper execution of the works except for such items specifically and only required for the use of nominated sub-contractors. No timber used for scaffolding, formwork or temporary works of any kind shall be used afterwards in the permanent work. (NHC, 2022).

2.13.8. Sourcing and Transportation of Project Inputs.

The various materials required for construction and building e.g. steel, building stones, sand, cement etc. will be obtained from sources elsewhere and transported to the site using transport trucks. Several building materials shall be sourced locally to reduce the distance of travel by the transport vehicles.

2.13.9. Storage of Building Materials.

Building materials will be stored on site according to their need. Bulky materials such as, ballast, sand and steel can be carefully piled and covered on site. Materials such as cement, paints and glasses among others are to be stored in temporary storage rooms conveniently within the project site for this purpose.

2.14. Site (Project) Activities during the Construction Phase.

2.14.1. Site Clearing.

The project site will be prepared for construction by clearing the site of grass, shrubs, bushes, grub up roots, ornamental plants, undergrowth and small trees and any debris that may be found within the site The site clearing with be majorly manual and will not involve the use of explosive materials.

2.14.2. Setting Out.

The contractor shall set out the works in accordance with the dimensions and levels shown on the drawings and shall be responsible for the correctness of all dimensions and levels so set out by him and will be required to amend all errors arising from inaccurate setting out or discrepancy in the dimensions or levels marked on the drawings, such errors or discrepancies must be reported by the contractor to the project manager for his immediate attention. No work shall be commenced by the contractor until he has received written instructions from the project manager to adjust such discrepancies which may have been proved. Upon receipt of such instructions the contractor shall there upon be responsible for the accurate setting out of the work giving effect to the adjustments necessary to comply with such instructions.

2.14.3. Hoarding.

The Contractor shall allow for providing and maintaining hoarding and access gates comprising of 30 gauge gci sheets, 2.50 meters high, from ground level nailed on sawn and cured timber posts as may be necessary for the protection of the works, area residents and the public all to the approval of the project manager and the County Government of Homa Bay requirements. The hoarding shall be erected at various locations on the site and later removed and disturbed surfaces made good to the satisfaction of the project manager on the completion of the contract works. The hoarding and gates shall be painted as directed by the project manager and advertisements shall not be displayed except with prior written permission of the project manager. The Contractor shall be responsible for paying any charges, fees or taxes demanded by the County Government of Homa Bay in respect of the hoarding installation during the contract period.

2.14.4. Signboard.

The contractor shall provide, erect and maintain throughout the contract period and afterwards clear away a signboard in design format provided by the proponent. It shall have information which indicates the following:

- Project name.
- The developer's / client name and address.
- The contractor & sub contractors.
- The county approval number.

- Project manager.
- The architect.
- Engineers.
- Quantity surveyors.
- NCA approval.
- EIA license number. (NHC, 2022).

2.14.5. Site Office and Clerk of Works Accommodation.

The site office and Clerk of Works accommodation shall be constructed in accordance with NHC drawing. The office shall be completed and ready for use within six (6) weeks from the date of site possession. The site office shall be equipped with sufficient furniture to permit the project manager to hold site meetings in it, and for the Clerk of Works or any other site staff to operate efficiently. The Contractor shall pay for all charges for electricity and water bills during the construction and maintenance periods. The contractor shall also allow for providing the services of a cleaner for keeping both the office and the closet in a clean and sanitary condition from commencement to completion of the works. (NHC, 2022).

2.14.6. Construction of Sanitation Facilities Among Other Structures.

Sanitation of workers shall be arranged and maintained by the contractor to the satisfaction of the Government and/ or local authorities. (NHC, 2022).

2.14.7. Electricity and Water Connectivity.

The contractor shall provide all necessary water, electric light and power required for use in the works. (NHC, 2022).

2.14.8. Construction of the Substructures.

The construction of substructure shall be done according to the works and specifications and shall include excavation and earthworks to constituting:

1. Foundation trench, column bases.

2. Filling.

3. Anti-termite treatment.

4. Reinforcement.

5. Walling.

6. Damp proofing. (NHC, 2022).

2.14.9. Super Structures.

2.14.9.1. Reinforced Concrete Structures.

- Reinforced concrete for columns ramps and beams.
- High tensile square twisted reinforcement bars – mesh fabric.
- Sawn formwork for vertical columns, sides and soffits of beams, vertical of side ramps. (NHC, 2022).

2.14.9.2. Walling.

Walls will be quarry stones will be used for construction of both internal and external walls. (NHC, 2022).

2.14.9.3. Roofing.

Roofing activities will include sheet metal cutting, raising the roofing materials and fastening the roofing materials to the roof. (NHC, 2022).

2.14.9.4. Windows and Doors.

Windows - Purpose made aluminium windows Doors – Purpose made steel glazed casement doors, Purpose made aluminium doors, flush door. (NHC, 2022).

2.14.9.5. Finishes.

This will include installation of sanitary fittings, plumbing and drainage, electrical distribution systems, painting. external and internal wall finishes, floor finishes. (NHC, 2022).

2.14.9.6. Painting and Decoration.

External and internal walls will be painted with three coats of paint. Exposed metalwork will be first primed with aluminium primer, then painted 2 undercoats and one finish coat enamel paint while exposed woodwork will be primed then painted with 2 undercoats and one finish coat gloss oil paint. (NHC, 2022).

2.14.9.7. Balustrades.

Will be placed on balconies and along the stairs. (NHC, 2022).

2.14.9.8. Joinery and Fixtures.

Joinery fitting will be applied to built-in wardrobes and all the type of low-level kitchen worktops. (NHC, 2022).

2.14.9.9. Plumbing Works.

Installation of pipe work for water supply and distribution will be carried out. In addition, pipes will be installed to connect sanitary facilities with the public sewer system and for drainage of storm water from the rooftop into the storm water drainage system. Plumbing activities will include metal and plastic cutting, the use of adhesives, metal grinding and wall drilling among others. (NHC, 2022).

2.14.9.10. Electrical Installation Works.

Electrical works during construction of the proposed project will include installation of electrical gadgets and appliances including electrical cables, lighting apparatus and sockets. (NHC, 2022).

2.14.9.11. External Works.

External works will include water reticulation, external drainage, pipe works, external water storage and external drainage. (NHC, 2022).

2.14.9.12. Cleaning Up.

On completion and as necessary during the course of the works the Contractor must thoroughly clean by washing all floors, woodwork, steps, glass and sanitary fittings, clean out all gulley and drain and leave the buildings and the entire site in a clean and habitable condition to the satisfaction of the project manager. (NHC, 2022).

2.14.9.13. Other Project Design & Construction Considerations.

1. Protective Hoarding, Scaffolding

All protective hoardings, catch platforms, fences and other temporary structures erected for the safety and convenience of persons in any public place or on any public road shall:-

a) Be painted in white or other light colour;

b) Be provided with proper and illuminated paths or footways for the use of such persons; and

c) Between 6pm and 6am be illuminated with such warning signs and warning lights as may be approved by the approving authority. (NHC, 2022).

2. Trees and Tree Felling.

Where new construction necessitates the potential need for felling of trees, approval in writing by way of a permit must be obtained by the owner or contractor prior to the felling of any trees over 3m high and any conditions must be met. The application should be made either to the Ministry responsible for Forestry. Tree felling must be carried out by a competent person with sufficient and adequate experience utilising the correct equipment and adequate protection to the public and adjacent properties must be provided. (NHC, 2022).

3. Boundary Wall.

Unless the Approving Authority otherwise agrees, the development of the site shall include the provision of boundary walls, screen walls, fences or other means of enclosure of approved materials, construction and design. Boundary walls, screen walls, fences or other means of enclosure of residential plots shall not be erected to a greater height than 1.35m where abutting on to a street or in front of the building line of the main building, or in any other case. Where the ground on the line of a boundary wall or fence has such a slope or, in the opinion of the Approving Authority, on the grounds of privacy, amenity, safety or control, it is necessary or advisable to deviate from the heights prescribed, the Approving Authority may permit such other height as it considers adequate in the circumstances.

4. Contractor's Sheds.

The contractor shall make application to erect contractor's sheds (other than sheds in contractor's yards) during the execution of building works; The contractor carrying out building works shall provide:-

a) Adequate kitchens and latrines for the use of the workmen employed on such works; and

b) For the disposal of drainage, which shall be into a public drain or sewer where the same exists on or near a site. (NHC, 2022).

2.14.9.14. Proposed Project Budget, EIA Processing and Monitoring Fee.

The proposed project cost is estimated at approximately Kenya Shillings one billion only (KShs.1,000,000,000). EIA processing and monitoring fee is 0.1% of the total project cost to a minimum of KES 10,000. In view of the aforementioned the EIA processing and monitoring fee payable to NEMA for proposed project is one million Kenyan shillings only (KES. 1,000,000). See the Bills of Quantities (BQs) in appendices III. (NHC, 2022).

2.14.9.15. Certification of Occupation.

On completion of construction activities, the proponent will apply for a certificate of occupation as required by the building code by- laws, declaring the building's compliance with relevant building codes and other laws, and indicating it to be in a condition suitable for human habitation. (NHC, 2022).

2.15. Site (Project) Activities during the Operation (Occupancy) Phase.

2.15.1. Facility Management.

In line with the AHP development framework guidelines for the responsible maintenance of the buildings and common property facilities, this Development Framework Guidelines anticipates the formation of a Management Company (MC) to be incorporated under the Companies Act, 2015 which shall manage the property on behalf of all the home owners. The Management Company's shareholders shall comprise all those persons who are owners of units in the residential estate. The shareholders will elect a Board of Directors (BoD) who shall appoint a Managing Agent (MA), duly authorized to conduct facilities and estate management services that will be responsible for the day-to-day operations of facilities management in the development. (SDHUD, 2018).

1. Role and Responsibilities of the MC.

The MC will be primarily responsible for ensuring that implementation of the commonly subscribed community living conditions and restrictions that dictate homeowner actions with respect to the development and neighborliness. With the BoD as the duly elected representatives of the shareholders (home owners), the MC will be ultimately responsible

for financial, legal, physical and relational matters with related parties in the development. The Board will be required to meet routinely and have an annual meeting with all homeowners. The BoD will set policies and regulations and they may appoint an MA to conduct day-to-day operations and enforce the set policies and regulations. The BoD will be required to monitor and assess the actions of the MA by requiring them to prepare regular reports detailing accomplished tasks and financial information. Anticipated responsibilities for the managing agent include, but are not limited to:

a) Collecting and managing service or facilities management fees from homeowners;

b) Maintaining the property and ensuring that common property is functional and in good condition;

c) Ensuring that the facilities are not in violation of any regulatory or local housing provisions and that the facilities are up to environmental standards;

d) Alerting home owners of any existing violations and taking remedial action as required;

e) Managing the finances earmarked for the running of the MC and upkeep of facilities;

f) Handling questions and concerns from homeowners;

g) Appointing and retaining service providers such as security services, garbage collection, building repair and maintenance services, grounds management and landscaping, etc.

h) Obtaining and managing required insurance policies;

i) Retaining legal counsel, as necessary;

j) Preparing regular reports for both the board of directors and home owners;

k) Conducting satisfaction surveys ensuring that homeowners realize the importance of facilities management and taking required action; and

l) Regularly communicating with homeowners and keeping them up to date on community news and developments. (SDHUD, 2018).

2. Funding of Facility Management Operations.

In keeping with leading practices, the funding approach for facilities management under this Development Framework Guidelines will aim to ensure that common property infrastructure and services are of a quality and functionality that is consistent with the

level of physical, social, aesthetic and economic amenity provided by the property at the beginning of the development's occupancy.

The funding approach will seek to address the following five desirable characteristics:

a) Minimizing total cost incurred by owners over the life of the development;

b) Equity in the allocation of cost across individual lot owners at a particular time juncture;

c) Equity in the allocation of costs to different lot owners over the life of the development;

d) Avoidance of unanticipated significant financial obligations for lot owners; and

e) Minimization of disharmony between the owners who collectively own the common property.

The MC will establish a sinking fund that will be managed by a Fund Manager. The Fund Manager will be required to provide reports on the financial performance of the fund and the use of funds. This report will be presented to the homeowners at the annual general meeting. The sinking fund will be capitalized in the first instance by lump sum contributions equal to the first two years of a suitable monthly service fee. This lump sum contribution will be added to the purchase price of the home. After the home purchase, the homeowners will be required to contribute a monthly service fee which the MA will be required to collect. Homeowners under the TPS could submit their payments through their monthly payment to the Housing Fund.

The MC will set a reasonable annual operating budget that will be ratified by the Board of Directors and shareholders in the annual general meeting. The budget will be submitted to the Fund Manager who will release funds as agreed to facilitate the MA's work. The MA will provide regular finance reports to both the Fund Manager and the BoD. The Fund Manager will use the financial reports from the MA to paint a true and transparent picture of the performance of the sinking fund. (SDHUD, 2018).

2.15.2. Residential Activities.

The residential units shall be available for occupation once the construction of the proposed project is complete. This stage shall involve operation and managing the development and associated facilities. The proponent shall be responsible for

management of the facility. The operation of the facility will be accompanied by several domestic activities. (SDHUD, 2018).

2.15.3. Solid Waste and Waste Water Management.

Various household activities will result to generation of solid wastes such as waste paper, glass bottles, plastic and tin cans, kitchen refuse among others. The proponent will provide dust bins and skips for temporarily holding waste within the premises before final disposal. The development shall be connected to the existing Homa Bay County Water and Sanitation Company Limited (HOMAWASCO) sewer system.

2.15.4. Cleaning.

The proponent will contract a registered company for cleaning services. Their duties will include cleaning of the shared areas like corridors, stairs and compound. They will also be involved in collection and disposing of waste onto the central collection place within the site. Cleaning activities will involve the use of substantial amounts of water, disinfectants and detergents.

2.15.5. General Repairs and Maintenance.

The development and associated facilities will be repaired and maintained regularly during its operational phase. The general repairs and maintenance will be the responsibility of the proponent. Such activities will include repair of building walls and floors, repairs and maintenance of electrical gadgets and equipment, painting among others

2.16. Facility Services.

2.16.1. Electricity.

The site is connected to the electricity main line of the Kenya Power Company (KPC), which will be in all phases of the project. The necessary guidelines and precautionary measures relating to the use of electricity shall be adhered to.

2.16.2. Sewerage.

The development will be connected to Homa Bay County Water and Sanitation Company Limited (HOMAWASCO) trunk sewer line.

2.16.3. Water.

Water from Homa Bay County Water and Sanitation Company Limited (HOMAWASCO) will be used during construction and operational phases of the proposed project.

2.17. Proposed Project Decommissioning Phase Activities.

2.17.1. Introduction.

Decommissioning is the cessation of operations and the controlled process of safely retiring a facility from service for change of use or end of life of the facility. If the development completes its lifecycle or in case of change of use, then decommissioning shall become necessary. The proponent shall be required to prepare a decommissioning plan that documents the activities and schedule to bring to a close the development. The decommissioning plan shall be submitted to NEMA for approval at least three (3) months prior to decommissioning. Interested and Affected parties who will be affected by the changes shall be informed of intent to cease operations well in advance.

2.17.2. Change of Use Situation.

In a situation where there is a change of use, decommissioning process may entail demolition of part of the building or project structures alteration for different utilization. Upon alteration and demolition of some features and structures, the affected land will need to be reclaimed or restored into a natural condition through landscaping and planting of vegetation.

2.17.3. End of Life Situation.

When the project reaches the end of its life, it must be decommissioned. This process includes the removal of buildings and other structures as well as site cleanup and site restoration.

Decommissioning process could typically involve selective demolition, which means the sorting, of all waste fractions on the demolition site with respect to highest possible recycling and minimization of waste disposal on landfills.

1. Selective demolition.

This will include following activities;

- Preliminary work which include removal of remains,
- Removal of installations which include windows doors, pipes, floors etc,
- Demolition of shell structures, which involves manual labor, and machine works,
- Finishing of works involving transportation of demolition waste to NEMA licensed disposal site.

2. Removal of wastes.

- All wastes generated as a result of facility decommissioning activities will be handled in compliance with the Waste Management Regulations, 2006.

3. Site restoration.

Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through the filling in of any open pits and grading the land to its natural contours and replenishment of the topsoil and re-vegetation using indigenous plant species. All the necessary health and safety measures for personnel will need to be implemented including provision of personal protective equipment such as, safety harnesses, helmets, gloves, respirators, safety shoes, coveralls, goggles and ear protectors.

2.18. Traffic Management Plan, (TMP).

1. Traffic Management Plans during Construction Phase.

The construction site should be organized so that vehicles and pedestrians using site routes can move around safely. The routes need to be suitable for the persons or vehicles using them, in suitable positions and sufficient in number and size. The term 'vehicles' includes: cars, vans, lorries, low-loaders and mobile plant such as excavators, lift trucks and site dumpers etc. construction site vehicle incidents can and should be prevented by the effective management of transport operations throughout the construction process. Key issues in dealing with traffic management on site are:

a) Keeping pedestrians and vehicles apart.

The majority of construction transport accidents result from the inadequate separation of pedestrians and vehicles. This can usually be avoided by careful planning, particularly at the design stage, and by controlling vehicle operations during construction work. The following actions will help keep pedestrians and vehicles apart:

• **Entrances and exits** - provide separate entry and exit gateways for pedestrians and vehicles;

• **Walkways** - provide firm, level, well-drained pedestrian walkways that take a direct route where possible;

• **Crossings** - where walkways cross roadways, provide a clearly signed and lit crossing point where drivers and pedestrians can see each other clearly;

• **Visibility** - make sure drivers driving out onto public roads can see both ways along the footway before they move on to it;

• **Obstructions** – do not block walkways so that pedestrians have to step onto the vehicle route; and

• **Barriers** - think about installing a barrier between the roadway and walkway.

b) Minimizing vehicle movements.

To limit the number of vehicles on site the following is recommended:

• Provide car and van parking for the workforce and visitors away from the work area;

• Control entry to the work area; and

• Plan storage areas so that delivery vehicles do not have to cross the site.

c) People on site.

The proposed project contractor shall take steps to make sure that all workers are fit and competent to operate the vehicles, machines and attachments they use on site.

d) Turning vehicles.

The need for vehicles to reverse should be avoided where possible as reversing is a major cause of fatal accidents. One-way systems can reduce the risk, especially in storage areas. A turning circle could be installed so that vehicles can turn without reversing.

e) Visibility.

If vehicles reverse in areas where pedestrians cannot be excluded the risk is elevated and visibility becomes a vital consideration. You should consider:

• Aids for drivers - mirrors, Closed-Circuit Television (CCTV) cameras or reversing alarms that can help drivers can see movement all-round the vehicle;

• Plant and vehicle marshallers - who can be appointed to control manoeuvres and who are trained in the task;

• Lighting - so that drivers and pedestrians on shared routes can see each other easily. Lighting may be needed after sunset or in bad weather;

• Clothing - pedestrians on site should wear high-visibility clothing.

f) Signs and instructions.

It is recommended to make sure that all drivers and pedestrians know and understand the routes and traffic rules on site.

• Use standard road signs where appropriate,

• Provide induction training for drivers, workers and visitors and

• Send instructions out to visitors before their visit.

See figure 8 below.

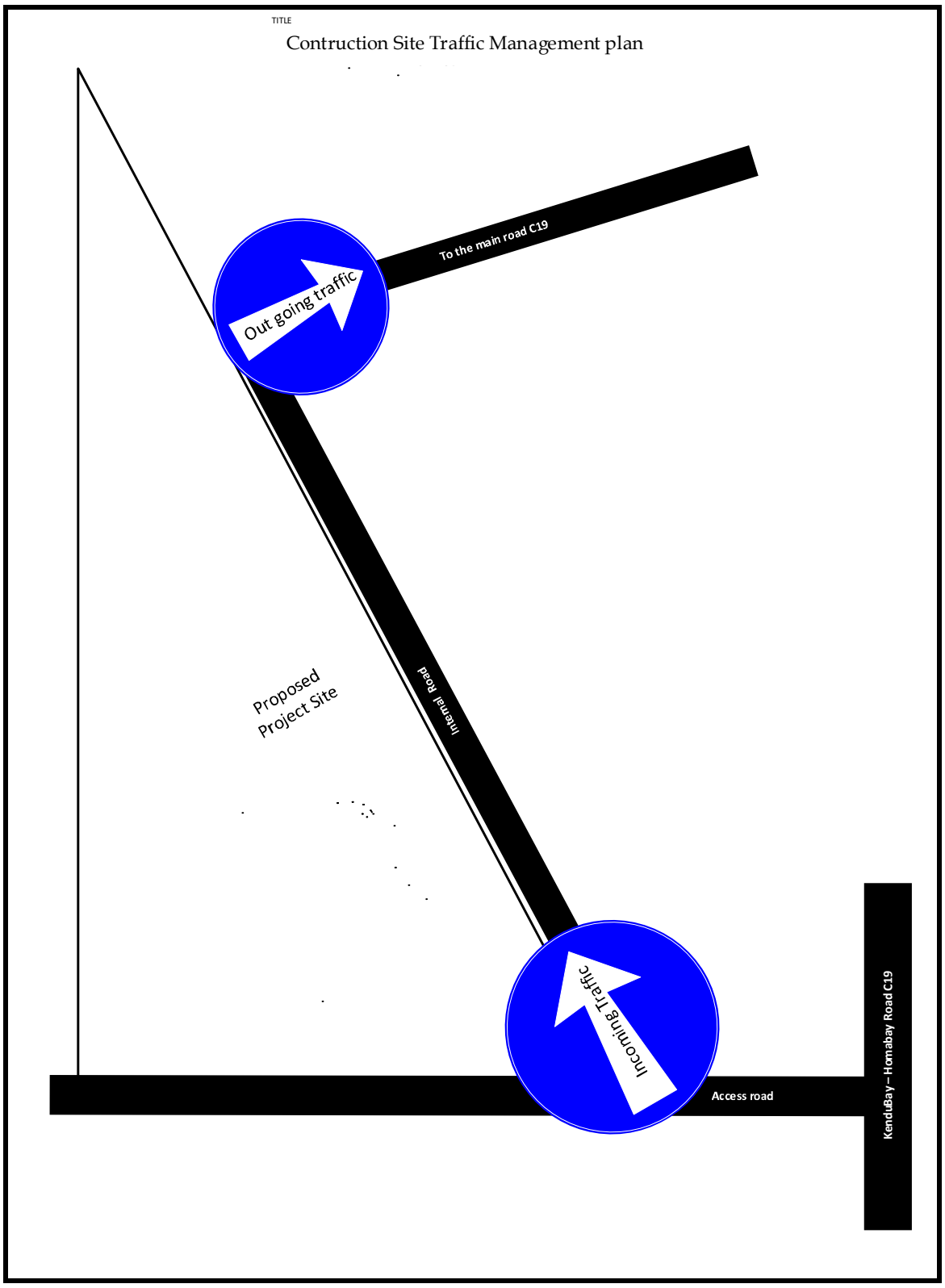

Figure 8: Construction site traffic management plan.

Traffic Management Plans during Operational Phase.

a) Site Access and Traffic.

Through a manned gate(s) and pedestrian entrances

b) Parking.

- The proposed project has made provision for adequate parking for both residents and visitors
- Parking areas provided by design are situated in safe locations within the proposed project with adequate pedestrian routes avoiding potentially dangerous areas.

c) Signage.

It is recommended for use of traffic signage. All signage wherever possible should be of standard road traffic sign design to avoid confusion.

- Suitable warning signs should indicate potential hazards on traffic routes within and immediate about of the project site. This will include road junctions, sharp bends, crossings, blind corners and steep gradients.
- Similar signs may be necessary to inform pedestrians of potential hazards.
- Where signs need to be visible at night, they will need to be illuminated and / or reflectorized.

CHAPTER THREE: BASELINE INFORMATION.

3.1. Physical Environment.

3.1.1. Position and Size.

Homa Bay Municipality is within Homa Bay County, Kenya and it serves as the headquarters for the County Government. It is situated on latitude 3400 46'E and longitude 0000 40'S and it covers an area of 29km^2 out of which 9km^2 falls within the Central Business District (CBD) while the rest consists of peri-urban settlements. The CBD is under leasehold tenure while land in the peri-urban areas is under freehold. This was after the expansion of the boundary in 1991 from eight square Kilometres when Homa Bay Town was a town council to 29km^2 when it was upgraded into a municipality. The Municipal boundary stretches to Kabunde area to the South, Koduogo market to the west, and borders the lake to the north and Ngegu to the East. The Municipality is located 130 Kilometres south of the city of Kisumu city, the headquarters of the Kisumu County, and about 400 Kilometres from the City of Nairobi, the capital of Kenya. The Municipality is surrounded by classified roads with one class C20 (Homa Bay-Rongo) road covering about 30Km; two class C19 (Homa Bay - Mbita and Homa Bay - Kendu Bay) road covering about 71Km. The rest of the classified road networks serving the Municipality are graveled to motor able standards. The Municipality falls majorly within four wards in Homa Bay Sub County that is Arujo, Homa Bay West, Homa Bay East wards and part of Homa Bay Central Ward, (Homa Bay Municipality, 2019)

3.1.2. Geological and Soil Characteristics.

3.1.2.1. Rocks.

The municipality is underlain by various rock types, namely, agglomerates, conglomerates, tuff sandstone, granite and other deposits which are useful in the construction industry. (Homa Bay Municipality , 2019).

3.1.2.2. Soils.

The Municipality's soil is black cotton soil, which is difficult to work upon with simple hand implements. It is also difficult to work on during heavy rains, making farming difficult. The lake shore lowland is dominated by alluvial soils, mainly the sandy loam

type which is well drained and suitable for cotton, sunflower, maize, beans, cow peas and vegetable production. Other crops with potential are sugar cane and potatoes. (Homa Bay Municipality , 2019).

3.1.3. Climate.

3.1.3.1. Rainfall.

The Municipality experiences two rainy seasons, the long and the short rains, which fall between March to May and between the months of October to December, respectively. The rainfall pattern ranges between 250 and 700 mm per annum. The rainfall probabilities and nature of soil determine the activities of small scale farmers around the Municipality. Crops grown here are, therefore, those requiring low rainfall like cassava, millet and sunflowers. (Homa Bay Municipality , 2019).

3.1.3.2. Winds.

Generalized wind speeds average about 4 m/sec and have certain regularity due to the convection effect of the large water body of the lake that borders the often hot dry land. (Homa Bay Municipality , 2019).

3.1.3.3. Temperature.

Temperature typically varies with altitude and proximity to the lake and tends to increase towards the lowland with an average of 65 degree Fahrenheit to 85 degree Fahrenheit and it rarely goes below 62 degree Fahrenheit or above 90 degree Fahrenheit. Temperatures are highest between December and March with the hottest weather being experienced in February and the lowest in April and November. (Homa Bay Municipality , 2019).

3.1.4. Topography and Drainage.

The Municipality of Homa Bay is located on the lakeshore lowland, which ranges between 1143 to 1220 meters above sea level and comprises of a narrow stretch bordering Lake Victoria. At the end of lakeshore lowland lies Homa Bay. The bay is skirted by a shoreline stretching for approximately 16.5 km covering parts of Homa Bay Sub County. The Municipality area has a gently rolling terrain that flattens towards Lake Victoria. It is characterized by various hills standing separately. Most parts of the

Municipality drain westwards to the lake except the areas of Got Rabuor, Arujo and parts of Sofia, which drain into the Arujo stream which eventually drains into Lake Victoria. The Municipality is responsible for management and maintenance of the urban drains. Storm water drainage facilities are not available in most of the urban roads except the CBD and central government and municipal residential quarters which are well serviced with drains. However, most of the drains in the residential estates have been covered with alluvial soil over the years. (Homa Bay Municipality , 2019).

3.1.5. Ambient Air Quality Status.

Air pollution within the municipality is minimal; however, there are notable problems and challenges which include

- Dust during constructions
- Stench from fish (mgongo wazi)
- Burning of wastes
- Smoking in public places
- Exhaust fumes from unroad worthy vehicles

The project proponent has procured the services of a NEMA registered laboratory to undertake baseline ambient air quality measurements for the proposed project site. The report of the same is attached in appendix IV of this report.

3.1.6. Ambient Noise Condition.

Noise pollution is increasingly becoming a problem within the municipality due to:

- The location of the busy bus park in the middle of town
- Jua Kali activities
- Music stores and nightclubs, churches

The project proponent has procured the services of a NEMA registered laboratory to undertake baseline ambient noise measurements for the proposed project site. The report of the same is attached in appendix V of this report.

3.2. Biological Environment.

The vegetation is largely of acacia woodland and bush land growing over expansive black cotton soils that cover most of the Municipality apart from the hilly areas which

have rock outcrops. The vegetation of acacia woodland is characteristic of the kind of vegetation cover found in areas of dominate black cotton soils. There is also an assortment of species of indigenous species of trees. A lot of trees are grown within the peri-urban areas for the conservation of the environment. However, since agriculture is still exercised in most parts of the Municipality, crops also form part of vegetation cover as do grass in open fields and homesteads and compounds or courtyards.

It is to be noted that the water hyacinth in the lake can also be considered available vegetation, but this is subject to winds as sometimes it is blown further into the lake, but mostly it covers a large tract of the shoreline. (Homa Bay Municipality , 2019.)

The proposed project site is covered by grasses with few scattered trees. There are no wild animals. Only few birds could be seen on the site see figure 9 below.

Figure 9: Proposed project site.

3.3. Natural Resources.

The Municipality resources can be ranked into land resources and water resources, both endowments that are rich and a blessing to the people. Land resources include the strategic location just at the mouth of the bay, an area that is not prone to flooding and

other calamities that are associated with large water bodies. The land is a good starting point for the construction industry for the building of houses. The prevailing climate, regulated by the winds and the calming effects also make life in the Municipality friendlier. The land can be put into a wide array of other uses like agriculture, and development of public utilities. The Municipality also gains from its location since it is the gateway to vast tourist attraction sites in that part of Kenya. The tourist attractions sites include the islands of Mfangano, Rusinga, Remba, Ringiti, Sena among others as well as to Ruma National Park, even though they are not located in the Municipality or even in the wider Homa Bay Sub County; The Municipality stands to gain from these sites for the improvement of its economy. Water resources include the rich Lake Victoria. If there is proper investment in the water supply from the lake, the Municipality stands to benefit significantly. This remains pegged on the environmental preservation and protection so that the water in the lake is not so polluted as to make it unfit for human use. The lake also has the potential for tourism since it is the second largest fresh water lake in the world and has an array of aquatic life and scenic beauty. (Homa Bay Municipality , 2019).

3.4. Socio-Economic Environment.

3.4.1. Administrative and Political Units.

The county has eight constituencies/sub counties, 40 wards, 23 divisions, 140 locations and 265 sub locations as illustrated in table 6 below.

Table 6: Area and Administrative Structures

Sub-County	**Area (Km^2)**	**Divisions**	**No. of Locations**	**No. of Sub-Locations**
Kasipul	259.9	3	13	25
Kabondo Kasipul	248.7	2	15	35
Karachuonyo	441.2	4	23	59
Homa Bay	198.7	2	23	59
Rangwe	259.8	2	7	19
Ndhiwa	711.4	6	29	49
Mbita	420.8	3	11	27
Suba	641.8	2	9	24
Total	**3182.3**	**24**	**116**	**297**

Source: (Homa Bay County Government, 2018).

3.4.2. Population and Demographic Analysis

3.4.2.1. Population and Composition.

Based on projections from the 2009 Kenya Population and Housing Census, Homa Bay Municipality has an estimated population of 53,696 persons consisting of 25,775 males and 27,921 females as at August 2019. This figure can be broken down by location as in table 7 below:

Table 7: Population breakdown by contribution from locations.

Location.	**Projected Population of Males.**	**Projected Population of Females.**	**Projected Total Population by Location.**
Arujo	12,898	13,972	26,870
East Kanyada	2,153	2,333	4,486
Homa Bay Town	9,622	8,882	18,504
Kalanya Kanyango	2,108	1,947	4,055
Kanyabala	4,177	4,529	8,703
Kanyach Kachar	2,351	2,546	4,897
Kothidha	1,618	1,753	3,371
West Kanyada	631	683	1,314

Source: (Homa Bay Municipality , 2019).

3.4.2.2. Population Density and Distribution.

According to 2009 Census, Homa Bay Municipality has projected population of 131,667 by 2020 and 139,804 people by 2022. The population density per square kilometres is projected to be 663 and 596 in the year 2020 and 2022 respectively explaining the migration trends from the peri-urban to urban areas. See table 8 below.

Table 8: Population Densities for Homa Bay Municipality

	2009 (Census).		**2017 (Projections).**		**2020 (Projections)**		**2022 (Projections)**	
Constituency	**Population**	**Density (Km2)**	**Population**	**Density (Km2)**	**Population**	**Density (Km2)**	**Population**	**Density (Km2)**
Homa Bay Town	94,660	476	120,332	606	131,667	663	139,804	596

Source: (Homa Bay Municipality , 2019.).

3.4.2.3. Average Household Size.

The average household size is five persons. The projection for the growth of households within the Municipality is estimated to be 5.1 and 5.2 for both short-term and long-term planning periods as per the County Integrated Development Plan (CIDP) 2017-2022.

3.4.3. Tourism and Wildlife.

Homa Bay County sits in a prominent position to be a lead destination in the Western Tourism Circuit and is home to Ruma National Park which is the only park where unique and rare species 29 like the roan antelope can be found. The county also hosts events and sites of mythical interest like the Tom Mboya Mausoleum, the Mfangano Rock Art, Oyugis Bird Sanctuary, Homa Hills Hot Spring and Simbi Nyaima. There are over 18 islands such as Rusinga and Mfangano, peninsulas and bays some with unique fauna and flora and an impressive array of physical features with great aesthetic value. There is need to improve these tourism sites to bring in revenue to the county. It also boasts of breath-taking scenery and forested landscape leading to and around the Lake Victoria coast line, especially within Mbita and Suba, such as is the case with the Sikri peninsula. There are also opportunities for sports and cultural tourism especially as relates to the way of life of the Luo and the Abasuba whose traditional boat racing and artifacts continue to attract a lot of local and international tourists.

Homa Bay County is home to tourist attractions of the lake region that has been categorized as Nature and Wildlife, Culture, Heritage and Community-Based Tourism, Agro-tourism, Eco-tourism etc. Some of the major tourism attraction sites include Ruma National Park and Homa Hills. The county local residents are usually involved in cultural events that boost tourism.

Homa Bay County has 91% and 9% of unclassified and classified hotels respectively. This is according to the last National Hotel Classification exercise that was carried out in 2003. The main wildlife found in the county of Homa Bay include Topi antelope, hyenas, Roan antelopes, giraffes, buffaloes, hippopotamus, crocodiles and various species of snakes. Lately, zebra and rhinoceros have been introduced to Ruma National Park. Ruma National Park is the main gazetted and protected wildlife conservation area managed by the Kenya Wildlife Society. Other conservation areas that are not protected includes lakes

shores, river 30 banks, hill tops and forests with inhabitants like hippopotamus, monkeys, leopards and antelopes. These hill tops could serve as potential tourist attraction sites for the county, (Homa Bay County Government, 2018).

3.4.4. The Blue Economy.

Fishing is a main economic activity in Homa Bay County. It produces the best fish in the world (Tilapia and Nile Perch), which is consumed locally, sold to other towns like Kisumu and Nairobi and exported worldwide. Europe is a major consumer of Nile Perch from Lake Victoria, (Homa Bay County Government, 2018).

3.4.5. Solid Waste Management Facilities.

Waste management remains a major concern in Homa Bay County what with emerging need for sustainable development in the Lake Victoria basin. Most of the solid wastes in the county remain 45 uncollected. Resultant effects include spread of infectious diseases, blocked sewers, litter in the streets and pollution of Lake Victoria through crude dumping of waste. With both direct and indirect linkages to economic development, waste materials represent wasted money, in terms of the original cost of the materials, the disposal and in its potential value as a recyclable and reusable resource. However, going forward, the County Government is focused on improving solid waste management through an integrated approach that includes recycling and composting programmes; storage facilities; collection Systems; transportation of waste from collection points to designated disposal points; responsible waste disposal; proper handling of special/hazardous waste; environmental educational awareness; capacity building of stakeholders; Public Private Partnerships (PPP); new legislative framework; resource mobilization and enhanced organizational set –up. Each of the 8 sub-county headquarters and all the other major urban centres such as Sindo, Rodi Kopany, Kosele and Pala will have designated disposal points. Waste management in the four county towns of Homa Bay, Mbita, Oyugis and Kendu Bay has been contracted out with great effect on service delivery, (Homa Bay County Government, 2018).

3.4.6. Infrastructure.

3.4.6.1. Transport.

The CBD of Homa Bay attracts passengers from all over South Nyanza since Homa Bay is a former headquarters of the previous South Nyanza Districts that was split into Homa Bay, Migori, Rachuonyo, Suba, Kuria and Rongo Districts. Most government offices, including the land offices, that served the districts, remained in Homa Bay and this still attracts population from such a wide hinterland. The bus terminus of Homa Bay remains a gateway into Mbita Point, Kisumu, Kisii and Migori for people in the region. ((Homa Bay Municipality , 2019).

a) Road Transport.

The HBD has a total of 645 Km of both classified and unclassified roads and all these roads affect the transportation network of the municipality. The roads consists of the dilapidated and the currently under construction, Homa Bay – Rongo tarmac road, Homa Bay - Asumbi tarmac road, Homa Bay - Kendu Bay gravel road and the gravel Homa Bay - Mbita Road. The roads in the CBD are bitumen surfaced although the pavement on some of the roads is badly worn out. Roads connecting the municipality with the residential estates are earth/ gravel surface. Some of the roads are often impassable during the heavy rains. Currently, some of the roads in the CBD are being rehabilitated. (Homa Bay Municipality , 2019)

b) Motorized versus non-motorized transport.

Despite the presence of heavy pedestrian and cycle traffic, there is inadequate provision of infrastructure. Pedestrian sections hardly exist and where available they are narrow, poorly designed and maintained. Along main roads, surface drains and sewer manholes are left open thus posing serious risks to pedestrians and cyclists.

Security for pedestrians and cyclists is poor as street lighting is inadequate and/or not provided at all in many routes. A footpath and/or a cycle lane of at least 1.5m wide should be provided along the road. The open veranda space fronting business premises should also be left clear for free movement of pedestrian traffic. At the moment, this space has been encroached upon by informal sector activities. (Homa Bay County Government, 2018).

c) Terminal and parking facilities.

The main terminal facility is a hard-surface, paved bus station that. Other small bus or matatu stands and laybys also exist in Municipality of Homa Bay (MoHB) for the picking or dropping of passengers and goods. There is inadequate provision of parking facilities in the CBD. Vehicles are parked along the road pavement and footpaths resulting into serious traffic congestion in the CBD. The situation is particularly bad along the Rongo-Homa Bay-Kendu Bay roads where public transport vehicles (buses and matatus) park to drop off and pick up passengers. Parking problem is also aggravated by major building developments being allowed without adequate space provision for parking. Parking space of one car should always be provided for every 80 -100m2 of commercial/ office floor space. An unauthorized bus park and bus stops are located near the municipal market. (Homa Bay Municipality , 2019).

d) Water Transport.

Homa Bay County has 2 water buses, 2 ferry services between Mbita and Lwanda Kotieno, and Mbita - Mfangano. Homa Bay County has 151 underdeveloped landing beaches and 6 jetties which includes Mbita (2), Kendubay (1), Mfangano (2), and Homa Bay (1). The 12 islands in the county water surface area are accessible with the majority only by motor boats. The harbours established by Kenya Railways in Homa Bay, Kendu - Bay and Kajimu need basic rehabilitation. The county has neither a railway system nor a pipeline, (Homa Bay County Government, 2018).

e) Air Transport.

The airstrip that serves the MoHB is located 8 Km South-East of the municipality at Kabunde. The major function of the facility is to facilitate air transport for tourists travelling from Nairobi, Maasai Mara, and other tourist attraction centers to Ruma Game Reserve, Simi Yakima, Rusinga Island and Mfangano Island. It is mainly used by light aircraft. (Homa Bay Municipality , 2019). The proposed project site is adjacent for the main Kendu Bay Homa Bay road C 19. It is served by an all weather feeder road off the C19 which will be upgraded to bitumen standard. See figure 10 below.

Figure 10: Roads servicing the proposed project site

3.4.6.2. Information Communication and Technology, (ICT).

Homa Bay County has 14 post offices spread across its vast territory to adequately cater for its population needs. However, with the emergence of mobile phones-based short message services, increased availability of email facilities, other electronic media and curio services, the use of post office services has been significantly reduced. The county enjoys mobile phone penetration of 85.6% with all the national telephone operators registering a presence. The use of all landline services has virtually ended in the county with most connectivity infrastructure vandalized. Possession of mobile phones is at 54% averagely in the county, while this has significantly increased for the urban households with 9 in 10 urban households (94 percent) owning a mobile phone. Hoodlum Centre was introduced in the county hence bringing services closer and boosting the economy. The County Government of Homa Bay has developed a Multi-Sectoral County ICT Road Map to guide the implementation of ICT in the County; established an ICT and Innovation Hub in Homa Bay Town; extended the fiber optic cable to the County Headquarters; operationalized County Website and improved government service delivery processes by networking various offices. There is need to expand the already existing ICT hubs that had been started by the National Government and further expand

incubation centres in the remaining sub counties, (Homa Bay County Government, 2018).

3.4.6.3. Energy.

The main energy sources are electricity, petroleum fuel and fuel wood. The energy supplied is used for cooking, lighting, industrial production and transport. The main energy sources for cooking are kerosene, charcoal and firewood. Use of electricity and petroleum gas for cooking is limited. For lighting, the main sources are kerosene and electricity. The majority of these consumers (about 65%) are domestic. Industrial consumers are negligible. Only about 20% of the Municipality of Homa Bay (MoHB) is supplied with power.

Average annual demand for electric energy in Homa Bay County was 51.1GWh as at the end of 2016 and is expected to increase to 149.31Gwh (low case scenario) or 284.25Gwh (high case scenario) by the year 2030. Given the expected growth in electric energy demand, the County Government plans to meet the deficit by facilitating investments in solar, geothermal and biomass power generation plants, which have significant power generation potential in the County. Much of the demand is concentrated in urban centres indicating that electricity consumption in the rural areas is quite low. All urban and most rural trading centres in the county have been covered with grid power through the rural electrification program. The County Government intends to increase energy access to the remaining population by having them connected through maximization of existing power systems network, extending system networks to underserved areas, installing more transformers in identified settlement sites or subsidizing the cost of connection, (Homa Bay County Government, 2018).

Street-lighting is extremely poor within the CBD. Street-lighting infrastructure exists, but it is poorly maintained and broken down. Roads serving important facilities like markets, slaughterhouses, Bus Park, stadium, hotels and offices are poorly served. In the residential areas, street-lighting is poor and in many cases it is virtually non-existent. Inadequate street lighting is a major cause of increased insecurity. Travel at night by car and even particularly walking is often risky and has also negatively affected business activity hours, (Homa Bay Municipality , 2019).

There proposed development will be connected to the Kenya Power Company (KPC) power grid. The development has provision for internal street and security lighting. There is KPC power line within the vicinity of the proposed project site. See figure 11 below.

Figure 11: KPC power line within the vicinity of the propose project site.

3.4.6.4. Water, Water Supply and Demand.

The census 2009 Report, indicate that the main sources of water per household are 39% streams and rivers, 24% boreholes and shallow wells, 13% ponds and dams, 10% springs, 8% piped water, 8% rainwater harvesting while 4% get directly from the lake.

The main source of water is Lake Victoria situated to the South-East of the Municipality. The municipality consists of two pump-sets with capacities of 1,500m3/d and 2,000m3/d for the old and new pump stations. While the old pump delivers raw water to the lower treatment plant near Makongeni Estate, the new one lifts water to the new treatment plant on the slopes of Asego Hills to the North of the CBD. The total water supply system leaves a shortfall of 4,298m3/day throughout the municipality hence supplemented by sources including shallow wells, springs, boreholes, roof catchments and direct from the lake, (Homa Bay Municipality , 2019).

Homa Bay Water and Sanitation Company (HOMAWASCO) is mandated to manage water supplies in the County. However, many areas of the county are characterised by low levels of access to water, especially the urban slums and in rural areas. Majority of

urban areas are also characterized by poor service quality in the form of intermittent water supply. Lake Victoria Water Services Board is responsible for asset management and has a Service Provision Agreements (SPAs) with Water Service Providers (WSPs), principally HOMAWASCO. The Water Services Regulatory Board (WASREB) carries out performance benchmarking and is in charge of approving SPAs and tariff adjustments. Since enactment of the Water Act 2016, the functions of Lake Victoria South Water Services Board are expected to be transferred to a Board to be constituted for Homa Bay County. The Ministry of Water and Sanitation remains in charge of policies for water supply, (Homa Bay County Government, 2018).

In respect to water demands and with the approximately 15,000 households, that alone would need more than 7,798m3 of water per day, for the businesses and offices, schools, colleges, prison, churches, etc., the water demand obviously outstrips supply by far. Homa Bay cluster water supply project in partnership with the Belgium Government which is currently ongoing includes the construction of a new water treatment plant with a capacity of 4800m3 per day and the rehabilitation of the existing system at Asego Hill increasing thus increasing its capacity from the current 2,000m3 to 4,000m3 per day. The existing old water treatment plant currently produces 1,000m3 per day. The total water production will then be 9,800m3 per day offsetting the current water demand for Homa Bay Municipality which stands at 7,798m3 per day and the project was expected to completed by 2020, (Homa Bay Municipality , 2019).

The proposed project site is adjacent to HOMAWASCO water treatment plant. The site will be connected to the HOMAWASCO water supply system. During the field assessment it was ascertain from HOMAWASCO that there is adequate capacity to meet the increased water demand for the development from their water supply treatment plant. See figure 12 below.

Figure 12: HOMAWASCO Water treatment plant next to the proposed project site.

3.4.6.5. Sanitation and Sewer System.

As part of measures to improve management of water and sanitation facilities, water associations have been formed and Homa Bay Water and Sanitation Company (HOMAWASCO) have been mandated to manage water supplies in the County. However, many areas of the county are characterised by low levels of access to water and sanitation, especially the urban slums and in rural areas. The Ministry of Public Health and Sanitation is in charge of policies for sanitation, (Homa Bay County Government, 2018).

Since the proposed project is residential the effluent generated will be domestic effluent

The proposed project site is in the vicinity (less than 200 meters) of HOMAWASCO sewerage treatment plant. The site will be connected the existing public sewer trunk line to the Homa Bay Sewerage Plant which is within the vicinity for treatment prior to discharge to the environment. See figure 13 below

Figure 13: Main sewer trunk line adjacent to the proposed project site.

3.4.6.6. Storm Water Drainage.

The storm water drainage network is indeed poor and inadequate. The municipality does not have a comprehensive storm water drainage system, but they have primary and secondary networks. The primary drainage system consists of natural streams and valleys that naturally drain the municipality. The natural flow of streams has been interrupted by development and building activities that have, therefore, in due course blocked. The secondary drainage system consists of the man- made drainage system that is totally inadequate and/or totally lacking in the CBD. The storm water drains are often broken down and many are blocked by solid waste. Along the main streets in the CBD, manhole covers and the slabs are broken and deep drains are left open.

This poses serious risks to motorists and pedestrians and encourages breeding of mosquitoes and other vermin.

The construction of wide, deep and open drains is particularly unacceptable. In many areas, the drains are not lined leading to massive erosion due to steep land slope, deep loose soil and heavy rainfall storms experienced in the area. The drainage system has also been blocked by encroachment of business and building activities, (Homa Bay Municipality , 2019).

The proposed project site is well served by public storm water drainage, all the storm water from the development will be channeled to the public storm drainage within the vicinity the drainage eventually drain into the Lake Victoria which also with the vicinity. See figure 14 below.

Figure 14: Existing storm water drainage with the vicinity of the proposed project site.

3.4.6.7. Housing Types and Settlement Patterns.

1. Land Tenure Classification and Land Use.

The mean land holding size in Homa Bay County stands at 6 acres, meaning majority of farmers fall in the bracket of smallholders. On average, two acres of these are used for settlement and the balance is used for agricultural and rural development purpose. The percentage of land with title deeds in Homa Bay County stands at about 85 per cent. The county of Homa Bay suffers low incidence of landlessness estimated at three per cent. This is because the cost of land remains low and the vast majority of residents are indigenous people with rights to hereditary land. The vast majority of the landless are migrants in trading centres and returnees who initially had no intentions of returning but were forced back in the wake of the post-election violence of 2008.

Most of the land is being used to produce A considerable portion of land in this county is owned by the county government while the rest of the available land is owned by the community as communal land as well as private entities. We also have isolated land –

private ownership e.g. freehold land; 19 public lands- government lands; ancestral land-communal lands and trust lands- held in trust- by churches. See table 9 below.

Table 9: Homa Bay County Land by Category and Size.

Category.	**Area (Km^2).**
Arable Area	2154.9
Non-Arable Land	843.1
Water mass	1227.3
Urban Area	185.3
Total Area	**4410.6**

Source: (Homa Bay County Government, 2018).

In Homa Bay town, the land tenure system is such that within CBD there is trust land and leasehold (99 years). Areas of Kalanya Kanyango in Homa Central Ward, Katuma in Arujo Ward have a freehold land tenure system, while areas of Kothidha and Kanyadier in East Ward are community land under a land adjudication programme.

The combination of the tenure systems offers both opportunities and constraints. Freehold tenure in some areas, like in the informal settlements like Shauri Yako and Makongeni, pose difficulties in enforcing regulations on land. However, the trust land areas provide the municipal council with sufficient land for future location public facilities and infrastructure. The proposed project site land title is a lease hold for 99 year to the Homa Bay County Government, (Homa Bay Municipality , 2019).

2. Existing Zoning.

High income residents enjoy housing in areas with better services and facilities such as Salama and areas on land parcels that are large and properly serviced. They are mostly found in the higher ground areas away from the beach front. On the other hand, the low income population lives in shacks on the shores of the lake like Shauri Yako, Sofia and Makongeni.

Some 75% of the population of MoHB stays in low- income residential housing units, 20% in the middle income housing areas and 5% population in the high- income residential zone.

However, it is difficult to delineate the residential estate zones with respect to income levels because the conventional ranking of high-income population may have the perceived ‘rich’ population of Homa Bay as poor or lower middle class since the income levels in MoHB is low and the relative cost of life is also low.

The medium density zones include: Makongeni; Oriang Manywanda; Trust land - Kaburini, and low density zones are: Milimani (Government land); Mbita Junction; Got Rabuor; High density; Shauri Yako; Sofia; Makongeni.

Shelter structures in the low-income slums are located on any free space available, making the housing densities in the settlements very high.

On average, different plot sizes are allowable in different areas where there is some semblance of development control, like in the CBD and in Salama, and generally in areas where the land is under leasehold tenure. Here, the minimum allowable plot size is a quarter of an acre. The plot sizes get larger as one move away from the CBD into the areas where the tenure is majorly freehold, (Homa Bay Municipality , 2019).

The proposed project site is zoned as a residential zone, see appendix VI for the Part Development Plan (PDP) for the proposed project site

3. Housing Typologies.

Varying housing typologies denote different income levels. High income housing is denoted by single detached or semi-detached two or three bed-roomed bungalows and a few maisonettes, built on brick and mortar with iron sheet or tile roofs. Middle income housing is usually composed of two or three-storied apartment blocks or row housing that house several families. Low income housing is usually in slums and poorly serviced neighborhoods built on scrap corrugated iron sheets or mud and wattle.

Other typologies consist of semi-permanent houses with mud and wattle walls, iron-sheet or thatched roofs and earthen or cemented floors. These are mostly found in areas under freehold tenure, (Homa Bay Municipality , 2019).

4. Housing Densities.

With population densities of 1941 persons per Km^2 according to the *Population Census Report*, 2009, and with average household sizes of five people, there was an average housing density of 388 houses per Km^2. Based on the 2009 census projection, a housing density of approximately 491 houses per Km^2 means that the housing demand will soon take much of the municipality's land, (Homa Bay Municipality , 2019).

5. Level of Services and Facilities.

Most housing estates especially in low-income residential estates have inadequate service provision like sewers, water, access roads, and street-lights among others, (Homa Bay Municipality , 2019).

CHAPTER FOUR: CONSULTATION AND PUBLIC PARTICIPATION, (CPP).

4.1. General Overview.

Consultation and public participation is an important component of the ESIA study. It is the public that experiences effect or impacts in any project and hence their views are equally as important as those of any other persons. In this project, the Interested and Affected Parties (IAP) constituted mainly the neighbours to the proposed project site as well as the relevant lead agencies.

4.2. Purpose of the CPP Process.

The purpose of the CPP was to first inform the public on the details of the proposed project, to gather information on their views of the proposed project in terms of likely impacts and mitigation measures, It is important incorporate to initiate conversation with all the Interested and Affected Parties (IAP) and to ensure that the data collected is analysed and the outcome is incorporated in the ESIA study report and to ensure that the potential negative impacts from their interactions are adequately mitigated.

4.3. Methodology used in CPP Process.

The ESIA project team used open ended questionnaires, feedback forms alongside public meetings methods to engage the stakeholders. There after the information obtained from the various CPP engagement tools was analysis and result incorporated in the ESIA study report to where feasible and applicable, inform the proposed project planning, implementation and operations.

4.4. Results of CPP Process.

The results obtained from the exercise through administration of questionnaires are presented below.

4.4.1. Questionnaire Feedback Analysis.

The random approach used to inform the stakeholders / public consultation included administration of questionnaires out of which 62 (100%) responses were gotten out of all the potential respondents initially approached. The responses were from neighbours,

business owners (SMMEs), Non-Governmental Organizations (NGOs) / Community Based Organizations (CBOs) / Faith Based Organizations (FBOs). Though not designed to be a statistically representative survey, standard rapid appraisal technique to capture individuals' as well as entities' perceptions of what the general community attitudes are concerning the issues probed by use of a structured questionnaires. It is this probing of collective attitudes, which, in the opinion of the EIA team, give reliability to the results as analyzed in the tables 10, 11 and 12 below.

Table 10: Stakeholders approval of the project.

		Frequency.	Percentage.	Valid Percent.	Cumulative Percentage.
Valid	No Objection	51	82.26	83.61	83.61
	Objection	10	16.13	16.39	100
Invalid	No Response	1	1.61	-	
	Total	**62**	**100**	**100**	**-**

Table 11: Fears or reservations / project negatives.

		Frequency.	Percentage.	Valid percentage.	Cumulative Percentage.
Valid 100%	None	9	13.43	13.43	13.43
	Water pollution	2	2.99	2.99	16.42
	Strain on the existing infrastructure and amenities by increased population	10	14.93	14.93	31.35
	Solid waste generation	16	23.88	23.88	55.23
	Increased population	4	5.97	5.97	61.2
	Insecurity	5	7.46	7.46	68.66
	Noise pollution	10	14.93	14.93	83.59
	Air pollution	3	4.48	4.48	88.07
	Unfair and opaque allocation of houses	5	7.46	7.46	95.53
	Construction phase accidents / incidents	1	1.49	1.49	97.02
	Potential for spread of diseases STI/STDs and waterborne	1	1.49	1.49	98.51
	Political interference with the project.	1	1.49	1.49	100
Missing		0	0	0	100
Total (No. Responses)		**67**	**100**	**100**	**100**

Table 12: Expected benefits / project positives.

	BENEFITS OF THE PROJECT.	NUMBER OF PERSONS.	PERCENTAGE OF TOTAL.
1.	Job / employment opportunities	31	26.05
2.	Increase availability of affordable houses	23	19.33
3.	Economic growth	11	9.24
4.	Enhance the area outlook / Improved aesthetics of the town.	10	8.40
5.	Improve living standards	8	6.72
6.	Promote business in the area.	6	5.04
7.	Improve infrastructure and utility services	5	4.20
8.	Generation / Increased of income	4	3.36
9.	Increased / Improved social amenities	4	3.36
10.	Increased tourism	4	3.36
11.	Expansion of Homa Bay town	3	2.52
12.	Will enhance diversity	2	1.68
13.	Will help in decongestion	2	1.68
14.	Increased security	2	1.68
15.	Capacity building for the artisans	1	0.84
16.	Reduce house rents.	1	0.84
17.	Optimal utilization of the land	1	0.84
18.	No Response	1	0.84
	Totals	**119**	**99.98**

The outcome of the consultative process was that 83.61 % of respondents showed no objection to the proposed project (table 10 above). The top three negative environmental impacts envisage from the proposed project by the respondents were increased waste generation (25%), Strain on the existing infrastructure and amenities by increased population (14.93%) and Noise pollution (14.93%) (Construction and decommissioning phases). The full extent of the response analysis is in table 11 above

26.05%, 19.33% and 9.24 % of the respondents felt that the project will be beneficial through jobs creation, increase in availability of housing units and economic growth respectively, these being the top three project benefits from the analysis of the responses. The full extent of the response analysis is in table 12 above.

The respondents proposed the following mitigation measures;

1. The houses should be allocated to low income earners;
2. More studies be done to reduce any negative impacts;
3. The sewerage plant should be relocated to another site;
4. Build additional / expansion of public amenities including schools, health facilities, roads;
5. Adequate consultation and public participation;
6. Early commencement of the project;
7. The contractor to adhere to proper health and safety measures;
8. Education and awareness on STIS/STDs - HIV and Aids;
9. Enlarge / expand the existing waste disposal sites;
10. Involve the common mwanainchi in both planning and management;
11. Appropriate mechanism put in place to deal with solid waste management;
12. Enhance the security;
13. The work should be done during the day;
14. Put in mechanism to curb noise from machinery;
15. The contractor should involve local small skill traders and labourers;
16. Fencing of the construction site;
17. Provision of first aid kits on the construction site;
18. Proper waste management in reference to NEMA guidelines
19. Tree planting to replace cleared vegetation

20. Use of proper equipment / materials to prevent / control noise pollution
21. Use sand harvested in adherence to sand harvesting guidelines
22. Installation of security light to enhance security
23. Construct wall for security purposes;
24. Improve the drainage / runoff system
25. Relocate the sewer plant form the current location

The copies of questionnaires with responses from the respondents are appended in this report. See Appendices VII.

4.4.2. Feedback, Comments and Views from Lead Agencies.

The relevant lead agencies were consulted during the Consultation and Public Participation exercise. Feedback forms were used to collect their views and recommendations on the proposed project. A summary of their views and recommendations is in table 13 below.

Table 13: Summary of Response from Lead Agencies Consulted.

	LEAD AGENCY.	PERSON CONSULTED / DESIGNATION.	COMMENTS.
1.	Homa Bay County Assembly	Apopo Adoto Lentana – Member of County Assembly (MCA) Kanyadoto ward.	• Consider alternative site because the current site is so into CBD.
2.	Homa Bay Municipality	Thomas Odip Owino	• The municipality support the project
3.	National Construction Authority Homa Bay County	Robert Macharia – Liaison Officer.	• Project registration shall be assisted by the office • Accreditation of skilled workers shall be assisted by the office
4.	Water, sanitation and Environment	Martin Omulama Mbati - Director	• Support the project.
5.	County Government of Homa Bay	Tom Nyonje - Governors Service Delivery Unit (GSDU)	• Fully support the affordable housing project • Need to extend the exercise to other municipality within Homa Bay County.
6.	Disaster Management and Special Projects	Eliud Onyango - Director	• Need for environmental Social Safeguards compliance. Compliance Social Environmental Action Plan (SEAP) • Inclusion of the deep ecologist. • Social Risk Management Committee (SRU)
7.	DOSHS - Labour department	Mercy Adema	• The project needs to be registered as a work place according to section 44 of occupational Health and safety Act. • There should be safety supervisor appointed in line with Building Operations and Works of Engineering Construction (BOWEC). • Risk Assessment need to be done to identify the hazards in line with section 6: 3 • The contractor must have an insurance cover so that they can have their documents processed by a DOSHS officer in case of an injury in order to receive compensation. • PPEs to be provided to the workers.

	LEAD AGENCY.	PERSON CONSULTED / DESIGNATION.	COMMENTS.
8.	Homa Bay County Assembly	Samuel Okuta Lieta – MCA West Karachuonyo Ward/ Chairman Lands, Physical Planning, Housing & Urban Development	• Consider relocation of the sewerage plant • Reassess water reticulation by HOMAWASCO • NEMA and Public Health to act on assessment needed to implement the affordable housing program • Lands ministry to fast track land banking for Nyalkinyi area • Land ministry to complete spatial plans • Plan for relocation of dump site and cemetery • Contractor to commit to absorb local labour across the county. • Raw materials be locally sourced (sand, stones)
9.	Homa Bay Town Constituency	Maurice Kaundo – Personal Assistant (PA^2) (Hon George Peter Opondo Kaluma).	• Check on the cost of the houses.
10.	Department of Health Services.	Jackline Adhiambo.	• Concerns on the waste affluent from the premise that would eventually truncate to the health conditions of the environs and the water in the surroundings.
11.	OOP – Interior	Maureen Wamalwa – Assistant County Commissioner	• Need detailed planning as far as water sewerage and waste management (Clarity need).
12.	Homa Bay Town Sub-County Administration office	Ragut Emmanuel - Sub County Administration Officer	• The HOMAWASCO & Municipality team in liaison NHC to collaborate and share data so that an actionable report on the environment impact can be availed prior to commencement of the project.
13.	Homa Bay County Assembly	Evelyne Atieno Owuor – Senior Clerk Assistant.	• In construction of affordable housing, the land in Homa Bay should be thoroughly investigated to ascertain how high the building can be done; this will arrest fears of building collapsing or sinking.

	LEAD AGENCY.	PERSON CONSULTED / DESIGNATION.	COMMENTS.
14.	Homa Bay County Assembly	MonoFlorita Ondiek – MCA Homa Bay Central / Deputy Majority leader	• Very necessarily that the government land is known in the designated municipalities before the project start. • Proper town planning.

Feedback form with feedback information from the various lead agencies are attached in appendix VIII.

4.4.3. Public Meetings.

Three public meetings were held with different segments of stakeholders in conformity with the requirement of EIA Regulations, 2003. The specific regulation 17 (2) (B) requirement to hold at least three public meetings with the affected parties and communities to explain the project and its effects, and to receive their oral or written comments. The meetings were facilitated by the Count Government of Homa Bay and were held with different segments of stakeholders as tabulated in table 14 below.

Table 14: Stakeholders engagement segments

	Stakeholder Segment.	**Date.**	**Time.**	**Venue.**
1.	With the relevant competent County Government of Homa Bay departmental representatives and the national government administration agencies county representatives	16th November 2022.	10:00AM	NEMA Homa Bay County Office.
2.	With the traders / artisans / jua kali / Small and Medium Enterprises (SMEs)	17th November 2022.	10:00AM	Proposed Project Site.
3.	With the general public/ baraza	18th November 2022.	10:00AM	Proposed Project Site.

The appropriate notices, invitations, meeting details, times and venues have been issued /communicated as required. The meetings were coordinated by the County Social & Environment departments and ministry of interior coordination administrators. See figure 15 below.

Figure 15: Notices for public meetings.

Below (figures 16, and 17) are some pictorial evidences of the public meetings.

Figure 16: Second public meeting with the general public.

Figure 17: Third public meeting with the business community / traders / SMSEs.

4.4.3.1. Issues Raised by the Different Segments of Stakeholders during the Public Meetings.

Tables 15, 16 and 17 below give a summary of issues and responses from the three consultation and public participation meetings.

Table 15: Summary of issues and responses from the public meetings with the lead agencies stakeholder segment.

LEAD AGENCIES.		
	ISSUES / COMMENTS.	**RESPONSES / MITIGATION MEASURES.**
1.	A comment by MCA the Chairman Lands, Physical Planning, Housing & Urban Development at the county assembly on the need to decongest the town, by pushing housing development outside of the town, and on the need to protect the welfare of the workers by adhering to Occupational safety and Health legal requirements.	• The current site is one of the many that the county is allocating for AHP. • The CGHB is in the process of doing land banking and land use zoning so as to allocate the county land for the various appropriate land uses. •The AHP will be undertaken in future in other urban center of the County.
2.	Advisory by NEMA County Director of Environment (CDE) that the project should not commence prior to issuance of The EIA License by NEMA, that since the project is full study it will have to be published in line with the legal provision for EIA process.	
3.	Concern the proposed site will not allow the expansion of the main highway should there be such requirement, hence an alternative site should be sought for the proposed project further the potential for effluent waste from the development to cause water pollution to the Lake Victoria which is within the vicinity.	• It was refuted by the HOMAWSCO officer that the discoloration and odor from the lake is not as result from Their treatment works, that the treatment was functioning properly and has adequate capacity to handle increased effluent form the development, That the said pollution was as a result of siltation from the lake catchment It was report by the officer that plans were underway to establish treatment work on a better location to cater for future expansion and more it away from the Lake shore.

LEAD AGENCIES.		
	ISSUES / COMMENTS.	**RESPONSES / MITIGATION MEASURES.**
		• It was reported by the HOMAWASCO officer that there was adequate capacity to handle increased water demand from the development that the current portable water treatment capacity was 8000 cubic meters per day against a demand of 3000 cubic meters
4.	Are there any plans to relocate the sewerage treatment plant form the current location (Next to Lake Victoria Shoreline)?	• It was reported by the HOMAWASCO officer that plans were underway to establish treatment work on a better location to cater for future expansion and more it away from the Lake shore the potential location being in Nyalkinyi area he gave a probable time frame of 5 years. This was also informed by cyclic incidences of rising level of the lake. • A call was made to Public health department to provide expert advisory on ways to improve treatment services for both portable water and sewerage.
5.	The representative from the office of the governor welcomed the project and recommended that the AHP should be extended to other sub counties within Homa Bay so that all county residents can enjoy the benefits.	
6.	The NCA representative informed the participants that in line with the AHP guideline and framework, the Authority will accredit the workers involved with various technical tasks of the project construction, That NCA will be undertaking continuous Monitoring and Evaluation to ensure compliance.	
7.	An advisory by NEMA Environment officer to relocate refuse chamber from the main entrance to a more appropriate location within the development.	

LEAD AGENCIES.		
	ISSUES / COMMENTS.	**RESPONSES / MITIGATION MEASURES.**
8.	MCA Homa Bay Central said that the project was timely given the housing challenge in the town She Advised that the youth should be considered in the project for employment and arising business opportunity.	
9.	The Personal Assistant (PA^2) to the area Member of Parliament (MP) give assurance that the proposed project had the political support from the MPs' office and advised that based on the economic status of the local the unit should be truly affordable.	NHC Environmental officer highlighted that the affordable housing framework guideline make provision for social housing, that for the future project inconsideration of the lowest income section of the resident the CGHB in partnership with the National Government or through Public–Private Partnership (PPPs) could consider development of social housing.
10.	The Social office representative inquired if the project has plans for conducting awareness creation on HIV/AIDS and Mitigating the Gender Based Violence (should incidences arise)	The awareness creation is requirement to be undertaken the proposed project contractor this is included in the tender and award document.
11.	Why the proposed project does not include 3 bedroom units	A needs assessment was conducted that informed the decision to develop 2 bedroom, 1 bedroom and studio apartments
12.	NHC Environmental officer clarified that in order to be able to benefit from AHP projects it is a requirement to be a Kenyan Citizen register with Bomayangu portal. An advisory was given to publicize and create awareness for the county resident to register.	

Table 16: Summary of issues and responses from the public meetings with the general public stakeholder segment.

	GENERAL PUBLIC.	
	ISSUES / COMMENTS.	**RESPONSES / MITIGATION MEASURES.**
1.	How to deal with the black cotton soil which tends to cause cracks on the houses.	The proposed project construction work will be supervised by NHC competent project team of professional who have put in place mechanism to ensure that issue is addressed.
2.	When does the registration process for Boma yangu portal begin?	The process is ongoing and continuous.
3.	If the can be bought in any location / site in Kenya.	There are guidelines on processes registration and allocation of houses under AHP bases of qualification criteria which also considers the applicant location and typology preference.
4.	If the AHP houses are bought on cash or installment basis.	•There is a personal choice for cash payment but also Provision for tenant purchase or mortgage model depending on the income classification of the AHP applicant. • An applicant needs to have paid 12.5% deposit of the total sum of the cost of the housing typology preferred •The Tenant purchase model of payment is for 18 years.
5.	How will the artisans participating in the programme be selected?	• The artisan will be sourced locally for unskilled labor only in the event of unavailable skilled labor will be sourced externally.
6.	Will there be designated place for waste material?	• The county government is responsible of locating /siting a disposal site which should then be designated by NEMA. •Most county government allocate disused quarries specifically for excavated soils. • If the there is no NEMA designated dump site the contractor will be required to procure services of a NEMA registered and licensed Handler.

Table 17: Summary of issues and responses from the public meetings with the business community/trader/SMSEs stakeholder segment

BUSINESS COMMUNITY / SMSE.		
	ISSUES / COMMENTS.	**RESPONSES / MITIGATION MEASURES.**
1.	The public emphasized on the need to ensure that local artisan were engaged during the construction of the project.	
2.	The participants were informed that there will be an project implementation committee constituted from the project partners in addition the project will be implemented by a contractor under supervision of NHC technical team	
3.	The public was further informed there are further plans to develop more AHP project both in Homa Bay Municipality and other urban centers within the County	
4.	The general public expressed the desire to meet the County Executive Committee Member (CECM) for land and housing department and the governor to explore ways of deeper involvement in project implementation.	Follow up on their request would be made

Minutes of the three meetings are attached in appendix XIV

CHAPTER FIVE: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK.

5.1. General Overview.

Through recognizing the importance of environmental conservation in all development endeavours, the Kenya government put in place a wide range of policy, institutional and legislative frameworks to guide developments in Kenya in the process of minimizing environmental degradation. This chapter gives an overview the policy, legal and institutional frameworks on health, safety, environmental aspects related to the proposed development.

5.2. Policies.

5.2.1. Homa Bay County Policies.

Table 18 below gives a summary of the project relevant county policies.

Table 18: Homa Bay county policies.

	Policy Framework.	**Summary of Provision.**
1.	Homa Bay County Integrated Development Plan (CIDP) 2018- 2022	Homa Bay County Integrated Development Plan is the County's development blueprint that outlines the programmes and projects which Homa Bay County intends to implement during the five-year period starting 2018 to 2022. The CGHB has made the following provision in the CIDP: •Adequate, affordable and quality houses and buildings for county residents by reducing mortgage and construction costs •To promote, conserve and protect environment and improve access to safe water for domestic, industrial and irrigation purposes for sustainable county development". •Environment and climate change; Implementation of community resilience to climate change project, Integrated solid waste management, County environmental monitoring and management, (Homa Bay County Government, 2018).
2.	Homa Bay County County Annual Development Plan 2022/2023.	The County Annual Development Plan (2022/23) implements the final year of the County Integrated Development Plan 2018-2022 (CIDP). It presents the strategic priorities that reflect the county government's priorities and plans; county programmes and projects to be delivered; The CGHB has made the following provision in the ADP in: •The priority for the sub-sector includes ensuring efficient and effective administration and management of land resources, developing and maintaining cost effective government buildings, facilitating development of quality and affordable housing, promoting sustainable urbanization, establishing and supporting urban institutions, improving the livelihoods of people living and working in informal settlements and, enhancing Infrastructure connectivity and accessibility within urban areas, (Homa Bay County Government, 2022)

	Policy Framework.	**Summary of Provision.**
3.	Homa Bay Municipality Integrated Urban Development Plan 2019-2024	Homa-Bay Municipal Urban Integrated Development Plan is a five-year development plan that outlines the background of the Municipality; its broad goals, objectives and strategies including programmes and projects that will be carried out by the Board within the next five years. It further outlines the strategic framework of the Municipality and how performance shall be planned and assessed. This make provision for the following: •Housing development and control for Construction of new low cost housing units to provide Adequate affordable housing for Municipality residents. •Environment management services; Urban Beatification, acquisition / rehabilitation of dump sites, Adequate provision /fixed litter bins installed in public facilities, (Homa Bay Municipality, 2019).
4.	Homa Bay County Climate Change Policy, 2021.	This Policy is developed to facilitate a coordinated, coherent and effective response by the County Government to local and National climate change actions. This policy is intended to ensure the mainstreaming of climate change mitigation and adaptation into development planning, budgeting and implementation in all sectors and levels of the county government in order to enhance the resilience of communities and natural systems, and thus ensure sustainable development. The goal of this policy frame work is to achieve an industrialized, healthy and wealthy county with adaptive and resilient communities, through sustainable development based on low carbon blue and green economy. It make specific provisions for: •To mainstream climate change adaptation and mitigation in all county government policies, plans and programs for sustainable developments, (Homa Bay County Government, 2021).
5.	Homa Bay Municipality Solid Waste Management Policy, 2019.	The policy addresses the Municipality's solid waste management needs and illustrates the methods by which the municipality will handle all types of wastes generated within its area of jurisdiction. The policy will focus on enhancing solid waste collection and disposal and waste reduction, (Homa Bay Municipality, 2019).

5.2.2. National Policies.

Table 19 below gives a summary of the project relevant National policies.

Table 19: Kenya National policies.

	Policy Framework.	**Sections.**	**Summary of Provision.**
1.	Environmental Impact Assessment Guidelines and Administrative Procedures		It provides procedural guidelines for implementation of Environmental Impact Assessment (EIA), Monitoring and Environmental Audit (EA) and Strategic Environmental Assessment (SEA) and issues of Trans-boundary, Regional and International Conventions, Treaties and Agreements. It describes procedural steps in EIA studies and Environmental Audits as well as the contents and format of the study reports to be submitted to NEMA. (NEMA, 2002)
2.	National Environmental Action Plan (NEAP).	Section 2.3.1.	The lack of an Environmental Impact Assessment (EIA) on development projects has led to degradation of natural resources and poverty. It is therefore recommended to: - •Involve local communities in resource management and incorporate indigenous management whenever appropriate. •Integrate conservation in development planning. •Plan for long-term as well as short term consideration on environmental impacts, (GoK, 1994).
3.	National Housing Policy, 2004.	Section 66	The policy aims at: 1. Enabling the poor to access housing and basic services and infrastructure necessary for a healthy living environment especially in urban areas. 2. Encouraging integrated, participatory approaches to slum upgrading, including income-generating activities that effectively combat poverty. Promoting and funding of research on the development of low cost building materials and construction techniques Harmonising existing laws governing urban development and electric power to facilitate more cost effective housing development Facilitating increased investment by the formal and informal private sector, in the production of housing for low and middle-income urban dwellers.

	Policy Framework.	**Sections.**	**Summary of Provision.**
			3. Creating a Housing Development Fund to be financed through budgetary allocations and financial support from development partners and other sources, (GoK, 2004).
4.	National Climate Change Response Strategy, (NCCRS), 2010.	Section 4.2.	NCCRS has outlined the evidence of climate change in terms of temperature and rainfall variation in Kenya, climate change impacts on the country and recommended actions that the country needs to take to reduce these impacts as well as take advantage of the beneficial effects of climate change. These actions range from adaptation and mitigation measures in key sectors, to necessary policy, legislative and institutional adjustments, to ways of enhancing climate change awareness, education and communication in the country, to necessary capacity building requirements, and to ways of enhancing research and development as well as technology development and transfer in areas that respond to climate change, among many others, (Government of Kenya, 2010).
5.	Policy Paper on Environment and Development (Sessional Paper No. 6 of. 1999).		The goal of the Policy paper is: - •To incorporate environmental management and economic development as integral aspects of the process of sustainable development. •To promote maintenance of a quality environment that permits a life of dignity and wellbeing for all. •To encourage sustainable use of resources and ecosystems for the benefit of the present generations, while ensuring their potential to meet the needs of future generations. •To promote maintenance of ecosystems and ecological processes essential for the functioning of the biosphere. •To promote the preservation of genetic resources, biological diversity, their cultural values and their natural heritage. •To incorporate indigenous knowledge, skills, and interests for effective participation of local communities in environmental management and sustainable development (GoK, 1999).

	Policy Framework.	**Sections.**	**Summary of Provision.**
6.	Sustainable Development Goals, (SDGs).	SDG No 11.	The goal on Sustainable Cities and Communities aims to make cities and human settlements inclusive, safe, resilient and sustainable. The goal states that to make cities sustainable for all, it is important to create good, affordable public housing and upgrade slum settlements, (UNDP, 2015).
7.	Kenya Vision 2030.	Section 4.5.	Water and Sanitation: - The Vision for the water and sanitation sector is to ensure water and improved sanitation availability and access to all by 2030. Effective management of water resources will be achieved through: enforcing regulations by the Water Resources Authority (WRA); encouraging formation of water resource users' associations by communities to assist in self-regulation; and promoting fair allocation of water among users for sustainability, (GoK, 2007).
		Section 4.6.	Environmental Management: The vision for the environmental sector is "a nation living in a clean, secure and sustainable environment. Kenya will progressively apply measures to guard against the adverse effects of increased pollution and waste experienced elsewhere aim to integrate planning approaches and improve overall governance of the environment, (GoK, 2007).
		Section 4.8.	Housing and Urbanization: it aims to provide the country's population with adequate and decent housing in a sustainable environment. Housing construction is a labor-intensive activity that will create jobs for youth and the unemployed. Construction also has strong linkages with other sectors of the economy. Proper planning and effective management of and increased investment in our urban areas are critical for the realization of this objective, (GoK, 2007).
8.	The Kenya Affordable Housing Programme Development Framework Guidelines, 2018.		The purpose of these Development Framework Guidelines (DFGs) is to provide qualitative guidance on the key components of the Affordable Housing Programme. These guidelines provide instruction on how the vision and policies of the GoK, through the SDHUD, will be implemented and how progress will be monitored and reviewed. The aim of the guidelines is to set out the following: •The rationale, priority needs, and trade-offs to achieve consistency between the assessment, policy formulation, and delivery of affordable housing, (SDHUD, 2018).

	Policy Framework.	**Sections.**	**Summary of Provision.**
			•The affordable housing delivery mechanisms and the means to ensure their financial viability, including the different sources of subsidy. •Consistent information for key stakeholders on the process of the development and delivery of affordable housing. The framework guideline establishes some basic tenets which are set out below regarding the development and the delivery of the Affordable Housing Programme; Preferred Project Structure, Project Delivery Process, Project Development, Procurement, Implementation, Funding Model, This framework addresses: •Key priority areas; Annual low income housing gap, Jobs created, Contribution to GDP. •House models, construction costs, and selling prices. •Accessibility to all Kenyans from social perspective •Key design principles; Open Space, Access & Movement, Smart Technology, Safety & Security, Creating Communities, Building Technology. •Development split and development returns. •Typical land breakdown Utilities, Roads, and Services25% / Open Space 15% / Community Facilities with Retail 10% / Residential 50%. •Project locations and criteria •Rural housing •Slum upgrading and social housing •Financing Framework •Legal Framework Environment And Social Safeguards, (SDHUD, 2018).

5.3. Legal Framework.

5.3.1. Homa Bay County Legal Framework.

Table 20 below gives a summary of the project relevant County legal Framework.

Table 20: Homa Bay county legal framework.

	Legal Framework	**Sections.**	**Summary of Provision.**
1.	Homa Bay County Climate Change Act 2022	PART V Climate Change audits and penalties. Article 35	(1) The Steering Committee may, on the recommendation of the Executive Committee Member designate and in consultation with relevant Executive Committee Members may conduct a climate change audit on the activities and operation of any private or public entity operating within the County.
		PART V Mainstreaming Climate change actions in public entities Article 36	Without prejudice to the provisions of subsection (1), every public entity operating in the County shall have the duty to: (a) mainstream climate change into the County Integrated development plan, County annual development plan, County fiscal policies, County annual budget and other frameworks for implementing its statutory functions; (b) perform its statutory functions in line with County Climate Change Action Plan; (c) Prepare and submit annual report at end every financial year to the Steering Committee on the status and progress of performance and implementation of all assigned climate change duties and functions.

5.3.2. Kenya National Legal Frameworks.

Table 21 below gives a summary of the project relevant Kenya National legal Framework.

Table 21: Kenya National Legal Framework.

	Legal Framework	**Sections.**	**Summary of Provision.**
1.	The Constitution.	Article 42	Every person has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69 , (GoK, 2010)
		Article 69	The State shall: - •Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits. •Encourage public participation in the management, protection and conservation of the environment. •Establish systems of environmental impact assessment, environmental audit and monitoring of the environment. •Eliminate processes and activities that are likely to endanger the Environment, (GoK, 2010).
2.	The Environmental Management and Coordination Act, (1999)	Section 58	States- any person, being a proponent of a project, shall, before financing, commencing, proceeding with, carried 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, (GOK, 1999).

	Legal Framework	**Sections.**	**Summary of Provision.**
3.	The Environmental Management and Co-ordination (Amendment) Act, 2015.	Section 43	Amendment of sections 58 (2) to: The proponent of any project specified in the Second Schedule shall undertake a full environmental impact assessment study and submit an environmental impact assessment study report to the Authority prior to being issued with any licence by the Authority: Provided that the Authority may direct that the proponent forego the submission of the environmental impact assessment study report in certain cases, (Government of Kenya, 2015).
		Section 44	Amendment of sections 59 to: Upon receipt of an environmental impact assessment study report from any proponent under section 58(2), the Authority shall cause to be published in the Gazette, in at least two newspapers circulating in the area or proposed area of the project and over the radio": (Government of Kenya, 2015).
4.	The Environment (Impact Assessment and Audit) Regulations, 2003.	Regulation 7.	A proponent shall prepare a project report stating - •The nature of the project; •The location of the project including the physical area that may be affected by the project's activities; •The activities that shall be undertaken during the project construction, operation and decommissioning phases; •The design of the project; •The materials to be used, products and by-products, including waste to be generated by the project and the methods of their disposal; •The potential environmental impacts of the project and the mitigation measures to be taken during and after implementation of the project; •An action plan for the prevention and management of possible accidents during the project cycle; •A plan to ensure the health and safety of the workers and neighboring communities; •The economic and socio-cultural impacts to the local community and the nation in general;

	Legal Framework	**Sections.**	**Summary of Provision.**
			•The project budget, (GOK, 2003).
5.	Environmental Management and Co-Ordination (Waste Management) Regulations, 2006.	Regulation 4 (2)	States that:- Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed off such waste in the manner provided for under these Regulations, (GOK, 2006).
		Regulation 5	States:- Any person whose activities generate waste, shall segregate such waste by separating hazardous waste from non-hazardous waste and shall dispose of such wastes in such facility as is provided for by the relevant Local Authority, (GOK, 2006).
		Regulation 23	No person shall engage in any activity likely to generate any hazardous waste without a valid Environmental Impact Assessment license issued by Authority under the provisions of the Act, (GOK, 2006).
6.	Environmental Management and Coordination (Water Quality) Regulations, 2006.	Regulation 4	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, (GOK, 2006)
		Regulation 14	Every person who generates and discharges effluent into the environment under a license issued under the Act shall carry out effluent discharge quality and quantity monitoring in accordance with methods and procedures of sampling and analysis prescribed by the Authority, and shall submit quarterly records of such monitoring to the Authority or its designated representative, (GOK, 2006)
7.	Environmental Management and Coordination (Noise and Excessive Vibrations Pollution Control) Regulations, 2009.	Regulation 4 (1) (a)	Except as otherwise provided in these Regulations, no person shall make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment, (GOK, 2009)
		Regulation 14 (1).	Where defined work of construction, demolition, mining or quarrying is to be carried out in an area, the Authority may impose requirements on how the work is to be carried out including but not limited to requirements regarding machinery that may be used, and the permitted levels of noise as stipulated in the Second and Third Schedules to these regulations, (GOK, 2009).

	Legal Framework	**Sections.**	**Summary of Provision.**
		Regulation 14(3).	Any person carrying out construction, demolition, mining or quarrying work shall ensure that the vibration levels do not exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source, (GOK, 2009).
		Regulation 15	Any person intending to carry out construction, demolition, mining or quarrying work shall, during the Environmental Impact Assessment studies- •Identify natural resources, land uses or activities which may be affected by noise or excessive vibrations from the construction, demolition, mining or quarrying; •Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction, demolition, mining or quarrying noise or vibration impacts; and •Incorporate the needed abatement measures in the plans and specifications, (GOK, 2009).
8.	Housing Act		This is an Act of Parliament to provide for loans and grants of public moneys for the construction of dwellings; to establish a housing fund and a housing board for these purposes; and for connected purposes. Section 3 establishes the National Housing Corporation whose mandate is to implement Government's Housing Policies and Programmes, (GoK, 1953).
9.	Environmental Management and Coordination (Air Quality) Regulations, 2014.	Regulation 5	No person shall act in a way that directly or indirectly causes, or is likely to cause immediate or subsequent air pollution; or emit any liquid, solid or gaseous substance or deposit any such substance in levels exceeding those set out in the First Schedule, (GOK, 2014).
		Regulation 31	The Authority, in consultation with the relevant lead agencies may- •Prescribe exposure limits of air pollutants and emission levels of hazardous substances; •Prohibit the use of substances which pollute the working environment; or •Specify particular measures of prevention of pollution or protection of workers, (GOK, 2014).

	Legal Framework	**Sections.**	**Summary of Provision.**
		Regulation 33	No person operating construction equipment or handling construction material shall allow emission of particulate matter so as to adversely affect the limits set out in the First schedule, (GOK, 2014).
10.	The Occupational Health and Safety Act (OSHA), 2007.	Section 6	On duties of the occupier, states that Every occupier shall ensure the safety, health and welfare at work of all persons working in his workplace. The duties include: - •the provision and maintenance of plant and systems and procedures of work that are safe and without risks to health; •Arrangements for ensuring safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances; •The provision of such information, instruction, training and supervision as is necessary to ensure the safety and health at work of every person employed; •The maintenance of any workplace under the occupier's control, in a condition that is safe and without risks to health and the provision and maintenance of means of access to and egress from it that are safe and without such risks to health; •The provision and maintenance of a working environment for every person employed that is, safe, without risks to health, and adequate as regards facilities and arrangements for the employees welfare at work, (GOK, 2007).
		Section 13	Every employee shall: - •Ensure his own safety and health and that of other persons who may be affected by his acts or omissions at the workplace; •Co-operate with his employer or any other person in the discharge of any duty or requirement imposed on the employer or that other person by this Act or any regulation made hereunder; •At all times wear or use any protective equipment or clothing provided by the employer for the purpose of preventing risks to his safety and health; •Comply with the safety and health procedures, requirements and instructions given by a person having authority over him for his own or any other person's safety, (GOK, 2007).

	Legal Framework	**Sections.**	**Summary of Provision.**
11.	The Water Act 2016.	Section 143	The Act states that, a person shall not, without authority conferred under this Act: •Wilfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or •Throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource. (GOK, 2016) •The proponent shall ensure that wastes generated is disposed of at designated dump sites, (GoK, 2002).
12.	The Public Health Act (Cap. 242).	Section 126A.	Every municipal council and every urban and area council may, and shall if so required by the Minister for the time being responsible for local government with the agreement of the Minister, make by-laws for all or any of the following matters as regards buildings: - •For controlling the construction of buildings, and the materials to be used in the construction of buildings; •For controlling the space about buildings, the lighting and ventilation of buildings and the dimensions of rooms intended for human habitation; •To compel owners to repair or demolish unsafe dangerous or dilapidated Buildings, (GoK, 2012).
13.	Physical and Land Use Planning Act 2019.	Article 57 (1)	A person shall not carry out development within a county without a development permission granted by the respective county executive committee member, (GOK, 2019).

	Legal Framework	**Sections.**	**Summary of Provision.**
14.	County Government Act, 2012		The main purpose of the enactment of this Act was to give effect to Chapter Eleven of the Constitution; to provide for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Functions which were carried out by local governments were effectively transferred to the county governments. The Act gives county the responsibility of planning and co-coordinating all developments within their areas of jurisdiction, (GOK, 2019).
15.	The Local Government (Adoptive By-Laws) (Building) Order 1968	By Law 3.	A person who erects a building or develops land or changes the use of a building or land, or who owns or occupies a building or land shall comply with the requirements of these By-laws, (GOK, 1968).
		By Law 5.	A person who intends to erect a building or materially change the use of a building or part of a building shall furnish the council in the manner provided in Part A of the First Schedule to these By-laws with such of the particulars as are applicable, (GOK, 1968).
		By Law 236	All parts of a domestic building shall be finished to a habitable standard and the requirements of this bylaw shall be satisfied if – •Walls are properly plastered or finished with other approved material; •Wall where joining the floor are provided with a skirting or finished in an approved manner; •Ceilings or open roofs are properly under-drawn to prevent the access of dust and flies; and •Floors are finished with a hardwearing surface which can be easily cleaned, (GOK, 1968).
		By Law 240.	On demolition states that a person intending to demolish a building or part of a building, shall notify the council in writing of such intention at least three days before the work is commenced, (GOK, 1968).

	Legal Framework	**Sections.**	**Summary of Provision.**
16.	The Penal Code (Cap 63).	Section 175.	On common nuisance:- Any person who does an act not authorized by law or omits to discharge a legal duty and thereby causes any common injury, or danger or annoyance, or obstructs or causes inconvenience to the public in the exercise of common rights, commits the misdemeanour termed a common nuisance and is liable to imprisonment for one year, (GOK, 2012).
		Section 191.	On fouling water:- Any person who voluntarily corrupts or fouls the water of any public spring or reservoir, so as to render it less fit for the purpose for which it is ordinarily used, is guilty of a misdemeanour, (GOK, 2012).
		Section 192.	On fouling air: - 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, (GOK, 2012).
17.	Occupiers Liability Act (Cap 34).	Section 3.	On extent of occupier's ordinary duty states that- An occupier of premises owes the same duty, the common duty of care, to all his visitors, except in so far as he is free to and does extend, restrict, modify or exclude his duty to any visitor or visitors by agreement or otherwise, (GoK, 2007).
		Section 5.	On Landlord's liability in virtue of obligation to repair Where premises are occupied by any person under a tenancy which puts on the landlord an obligation to that person for the maintenance or repair of the premises, the landlord shall owe to all persons who or whose goods may from time to time be lawfully on the premises the same duty, in respect of dangers arising from any default by him in carrying out that obligation, as if he were an occupier of the premises and those persons or their goods were there by his invitation or permission (but without any contract), (GoK, 2007).
18.	The Environment and Land Court Act, 2011.	Section 13	A superior court established to hear and determine disputes relating to the environment and the use and occupation of, and title to, land, and to make provision for its jurisdiction functions and powers, and for connected purposes the Court shall have power to hear and determine disputes: -

	Legal Framework	**Sections.**	**Summary of Provision.**
			•Relating to environmental planning and protection, climate issues, land use planning, title, tenure, boundaries, rates, rents, valuations, mining, minerals and other natural resources; •Relating to compulsory acquisition of land; •Relating to land administration and management; •Relating to public, private and community land and contracts, choses in action or other instruments granting any enforceable interests in land; • Any other dispute relating to environment and land, (GOK, 2011).
19.	Urban and Cities Act No. 13 of 2011.	Section 36	Every city and municipality established under this Act shall operate within the framework of integrated development planning which shall •Give effect to the development of urban areas and cities as required by this Act and any other written law. •Be the basis for the preparation of environmental management plans. •Be the basis of overall delivery of service including provision of water, electricity, health, telecommunications and solid waste management; (GOK, 2011).
20.	Work Injury Benefits Act 2007 (WIBA).	Section 7.	Every employer shall obtain and maintain an insurance policy, with an insurer approved by the Minister in respect of any liability that the employer may incur under this Act to any of his employees, (GOK, 2007).
		Section 10.	•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. •An employer is liable to pay compensation in accordance with the provisions of this Act to an employee injured while at work. •An employee is not entitled to compensation if an accident, not resulting in serious disablement or death, is caused by the deliberate and wilful misconduct of the employee, (GOK, 2007).

	Legal Framework	**Sections.**	**Summary of Provision.**
		Section 21	Notice of accident by employee to employer written or verbal notice of any accident provided for in section 22 which occurs during employment shall be given by or on behalf of the employee concerned to the employer and a copy of the written notice or a notice of the verbal notice shall be sent to the Director within twenty-four hours of its occurrence in the case of a fatal accident, (GOK, 2007).
21.	The National Construction Authority Act (NCA), 2011	Section 5.	•The object for which the Authority is established is to oversee the construction industry and coordinate its development. •Promote and stimulate the development, improvement and expansion of the construction industry; •Provide consultancy and advisory services with respect to the construction industry. •Promote and ensure quality assurance in the construction industry. •Develop and publish a code of conduct for the construction industry; (GoK, 2011).
22.	Climate Change Act, 2016.	PART IV Article 15 Climate change duties of public sector.	This Act is applied for the development, management, implementation and regulation of mechanisms to enhance climate change resilience and low carbon development for the sustainable development of Kenya, (GoK, 2016) (1) The Climate Change Council may, on recommendation of the Cabinet Secretary and in consultation with relevant Cabinet Secretaries and county government, impose duties relating to climate change on any public entity at all levels of government. (2) Any public entity on which a climate change duty has been imposed shall, in exercising functions under this Act or any other law, act in a manner best suited to achieve the successful implementation of this Act and the National Climate Change Action Plan. (5) Each state department and national government public entity shall have the following duties— (a) integrate the climate change action plan into sectoral strategies, action plans and other implementation projections for the assigned legislative and policy functions; (GoK, 2016).

	Legal Framework	**Sections.**	**Summary of Provision.**
23.	National Building Regulations - 2017		The National Building Regulations (NBR) 2015 is a set of rules to be used by professionals in the building industry to guide design, construction and maintenance of buildings in Kenya. These Regulations cover provisions for site planning, building site operations, building design, building and infrastructure services, disaster management, construction and maintenance of all buildings as contained in these regulations, (GOK, 2017).
		A - 5	Development Permissions, (GOK, 2017).
		Section B	Planning, Siting And Space Within And Around Buildings, Special Requirements For People With Disabilities, (GOK, 2017).
		Section D	Demolition Of Buildings, (GOK, 2017).
		Section E	Protection Of Buildings, (GOK, 2017).
		Section F	Structural Design, (GOK, 2017).
		Section G	Building Materials, (GOK, 2017).
		Section H	General Requirements For Floors, (GOK, 2017).
		Section J	General Requirements For Walls, (GOK, 2017).
		Section K	General Requirements For Roofs, (GOK, 2017).
		Section L	Glazing And Cladding, (GOK, 2017).
		Section M	Stairways, Lifts And Escalators, (GOK, 2017).
		Section N	Lighting And Ventilation, (GOK, 2017).
		Section O	Water Services, Drainage, Waste Disposal And Storm Water, (GOK, 2017).
		Section P	Waste Disposal, (GOK, 2017).
		Section Q	Electrical Installations, (GOK, 2017).
		Section R	Refuse Disposal, (GOK, 2017).
		Section S	Fire Safety And Fire Installations, (GOK, 2017).
		Section T	Inspection And Maintenance Of Buildings, (GOK, 2017).
		Section U	Disaster Risks Management (On Construction Sites And The Built Environment), (GOK, 2017).

5.3.3. International Conventions and Treaties.

Table 22 below gives a summary of the project relevant International treaties and conventions to which Kenya is signatory to and which have relevant to the proposed project.

Table 22: International treaties and conventions.

	International Convention	**Description of the Convention.**
1.	United Nations Framework Convention on Climate Change (UNFCCC), 1992.	The Convention sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases, (UN, 1992).
2.	Kyoto Protocol.	The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets. The Protocol is based on the principle of common but differentiated responsibilities: it puts the obligation to reduce current emissions on developed countries on the basis that they are historically responsible for the current levels of greenhouse gases in the atmosphere, (UN, 1998).
3.	Paris Agreement.	The Agreement aims at strengthening the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty. The Paris Agreement builds upon the United Nations Framework Convention on Climate Change and for the first time brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so, (UN, 2015)
4.	Convention on Biological diversity. (CBD^2)	The objectives of this Convention, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding, (UN, 1992).

	International Convention	**Description of the Convention.**
5.	Africa Convention on the Conservation of Nature and Natural Resource.	The objectives of the convention are: To enhance environmental protection; to foster the conservation and sustainable use of natural resources; and to harmonize and coordinate policies in these fields with a view to achieving ecologically rational, economically sound and socially acceptable development policies and programmes, (African Union, 1968).
6.	Safety Provisions (Building) Convention, 1937	The Convention applies to all work done on the site in connection with the construction, repair, alteration, maintenance and demolition of all types of buildings. According to Part IV on general rules as to safety equipment and first aid, • All necessary personal safety equipment shall be kept available for the use of the persons employed on the site and be maintained in a condition suitable for immediate use. • The workers shall be required to use the equipment thus provided and the employer shall take adequate steps to ensure proper use of the equipment by those concerned. • Adequate provision shall be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work, (International Labor Organization, 1937),
7.	Safety and Health in Construction Convention, 1988	This Convention applies to all construction activities, namely building, civil engineering, and erection and dismantling work, including any process, operation or transport on a construction site, from the preparation of the site to the completion of the project. (ILO, 1988)

5.4. The National Administrative Framework under EMCA, 1999.

5.4.1. The National Environment Management Authority, (NEMA).

NEMA was established under EMCA 1999 to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment.

5.4.2. County Environmental Committees, (CECs).

The committees are responsible for the proper management of the environment within the county for which it is appointed and develop a county strategic environmental action plan every five years.

5.4.3. National Environmental Complaint Committee (NECC).

NECC is established under section 31 of the Environmental Management and Coordination Act, 1999.

The functions of the National Environmental Complaints Committee area to;

1. To investigate any allegations or complaints against any person or against the Authority in relation to the condition of the environment in Kenya;

2. To investigate on its own motion, any suspected case of environmental degradation,

3. To prepare and submit to the Cabinet Secretary, periodic reports of its activities which report shall form part of the annual report on the state of the environment,

4. Undertake public interest litigation on behalf of the citizens in environmental matters;

5. To perform such other functions and exercise such powers as may be assigned to it by the Cabinet Secretary.

The National Environmental Complaints Committee has the authority may, by notice in writing, require any person to—

1. Give to the National Environmental Complaints Committee all reasonable assistance in connection with the investigation of any complaint or

2. Appear before the National Environmental Complaints Committee for examination concerning matters relevant to the investigation of any complaint

5.4.4. The National Environmental Tribunal, (NET).

NET was established under article 125 of Environmental Management and Coordination Act 1999. Its key mandate is to hear and resolve issues arising from environmental concerns raised.

Section 126 (2), The Tribunal shall, upon an appeal made to it in writing by any party or a referral made to it by the Authority on any matter relating to this Act, inquire into the matter and make an award, give directions, make orders or make decisions thereon, and every award, direction, order or decision made shall be notified by the Tribunal to the parties concerned, the Authority or any relevant committee thereof, as the case may be.

5.5. Regulatory Agencies and Jurisdiction Relevant to the project.

Table 23 below gives a summary of the various agencies which are relevant to the proposed project and their jurisdiction.

Table 23: Regulatory Agencies Relevant to the Proposed Project and Their Jurisdiction.

	REGULATORY AGENCY	REQUIREMENT	PROJECT PHASE REQUIRED
1.	National Environment Management Authority (NEMA)	Issuance of EIA license and Monitoring for Compliance with conditions and environmental law	Construction, operation and decommissioning
2.	County Government of Homa Bay.	Approval of plans and building inspections, issuance of licenses	Construction, operation and decommissioning
3.	Physical Planning Department	Building certifications	Construction
4.	Homa Bay County Water and Sanitation Company Limited (HOMAWASCO).	Supply of water and provision of the sewerage connectivity services	Construction, operation and decommissioning
5.	Directorate of Occupational Health and Safety Services (DOSHS)	Ensure safety of workers at construction site	Operation
6.	National Construction Authority (NCA).	Project Registration and Certification of contractors	Construction.

5.6. Offenses & Penalties.

Table 24 below gives the various environmental offenses under EMCA 1999 and their penalties.

Table 24: Offences under EMCA 1999 and Penalties

	ISSUE.	OFFENCE.	PENALTY.
	General offense	•Any person who contravenes any provision of this Act or of regulations made there under for which no other penalty is specifically provided	•Imprisonment for a term of not less than one year but not more than four years, or to a fine of not less than two million shillings but not more than four million shillings, or to both such fine and imprisonment
	Inspection	Any person who: •hinders or obstructs an environmental inspector in the exercise of his duties under this Act or regulations made there under; •fails to comply with a lawful order or requirement made by an environmental inspector per this Act or regulations made there under; •refuses an environmental inspector entry upon any land or into any premises, vessel or motor vehicle which he is empowered to enter under this Act or regulations made there under; •refuses an environmental inspector access to records or documents kept under the provisions of this Act or regulations made there under; •fails to state or wrongly states his name or address to an environmental inspector in the cause of his duties under this Act or regulations made there under; •misleads or gives wrongful information to an environmental inspector under this Act or regulations made there under; •fails, neglects, or refuses to carry out an improvement order issued under this Act by an environmental inspector;	•Imprisonment of not less than one year but not more than four years, or to a fine of not less than two million shillings but not more than four million shillings, or both such fine and imprisonment."
	Environmental Impact Assessment	•Failure to submit a project report contrary to the requirements of section 58 of this Act;	•Imprisonment for a term not exceeding twenty-four months or to a fine of not more than two million shillings or both such imprisonment and fine.

ISSUE.		OFFENCE.	PENALTY.
		•Failure to prepare an environmental impact assessment report per the requirements of this Act or regulations made there under;	
	Records	•Failure to keep records required to be kept under this Act;	•Fine of not less than one year but not more than four years, or to a fine of not less than two million shillings but not more than four million shillings, or both such fine and imprisonment.
	Standards	Any person who – (a) contravenes any environmental standard prescribed under this Act; (b) contravenes any measure prescribed under this Act; (c) uses the environment or natural resources in a wasteful and destructive manner contrary to measures prescribed under this Act;	A fine of not less than one year but not more than four years or to a fine of not less than two million shillings but not more than four million shillings, or both such fine and imprisonment.
	Pollution	•Discharge of any dangerous materials, substances, oil, oil mixtures into the land, water, air, or aquatic environment contrary to the provisions of this Act; •Pollution of the environment contrary to the provisions of this Act; •Discharge of any pollutant into the environment contrary to the provisions of this Act;	•Fine of not less than two million shillings but not more than five million Shillings
	Environmental restoration orders, Easements, and Conservation orders.	Any person who – (a) Fails, neglects, or refuses to comply with an environmental restoration order made under this Act; (b) fails, neglects, or refuses to comply with an environmental easement, issued under this Act; (c) fails, neglects, or refuses to comply with an environmental conservation order made under this Act;	•Imprisonment for a term not exceeding twelve months, or to a fine not exceeding five hundred thousand shillings, or to both.

Source: (GOK, 1999)

CHAPTER SIX: IMPACT ASSESSMENT AND MITIGATION MEASURES.

6.1. Introduction.

The construction phase, operational phase, and decommissioning phase are three main stages of the proposed project expected to have potential negative impacts on the environment. This ESIA study report wholesomely identifies both the positive and negative impacts of the proposed project and provides for mitigation measures for the negative impacts for each of the phases as discussed in this chapter.

6.2. Anticipated Positive Impacts during the Construction Phase.

6.2.1. Creation of Employment.

During the construction of the proposed housing project employment opportunity will be created to all pools of labour. The workers will be needed at the site to put up the houses, connect electricity, water, and various other works, their mode of employment mostly is in form of casual labour to be paid on a wage basis. The construction activities on the site will benefit local people especially those operating kiosks and hotels near the site.

6.2.2. Business Opportunity.

This phase of the proposed project will consume a lot of inputs therefore; will require the supply of goods and services, sourced preferably from the closest source consequently promoting local business ventures who deal in construction materials. Materials needed in the construction of the housing project are to be facilitated by various suppliers on a tender basis, therefore creating the opportunity for doing business with the proponent of the proposed project. The construction services will also be contracted and sub-contracted to companies and individuals creating more opportunities.

6.2.3. Generation of Revenue for County and National Governments and Incomes.

There will generation of revenue to the county and national economy from the construction of the proposed project. This is through the consumption of locally available materials including concrete tiles, timber, and cement; and other materials inputs like fuel, oil and others that attract taxes including Value Added Tax (VAT) that is payable to the national government. The county government will gain revenue from payment of

taxes, rates, and application fees; this will be done to meet prerequisite statutory requirements. Increased construction activity will become an important source of revenue through processing of permits, approvals, and other related activity

6.2.4. Optimal Use of Land.

Currently the proposed project site lies idle therefore implementation will cause better utilization of land a scarce resource in Kenya, and also ease the burden on the proponent of paying land rates while gaining nothing back. The implementation of the proposed project will enhance the effective and optimal use of the land to the great benefit of the proponent of the project, the nation, and its people at large. The housing project is apartment blocks thereby enhancing optimal use of land.

6.2.5. Formalization of the Informal Sector.

Ring fencing strategies will ensure that the Jua Kali sector is able to supply inputs to the affordable housing program. Light industries will also have the opportunity to provide construction materials such as cement.

6.2.6. Stimulation of Economic Growth.

The proposed project will by design stimulate the development of Small, Medium and Micro Enterprises (SMMEs) through the government Procurement Progression Plan policy, commitment has been expressed to stimulate and develop local businesses by procuring project input and fitting such a standardized doors and door frame, windows and window frames and other fittings and components from the local Jua Kali Sector this stimulate local and national economic growth and wellbeing. Contribution of real estate and construction to Gross Domestic Product (GDP) will increase

6.3. Anticipated Negative Impacts during the Construction Phase.

Construction sector is considered as one of the main sources of environmental pollution in the world. It has massive direct and indirect effects on the environment. Homa Bay County is witnessing widespread construction projects which increase the pressure on the ecosystem and generate various pollutants.

6.3.1. Risk of Non-Compliance with the Statutory Requirements.

The proposed project's proponent and contractor have the potential of not comply with legal and regulatory requirements, which will result in major risks of legal cases or costly sanctions. The non-compliance usually arises from failure or negligence in making applications and obtaining relevant prerequisite licenses, authorizations, and project approval from and making submissions to the relevant competent government authorities.

Proposed mitigation measures.

- *It is recommended to submit the proposed project architectural drawing to the County Government of Homa Bay for approval before commencement of the project.*
- *It is recommended to apply and pay for water supply and sewer connection to Homa Bay County Water and Sanitation Company Limited (HOMAWASCO).*
- *It is recommended to conduct an EIA for the proposed project and submit the EIA study report and obtain an EIA License from NEMA before the commencement of the proposed project.*
- *It is recommended to ensure that a copy EIA License and the EIA study report are filed at the project site at all times during the construction phase.*
- *It is recommended to register the proposed project with NCA before the commencement of the project.*
- *It is recommended to register the proposed project construction site with DOSHS as a workplace before commencement of the project.*
- *It is recommended to submit the architectural drawings to DOSHS for approval.*
- *It is recommended that the contractor nominate a safety supervisor for the construction and submit the nominees' name to DOSHS relevant office.*
- *It is recommended to strictly adhere to the general and construction phase EIA License Conditions.*

6.3.2. Potential Damage to Public Facilities and Utilities.

Possibility where any work connected with the erection of the buildings or demolition may, cause or have any detrimental effect on the strength, standard, safety, quality or position of any public facilities or utilities,

Proposed mitigation measures.

- *It is recommended that the contractor meet the cost where the relevant approving authority may require the contractor to pay such deposit or give such security, as it may require covering the costs of the repair of any damage which may be caused by such work.*
- *It is recommended for the contractor to make good the damage to the damage to such public facilities and utilities to the satisfaction of the relevant regulatory / lead agency.*

6.3.3. Restriction of Accessibility and General Inconvience to the Public.

These are disruptions to the community and traffic associated with construction activity of the proposed project.

Proposed mitigation measures.

- *It is recommended to develop plans for employee/trades parking, materials delivery and storage and truck staging that optimize usage of the available space on site or other private property as applicable.*
- *It is recommended to contain construction works, materials, and equipment on site.*
- *It is recommended to develop plans to effective communicate plan to engage with stakeholders including the neighborhood, the general public, and other appropriate jurisdictions. If feasible website and other social media tools are encouraged as effective communication tools.*
- *It is recommended to coordinate activity with other major projects and events affecting the neighborhood transportation network including roadways, highways and walkways.*
- *It is recommended to develop silt/dust control implementation plans.*
- *It is recommended to commit to responding to neighborhood concerns and complains and to resolve them reasonably in a timely manner.*
- *It is recommended to develop traffic Management Plans & Works Schedule.*

6.3.4. Risk to Flora and Fauna.

The biological environment includes various species of animal and plant life both micro and macro, and their habitats. The initial activities of the construction phase include the

clearance of the land, and excavation before the foundation is built. This process is of adverse effect to the flora and fauna on the site of construction.

Proposed mitigation measures.

- *It is recommended to clear the unused materials from the site at the end of the construction phase to allow for the regeneration of vegetation.*
- *It is recommended that after construction has been concluded to restore the land through appropriate landscaping.*
- *It is recommended that the employment of appropriate soil conservation measures to reduce the erosion effect be ensured.*

6.3.5. Risk of Land Degradation.

The proposed projects will usually entail land disturbance involving the removal of vegetation and reshaping of topography. The construction phase will also result in cases of soil erosion from the clearance of land to excavation and levelling off the ground to the movement of trucks and machinery and the loading of materials. The machinery may also cause soil contamination when leakage of oils and lubricants occurs. Heavy machinery traversing the site due to the construction activities may lead to soil compaction and soil erosion.

Such activities make the soil vulnerable to erosion. Soil removed by erosion may become airborne and create dust problem or be carried by water into natural waterways, thereby polluting them. Due to the soil erosion of the exposed and loose earth, there will be a deterioration of water quality in the surrounding water bodies due to siltation.

Proposed mitigation measures.

- *It is recommended if feasible to schedule excavation during low rainfall periods to reduce erosion impact.*
- *It is recommended to excavate immediately before construction instead of leaving soil exposed for extended time (months/years).*
- *It is recommended to control concentrate flow and run-off to reduce the volume and velocity of water from work sites.*
- *It is recommended that to establish breaks where / if wind erosion is a concern.*

6.3.6. Noise and Excessive Vibrations Pollution.

The construction phase is likely to have significant negative impact on the ambient environment caused by noise and vibration generated from construction activities. Several measures can be put in place by the Proponent and the contractor of the proposed project to reduce the impact of noise on the existing and potential residents of that area, as well as the workers involved in the project. This will be a short-term impact, however, the aim at this point is to minimize the effect of the noise and vibrations during this construction phase. The cumulative impact of the construction activities occurring simultaneously with the other human activities in the area will increase the noise and vibration levels in the area significantly.

Proposed mitigation measures.

- *It is recommended to provide the workers with appropriate and sufficient Personal Protective Equipments (PPEs) like earplugs to protect them from the noises generated and enforce their use.*
- *It is recommended to service all vehicles and set speed limits during construction are to reduce noise pollution.*
- *It is recommended that the machinery and vehicles be fitted with silencers where minimum noise and vibrations cannot be otherwise enforced.*
- *It is recommended to notify the neighbours of the impending construction and what to expect during the construction hours.*

6.3.7. Risk of Air Pollution.

Air quality impacts from construction include increased dust particulates in the atmosphere caused by grading, filling, removals, and other construction activities. Air quality may also be impacted by emissions from construction equipment and vehicles. Dust will be generated due by excavation activities, materials used during building construction and deliveries of input materials like sand. There will be minimal air pollution due to the combustion of fossil fuels expected from construction machinery. The proponent and contractor should ensure that plant and equipment which will be in use on-site for preparation of pre-cast materials and concrete mixing will utilize the latest technology or are properly maintained to have minimum emission.

Proposed mitigation measures.

- *It is recommended to provide the workers with appropriate and sufficient Personal Protective Equipments (PPEs) like respiratory masks to reduce the amounts of dust they inhale and enforce their use.*
- *It is recommended that the contractor regulate the speed at which construction site associated vehicles move to reduce the dust emission.*
- *It is recommended to water the site where /when necessary at least twice a day to reduce the propagation of dust.*
- *It is recommended and advised that the machinery used during the construction be adequately maintained to enhance fuel efficiency and reduce fume emission.*
- *It is recommended that the contractor come up with a dust suppression plan.*
- *It is recommended that the excavated soil be used to fill open dug up pits (cut and fill) and the surplus disposed of or enclosed and watered to suppress the dust it may produce during windy days.*

6.3.8. Potential for Occupational Safety and Health Compromise.

The construction works of proposed project will increase risks to health and safety, the generic issues will be from increased dust, falling debris, working from heights, noise, and out of routine occurrences. The construction employees and the general public will be subjected to these possible occupational health and safety hazards and disturbances. Food for the construction workers is usually provided by individuals, who in most cases operate without public health licenses, this can compromise the health of the workers especially if such food is not prepared by adhering to strict hygiene standards. Other health issues are from inhaling of cement and other particulate matter from materials in use and usually results in respiratory and lifestyle health complications. Flammable substances including diesel and motor oil may be stored or used within the project site for heavy-duty equipment; these substances are highly flammable and explosive thus posing danger for possible fires or explosions.

Proposed mitigation measures.

- *It is recommended to provide adequate and appropriate PPEs and enforce their usage.*

- *It is recommended to provide adequate fully stocked first aid kits at the site and designate trained first aiders.*
- *It is recommended that the contractor ensure that all equipment and machinery are used for the prescribed function or purpose only.*
- *It is recommended to ensure that all persons handling different machineries and equipments understand the technical operations in addition to providing instruction manuals for the various equipment and machinery.*
- *It is recommended to have an incident(s)/accident(s) register on site.*
- *It is recommended to provide relevant emergency signage at the site, adequate lighting and barriers where need be.*
- *It is recommended that the contractor obtains WIBA insurance for construction workers at the construction site.*

6.3.9. Negative Social Impacts.

If neighbouring residents and community are not involved in any way by the proposed project proponent, public uproar might be experienced. Conflicts usually arise from the foreseen negative impacts and increased interactions due to Influx of Job Seekers and Outside Workers. The socio-cultural interaction of the people of Homa Bay County especially those living/operating in proposed project area will also be modified. There may be experienced behaviour changes as the workers in site and contractors together with the proposed project implementation activities brings forth people of diverse culture and origin. Of concern will be congestion, theft, increased noise, and air pollution, pre-marital pregnancies and dropping out of school, the proliferation of HIV/AIDS and STD / STI infections and drug abuse, and various complaints.

Proposed mitigation measures.

- *It is recommended to give the local priority in employment to avoid conflicts and enhance project acceptance.*
- *It is recommended to put in place formal communication mechanism between workers, contractors and the neighbours which will address among other complaints raised.*

- *It is recommended to put up awareness creation signage around and within the proposed project site..*
- *It is recommended to create awareness and sensitization on matters HIV/AIDS and sexually transmitted diseases..*
- *It is recommended to make available stocked condom dispensers on the construction site.*
- *It is recommended that the contractor/proponent to provide security system and personnel onsite.*

6.3.10. Risk of Water Pollution.

In the short term, surface and groundwater may be impacted by construction activities, such as the contamination from fuels, cement, oils, and other liquid waste. Ground and surface water quality may be impacted by inappropriate waste disposal and spillages during construction. Inadequate management of construction materials and fuel could lead to spillages, notably of machine oil. Other hazardous substances that may be in use during the construction phase include paints, solvents, acids, and bases.

Proposed mitigation measures.

- *It is recommended that no construction camps be put within 50 m of drainage line and standing water source.*
- *It is recommended that no mixing of concrete occur within 50 m of a watercourse.*
- *It is recommended that appropriate containment structures be provided.*
- *It is recommended that all fuel storage be appropriately bunded.*
- *It is recommended that to provide ablutions facilities for construction worker.*

6.3.11. Increased Heavy Traffic in Area.

Heavy traffic volume is anticipated to increase especially on roads leading to the proposed project construction site. This is especially from the use of vehicles to deliver construction materials to and from the proposed project site. This will come along with the associated problem of noise pollution, damage to existing road infrastructure, traffic congestion, the possibility for occurrence of accidents, and contribution to dust generation.

Proposed mitigation measures.

- *It is recommended to erect warning/informative signs (billboards at the site). These should indicate the operation hours (start and completion times); the signs should be positioned where it is easily viewed by the public and most motorists.*
- *It is recommended that construction vehicles use designated routes, and enter and exit the site at designated and controlled points only.*
- *It is recommended to put up speed bumps with corresponding signage to give warning and direct the traffic as necessary.*
- *It is recommended that where necessary, walkways will be protected by the placement of temporary barriers.*
- *It is recommended to develop and implement a traffic management plan*
- *It is recommended that to further mitigate the negative impacts due to traffic by the contractor and proponent adherence to Homa-Bay County government traffic by-laws and Kenya traffic laws.*
- *It is recommended for controlling traffic along connecting routes during the construction phase and especially when large trucks are turning into or out of the site.*
- *It is recommended that all project vehicles adhere to speed limits determined by the contractor or the legal speed limit, whichever is lower; this should be enforced and subjected to monitoring by the contractor.*

6.3.12. Solid Waste Generation.

A significant amount of solid waste will be generated in this phase, first of all through the clearing of vegetation and excavation of soil. The other construction activities will generate the following streams of related solid wastes including stones, wood remains, broken glasses, containers, rods of metal, sharp objects (nails), etc. This will therefore have a major negative short-term strain on solid waste collection in the area. The proponent and contractor should take the initiative of disposing of appropriately the solid

waste which is expected to be generated during this phase of the proposed project. Other than construction waste other domestic waste will be realized from the workers on site.

Proposed mitigation measures.

- *It is recommended that material segregation bins and skips for waste generated be provided to facilitate salvaging, recycling, reusing, and disposal of waste.*
- *It is recommended that waste collection areas are kept neat, clean, and marked.*
- *It is recommended to contract NEMA licensed waste collector and Licensed transporter for waste disposal.*

6.4. Anticipated Positive Impacts during the Operation phase.

6.4.1. Provision of Good Quality and Affordable Housing to the Residents.

The proposed project aims to provide for a total of 400 housing units (120 – bedsitters/studio, 140 – one-bed roomed and 140 two-bedroom units); these housing units help ease the pressure on housing and settlement by a small percentage. It will also aid in stabilizing the price of rental houses in the region as it increases supply.

6.4.2. The impetus for Improvement of Infrastructure in the Area.

Infrastructural elements like roads and transport, communication, water, sewerage, and energy will be improved in one way or another to cater for the population influx. The operation of the proposed location will create the impetus for the development and improvement of infrastructure in its location. With the rising need for the above-mentioned resources, the county government in partnership with the national government will put up measures to provide for better access roads to the facility. Private enterprises like telecommunication services that work tirelessly to maximize profits will find a safe place in investing their network coverage in the region as they provide for internet connectivity. All this will boost further the infrastructure of the area.

6.4.3. Generation of Employment Opportunities.

The operational phase of the proposed project will result in the employment of the residence of Homa Bay County, especially in proposed project area. This phase will need the employment of security personnel to man the estate during the day and night, caretakers and maintenance team will also be needed to carry out the various wants of the

tenants and ensure the proper functioning of the estate. There will be employed in terms of the contract of waste handler whose key role will be to collect and dispose of the solid waste generated from the facility.

6.4.4. Generation of Revenue to the National and County Governments.

The operational phase of the facility is expected to be a source of revenue from payment of rates, taxes, service fees, and other statutory payments to the National government and the County Government of Homa Bay.

6.4.5. Optimal Land Utilization.

It is expected that the proposed project site will yield more returns than when it in its current use. The site is currently idle. There is a high demand for housing and business premises within the vicinity of the proposed project site.

6.4.6. Return on Investment.

The proposed project proponent - NHC will receive returns on its investment during the operational phase of the proposed project. This will enable them regain the initial capital and some profit, this will also enable them initiate similar projects elsewhere.

6.4.7. Increased Status of Area.

The development is envisaged to elevate the status of the proposed project area. It will provide a focal point. The proposed project will lead to the opening up of a previously undeveloped site. Property prices will rise and new businesses will move in. The development will act as a pull factor to other developments within the vicinity of the site. The developments will lead to the areas being enlivened in the evenings as well as the daytime. Local people will feel that they can get services within the area etc without having to travel to other areas.

6.5. Anticipated Negative Impacts During Operation Phase.

6.5.1. Visual Impacts.

The proposed project will comprise 18 blocks of apartment and will inevitably cause visual impacts to the neighboring community. The proposed project will cause visual intrusion by impinging but not obstructing the existing view. The natural aesthetic view

of the site that now a Lakeview will be compromised by the setting up of the buildings. The height of the proposed project structures is relatively not high the view shield will not be massive.

Proposed mitigation measures.

- *It is recommended to incorporate in the design stage features that will reduce visual intrusion and enhance seamless integration into the surrounding area.*
- *It is recommended that the proposed project wall cladding match with the existing architecture in the area.*
- *It is recommended to include landscaping in the proposed project design to enhance the blending with the surrounding.*

6.5.2. Risk of Non-Compliance with the Statutory Requirements.

There is always a potential risk that the proposed project proponent will not comply fully with statutory requirements; this being an offense will/might bear unintended legal consequences. Noncompliance might arise when the facility operator does not acquire the necessary licenses, permits, or approvals for running/initiating certain activities in the facility.

Proposed mitigation measures.

- *It is recommended to adhere to general and operation phase EIA License conditions.*
- *It is recommended to have well-maintained document records to efficiently maintain reports and optimize licenses.*
- *It is recommended to have clearly defined roles and responsibilities that outline the EMP implementation protocol.*

6.5.3. Solid Waste Generation.

The operation of the proposed project will result in the generation of significantly large amounts of solid waste. Domestic and business associated with activities in the proposed project will result in the generation of different streams of solid waste including organic waste, paper, plastic e-waste, etc. Most of the waste produced being non-biodegradable will result in the injury of the environment through blocking of drainage systems, choking water bodies, and other harmful impacts on animal and human health if not

handled properly. Organic waste on the other hand results in the generation of Methane a greenhouse gas that will cumulatively increase the incidence of global warming.

Proposed mitigation measures.

- *It is recommended to contract a NEMA registered licensed waste handler to collect and dispose off the wastes at NEMA designated sites.*
- *It is recommended to put measures to ensure frequent and regular waste collection.*
- *It is recommended that the residents be provided with NEMA approved plastic waste bags on regular basis, the bags should be branded bags and color-coded.*
- *It is recommended to have a designated waste chambers collection point where all residents will deposit their wastes.*
- *It is recommended that the waste chambers are appropriately located within the development but away from the main gates.*

6.5.4. Effluent Waste Generation.

The EIA team anticipates that the operational phase of this project will be characterized by increased effluent wastes generation. The effluent waste is from the kitchen and the bathrooms and the flushing of toilets. These wastewaters are expected to be channelled directly to the public sewer line, the proponent together with the tenants are expected to handle these waters with utmost caution as they could lead to health issues.

Proposed mitigation measures.

- *It is recommended that the proponent ensure frequent effluent system maintenance and timely repairs and unblocking of sewer system..*
- *It is recommended to ensure that storm water and effluent are separately channelled into the respective systems to avoid overloading the sewer system.*
- *It is recommended that the proponent apply for authorization from HOMAWASCO for connection to the public trunk sewer line.*
- *It is recommended to develop an Effluent Discharge Control Plan (EDCP) for the operation of the proposed project.*

6.5.5. Increased Energy Consumption and Demand.

Residential units utilize different forms of energy to achieve different purposes like lighting, cooking, etc., the generic types of energy that will be utilized in the proposed project will include electricity supplied by Kenya Power Company, Liquefied Petroleum Gas (LPG) in gas cylinders, charcoal for cooking, and other forms of energy on a small scale. Unsustainable consumption patterns will cause unnecessary pressure on natural resources.

Proposed mitigation measures.

- *It is recommended if feasible for the installation and use of solar powered street and common areas lighting.*
- *It is recommended that the proposed project be installed with energy-efficient fixtures like energy-saving fittings.*
- *It is recommended for the design to incorporate large window for natural lighting and ventilation to reduce energy cost.*

6.5.6. Increased Water Demand and Consumption.

The proposed project is expected to put pressure on HOMAWASCO water supply system during the operational phase by increased water requirement demands. The proposed project will be residential apartments therefore; the most common water uses will include cooking, cleaning, maintaining hygiene, heat transfer, and landscaping. Considering the magnitude of the proposed project significant increase in water demand and consumption will be witnessed during the operational phase.

Proposed mitigation measures.

- *It is recommended for the storage of water for consumption in tanks.*
- *It is recommended if feasible to do roof water harvesting.*
- *It is recommended to putting in place a leak detection mechanism like regular checks and routine maintenance will help save considerable amounts of water.*
- *It is recommended that development be fitted with water-efficient fittings and installations.*

6.5.7. Increased Strain on Utilities and Existing Infrastructure.

The proposed project is anticipated to cause significant stress on utilities and infrastructure services in the area such as roads, telecommunications network, water supply system, sewerage system/effluent management mechanisms in place, and the electrical grid system.

Proposed mitigation measures.

- *It is recommended to liaise with CGHB for upgrade bulk sewerage infrastructure or ensure the system installed can sustain the anticipated population before the occupancy of the houses.*
- *It is recommended to construct a bulk water storage reservoir.*
- *It is recommended that the proponent liaise with KPC to upgrade the existing supply system to one that can serve the anticipated increase of the area population.*
- *It is recommended if feasible for installation power saving mechanisms into the project like solar powered streetlights, energy saving lighting and large window that will allow sufficient natural lighting and natural ventillation.*
- *It is recommended for upgrading and expansion of the project feeder roads to cater for increased traffic and improve accessibility.*

6.5.8. Surface and Ground Water Pollution.

The generation of effluent waste and surface runoff from the housing scheme has the potential to pollute both groundwater and surface water. This especially is true because the proposed project is located in a high-water table area.

During the operation phase, all wastewater must enter the sewer system. Good environmental management practices must be followed to prevent the potential contamination of water resources.

Proposed mitigation measures.

- *It is recommended that all sewerage be channelled and contained within the effluent management systems.*
- *It is recommended that surface runoff water should not mix with the effluent and should be channelled appropriately to run off drains.*

- *It is recommended for regular maintenance, and prompt repair of the sewer system and run-off drains.*

6.5.9. Occupational Safety and Health Risk.

Several occupational safety and health compromises might arise from the operation of the proposed project. The table 25 below illustrates the potential Occupational Safety and Health (OSH) risks and their sources.

Table 25: Potential OSH Risks and their Sources.

OSH Risk	Source.
Fire.	Faulty electrical wiring; electrical equipment and machinery; fuel.
Injury from Injurious Substance or Equipment	Bathroom falls; slippery floors from cleaning or oil spills; tripping due to poor housekeeping.

Proposed mitigation measures.

- *It is recommended that the housing units design incorporate anti slip and fall flooring.*
- *It is recommended to incorporate into the development a fire safety system – fire extinguishers, fire hose reel connection points, and fire hydrants.*
- *It is recommended that fire fighting water reservoir be put in place and be filled with water at all times.*

6.5.10. Negative Social Impacts.

The proposed project will have occupants from diverse social, cultural, and economic backgrounds, their interaction might result in negative social impacts that might result in incidents of jealousy, gossip, and malice. The operation of the proposed project will also result in the spread of communicable diseases like HIV/AIDS, respiratory diseases, etc., waterborne diseases like cholera and typhoid might also arise due to the sanitation conditions in the proposed project vicinity.

Proposed mitigation measures.

- *It recommended for establishment of code of conduct for the housing unit owners / resident to order is maintained in the residential estate.*
- *It is recommended that the 'Nyumba Kumi' initiative be adopted and utilized within the proposed project to increase cohesion of the resident and also with the project neighbours.*

- *It is recommended for residents to form a resident association / group be formed to articulate their common issues and cohesion amongst themselves.*
- *It is recommended for establishment of a management company by the proposed project proponent to be transferred to unit owners after payment to ensure efficient and orderly management of the property.*

6.5.11. Population Influx.

There is no evidence of overcrowding around the proposed project's locality and therefore, there will be minimal variations on its demography until the proposed project operation. The population growth rate in the area is not expected to be consistent in the future, however, as there has been a significant increase in the number of approved and proposed development in the proposed project area. There will be a cumulatively attraction to immigrants to the area during the operational phase, this will increase the population of the area. The area will experience immigration of new residents to occupy the constructed houses and this will impact the social, economic and cultural dynamic of the population in the area.

Proposed mitigation measures.

- *It is recommended that the CGHB improve the access road to the project site to cater for increased human population to avoid traffic and human congestion.*
- *It is recommended to enhance the drainage along the road network.*
- *It is recommended that the proposed project incorporate social amenities like recreational facilities, street lighting, community hall, playfield, open spaces, and commercial centres to ease pressure on existing utilities and infrastructures.*
- *It is recommended that the proponent incorporate water and energy-saving features in the project design to ease pressure on water and power supply needs.*

6.6. Anticipated Positive Impacts during Project Decommissioning Phase.

6.6.1. Increase in Space and Land for Other Development Projects.

The decommissioning of the project will free up space for the implementation of other facilities and projects. The utilization of land after the decommissioning could be of more economic value than the proposed residential houses.

6.6.2. Provision of Short-Term Employment Opportunities.

The decommissioning phase will create short-term employment opportunities for persons who will be recruited to carry out the decommissioning process/activities. Persons employed to collect and dispose of the solid waste generated will also get short-term employment opportunities. Generally, business engaged by the decommissioning phase of the proposed project will have a higher capacity to offer employment opportunities.

6.6.3. Provides For Cheap Materials.

During the demolition and restructuring process, the contractor contracted to carry out the process will be required to start by dismantling the movable materials like windows, doors, sinks among others. These materials will be reused, donated, sold off cheaply to the locals willing buyers or disposed of.

6.6.4. Restoration and Rehabilitation.

The decommissioning process provides for the restoration and rehabilitation of the site. This gives room for improvement of the scenery as the process allows for complete removal and disposal of debris, planting of trees, ornamentals which provide for the diversity of flora.

6.7. Anticipated Negative Impacts During Project Decommissioning Phase.

6.7.1. Risk of Non-Compliance with the Statutory Requirements.

Prior to the commencement of decommissioning phase, the proponent has to meet certain statutory requirements and failure to meet them will result in noncompliance issues that might result in lawsuits and sanctions.

The contractor on his part has legal and regulatory requirements they need to meet; the proponent should therefore ensure that the contractor doesn't commit offences that might bear legal consequences.

Proposed mitigation measures.

- *It is recommended to adhere to general and decommissioning phase EIA License conditions.*
- *It is recommended to undertake a decommissioning EIA and submit it to NEMA.*

- *It is recommended to develop a decommissioning plan and submit it to NEMA three months before the commencement of the actual decommissioning work.*
- *It is recommended to register the decommissioning site with DOSHS.*

6.7.2. Noise and excessive Vibrations Pollution.

The decommissioning phase will be characterised by the generation of noise and excessive vibrations regardless of the method used. The contractor should choose a method that has less adverse effects to the environs of the building. The process should be carried out at a time when the weather of the region is not windy. The proponent should before the decommissioning process submit plans to NEMA on methods they will use to minimize noise and vibrations.

Proposed mitigation measures.

- *It is recommended to minimize noise and vibration through sensitization of drivers to avoid gunning vehicle engines or hooting especially when passing through sensitive / silent zone / areas such as school, churches, residential areas, and hospitals.*
- *It is recommended to ensure demolition trucks are kept in good condition to reduce noise generation.*
- *It is recommended to insulate all generators and heavy-duty equipment or place them in enclosures to minimize high noise levels.*
- *It is recommended to avoid blasting methods during decommissioning unless it is absolutely necessary.*

6.7.3. Generation of Decommissioning Solid Waste.

The decommissioning of the proposed residential houses will lead to the generation of solid waste. These wastes will be in the form of debris from the structural components. They are to be disposed of at appropriate disposal sites by licensed waste handlers. The contractor should ensure that all installations, fittings and equipment be dismantled for reuse and recycling to avoid wastage. Those materials that can be reused should also be sold out or donated.

Proposed mitigation measures.

- *It is recommended to ensure segregation of waste by separating hazardous from non-hazardous wastes for appropriate disposal.*
- *It is recommended to provide waste collection containers be placed in accessible locations.*
- *It is recommended that hazardous wastes be safely and appropriately disposed of where feasible, recycle recoverable wastes.*
- *It is recommended to contract a NEMA licensed waste firm to collect waste from the site for dumping at an approved site.*

6.7.4. Displacement of Residents and Loss of Investment and Houses for the Buyers..

The proposed project being residential houses, decommissioning will mean the displacement of the residents. It is paramount that before commencing this phase, all residents be given notice of impending eviction from the property thus allowing them time to transition out, and compensation made where required.

Proposed mitigation measures.

- *It is recommended that adequate notices to be given all Interested and Affected Parties (IAP) concerning the impending decommissioning to allow them to seek alternative housing arrangements.*
- *It is recommended depending on the reasons for decommissioning the property owner at the residential development if feasible to be appropriately and adequately compensated for the loss of their property (ies).*

6.7.5. Occupational Safety and Health Concerns.

The demolition process exposes workers to occupational safety and health risks. The risk may result from falling of objects, injuries from the use of hand tools, and carrying of heavy materials. Health risks may arise from the inhaling of dust and ergonomic impacts causing respiratory and other heath complications. The contractor and proponent should also ensure that the workers on site are insured against the various risks likely to occur during the time.

Proposed mitigation measures.

- *It is recommended for issuance of appropriate and adequate Personal Protective Equipments (PPEs) for all deserving workers and to enforce their use.*
- *It is recommended to do capacity building and training of staff/workers with respect to Occupational Health, Safety, and Environment.*
- *It is recommended to provide adequate and fully stocked first aid kits within the site and designate trained first aider(s).*
- *It is recommended that where the workforce exceeds 20, the contractor should facilitate the formation and operations of a Safety and Health Committee, per the Health and Safety Committees Rules, 2004.*

6.7.6. Livelihoods and Economic Losses.

The establishment and operation of the proposed project will bring about a lot of positive changes to the lives of the people around it and also to the surrounding economy. Decommissioning of the proposed project will thus mean reverting to previous economic conditions consequently many people will lose their source of income from jobs to business ventures hence loss of livelihood and economy.

Proposed mitigation measures.

- *It is recommended that the business associated with the development should be notified of the intention of decommissioning in good time for them to undertake relevant adjustment(s).*
- *It is recommended that appropriate and adequate notification of workers / staff early is /are given about the decommissioning plan for them to find other alternative sources of income or compensated for the loss of their means of livelihood / jobs.*

6.7.7. Dust and Air Emissions Pollution.

Decommissioning activities will generate fugitive dust. Sources of emissions will include exhaust from diesel engines of demolition equipment and vehicles.

Proposed mitigation measures.

- *It is recommended that the contractor provide all the construction workers with proper Personal Protective Equipment and enforced their usage.*

- *It is recommended for minimization of dust from open area sources like stokepiles, by using control measures such as enclosures and covers and watering the site and exposed soils.*
- *It is recommended that all machinery be regularly serviced and maintained to reduce emissions.*
- *It is recommended to control vehicle speed limits within and around the decommissioning site to minimize dust generation.*
- *It is recommended to sprinkle traffic routes with water regularly.*

6.7.8. Risk of External Damages of Adjacent Facilities and Infrastructure.

Such risk includes risk of damage to basements, dangerous demolition methods, damage to streets, *inter alia.*

Proposed mitigation measures.

- *It is recommended that the demolition and all works incidental thereto shall be specifically placed under the supervision of a person experienced in the carrying out of demolition works and appointed for the purpose.*
- *It is recommended that no demolition works is undertaken without relevant prior written permission of the competent approving authority (ies).*
- *It is recommended that where any building is demolished to ground level and such building contained a basement; the project proponent shall provide or cause to be provided safe lateral support to the sides of such basement.*
- *It is recommended for the contractor to make good the damage to the damage to such public facilities and utilities to the satisfaction of the relevant regulatory / lead agency.*

6.8. Emergency Response Plan (ERP).

Emergencies and disasters can occur at any time without warning. It is important for the proponent to be prepared for them, to be in a good position to act to minimizing panic and confusion when they occur. Emergency Response Plans (ERP) will have to be instituted throughout the project cycle. The following elements of a conventional emergency response plan are recommended as summarized in table 26 below.

Table 26: Elements of Emergency Response Plans (ERP).

	ERP COMPONENT	**ACTION(S) / REQUIREMENT(S)**	**RESPONSIBILITY**
1.	Potential Emergency	Identification of all potential emergencies associated with the proposed project at the project site	•Proponent.
2.	Emergency Operations Coordinator (EOC)	Designate a primary and secondary contact persons	•Constructor during Operations and Demolition phase. •Proponent during the operation phase.
3.	Emergency Contact Numbers	Give & Display contact for Fire station, Ambulance, police, Hospitals, Others	•Constructor during Operations and Demolition phase. •Proponent during the operation phase.
4.	Installation of emergency equipment	Fire sensors	•Proponent & Constructor during construction & operation phases.
		Fire alarms,	•Proponent & Constructor during construction & operation phases.
		fire extinguishers,	•Proponent & Constructor during construction & operation phases.
		fire hose,	•Proponent & Constructor during construction & operation phases.
		Panic alarm button,	•Proponent & Constructor during construction & operation phases.
		Provision and enforcement of use of PPEs,	•Constructor during Construction phase.
		Emergency Communication equipment, such as Phone & alarm bells installed.	•Proponent & Constructor during construction & operation phases.
5.	Training for emergency response	Regular Training for emergency response	•Constructor during Operations and Demolition phase. •Proponent during operation phase
6.	Trained in the use of emergency equipment	Employees Training in the use of emergency equipment	•Constructor during Operations and Demolition phase •Proponent during operation phase
7.	First Aid	Provision of first aid kits,	•Constructor during Operations and Demolition phase •Tenants during operation phase
		First aids training	•Constructor during Operations and Demolition phase •Tenants during operation phase
8.	Communication	Signage, action poster, alarm bell/ panic button	•Constructor during Operations and Demolition phase •Tenants during operation phase
9.	Procedure for rescue & evacuation	Evacuation plan, Warning system, Assembly site, Shelter in place plan.	•Constructor during Operations and Demolition phase •Tenants during operation phase

	ERP COMPONENT	ACTION(S) / REQUIREMENT(S)	RESPONSIBILITY
10.	Tenant emergency contact information	List of all tenant & their activities	•Proponent during operation phase
11.	ERP review	Annual ERP review	•Constructor during Operations and Demolition phase •Proponent during operation phase

6.9. Environmental Impacts Analysis: Leopold Matrix (LM) Analysis.

In the analysis of impacts on an Environmental impact assessment, various methods can be used. The team decided on the use of the Leopold Matrix analysis due to its ease in construction and its familiarity with many experts.

6.9.1. Matrix Rationale.

The Leopold matrix is used in qualitative analysis of impacts of a project. In this matrix, for every anticipated impact, a value is given that represents the impact vis-à-vis the environmental aspect affected. The environment is split into its three main categories; physical, biological and socio-economic. A value between 0 and 5 is used to denote the magnitude with 0 meaning no observable effect, 1-low effect, 2- tolerable effect, 3-medium effect, 4- high effect, 5- very high effect. Whereas for the significance letters L, O, N, M and R are used whereby L denotes impact limited to a specific location, O-impacts of importance to county, N- impacts of national character, M- impacts limited to a cross-border countries, R- impacts that affect regional character

6.9.2. Matrix Analysis.

The matrix illustrates that the significance of the impacts resulting from the housing project is felt at the location of the site and its surrounding and a very small percentage at the municipality level that comprise of waste management since the waste is disposed ay from the site at a licensed disposal site. The magnitude of the housing unit on the environment is low with adverse impacts being anticipated during the site preparation and decommissioning phase, the proponent is therefore advised to follow keenly the proposed mitigation measures to reduce this. See table 27 and 28 below.

Table 27: Leopold Matrix Analysis for the Proposed Project.

	Construction phase.				**Operational phase.**				**Decommissioning Phase.**				
		Site preparation	Construction	Finishing	Occupancy	Consumption of resources	Waste generation	Repair and maintenance	Demolition	Debris collection	Restoration	Total	Average
Physical factors	Noise	3	2	1	1	0	0	0	3	1	0	11	1.1
	Air	3	2	1	0	0	2	0	3	2	0	13	1.3
	Land	3	2	1	0	0	1	0	2	1	1	11	1.1
	Microclimate	0	0	0	0	0	0	0	0	0	0	0	0
	Water	0	0	0	0	2	0	0	0	0	0	2	0.2
Socio-economic factors	Land use	1	0	0	1	0	0	0	2	1	1	6	0.6
	Scenery	2	2	1	1	0	1	0	3	1	1	12	1.2
	Employment	2	2	1	1	1	0	1	3	1	0	12	1.2
	Cultural Heritage	1	0	0	1	1	0	0	1	0	1	5	0.5
	Neighbours	2	2	1	1	1	0	0	3	2	1	13	1.3
Biological factors	Diversity of flora/fauna	2	1	0	0	0	0	0	3	1	0	7	0.7

Table 28: Matrix Analysis for the Proposed Project.

		Operational phase			**Construction phase**				**Decommissioning phase**		
		Site preparation	Construction	Finishing	Occupancy	Consumption of resources	Waste generation	Repair and maintenance	Demolition	Debris collection	Restoration
Physical factors	Noise	L	L	L	L	O		L	L	L	
	Air	L	L	L			L/O	L	L	L/O	
	Land	L	L	L			L/O	L	L	L/O	L
	Microclimate										
	Water					O		L			
Socio-economic factors	Land use	L			L/O				L	L/O	L
	Scenery	L	L		L		L/O		L	L/O	L
	Accidents	L	L	L	L			L	L	L	L
	Cultural Heritage	L			L/O	L		L	L		L
	Neighbours	L	L	L	L	L		L	L	L	L
Biological factors	Diversity of flora	L	L					L	L	L	

CHAPTER SEVEN: ENVIRONMENTAL AND SOCIAL RISK ASSESSMENT.

7.1. Occupational Safety and Health (OSH).

7.1.1. Introduction.

The key to achieving healthy and safe working conditions is to ensure that health and safety issues are planned, organized, controlled, monitored, and reviewed. Everyone controlling site work has health and safety responsibilities. Checking that working conditions are healthy and safe before work begins and ensuring that the proposed work is not going to put others at risk requires planning and organization.

7.1.2. Planning the Work.

This will involve gathering as much health and safety information about the project and the proposed site as before work begins, this is important. Sources of information include.

1. The client;

2. The design team;

3. Contract documents;

4. The main contractors on the site;

5. Specialist contractors and consultants;

6. Trade and contractor organizations;

7. Equipment and material suppliers; and

8. OSH relevant laws regulations and guidelines.

The contractor shall find out about the history of the site and its surroundings. The contractor will see if there are any unusual features which might affect the work, or how the work will affect others.

7.1.3. Organizing the Work.

1. The contractor shall decide who will supervise the work – check that they are adequately trained and experienced.

2. The project proponent shall make sure that firms coming onto site provide adequate supervision for their workers.

3. See that work methods and safety precautions agreed upon before work is started are put into practice.

4. Find out if any of the work will be further subcontracted. Make sure that people working for subcontractors also get the information they require and provide training, supervision, etc. as needed.

7.1.4. Notifying the Site to DOSHS.

According to the Factories and Other Places of Work (Safety and Health Committees) Rules, 2004, a project site should be registered as a workplace with DOSHS if it regularly employs twenty or more employees and hence shall establish a Safety and Health Committee in the manner provided in these Rules.

7.1.5. Setting up the Site.

7.1.5.1. Site Access.

1. There should be safe access onto and around the site for people and vehicles.
there shall be a plan for how vehicles will be kept clear of pedestrians, especially at site entrances

2. The plan should include how vehicles can be kept clear of pedestrians at vehicle loading/unloading areas, parking and manoeuvring places, and areas where drivers' vision may be obstructed

7.1.5.2. Site Boundaries.

Construction work should be fenced off and suitably signed. This will protect people (especially children) from site dangers and the site from vandalism and theft. For some jobs, the workplace will have to be shared. A plan on who has to control each area. Shall be Agreed, what fences, barriers, means of separation or permits to work are required to keep both construction workers away from hazards created by others and other people away from hazards created by the construction work; site rules might be needed to make sure there is a system to ensure necessary precautions are kept in place during working hours and that night-time and weekend protection is put in place as required before the site closes.

7.1.6. Welfare Facilities.

1. Everyone who works on the project site must have access to adequate toilet and washing facilities, a place for consuming refreshments, and somewhere for storing and drying clothing and personal protective equipment.

2. The project contractor and others who have control over construction sites are responsible for providing or making available site welfare facilities. Employers are also responsible for ensuring that welfare facilities are adequate for their employees.

3. The welfare facilities should be sufficient for everybody who is working on the project site. If facilities such as toilets and canteens provided by someone else are to be used, check that they are suitable and properly maintained. They should be kept clean, warm, and properly ventilated and lit.

4. Welfare facilities shall be easily available to people working on the site. Toilets need to be easily accessible from where the work is being done. Washing facilities should be as close as possible to the toilets. Washing facilities also need to be near restrooms so that people can wash before eating.

7.1.6.1. Sanitary Conveniences.

1. The numbers of toilets required will depend on the number of people working on the project site.

2. Wherever possible toilets should be flushed by water and connected to the main drainage system. If this is not possible, toilets with a built-in water supply and drainage tank may be provided. If neither option is possible, chemical toilets may be provided.

3. Men and women may use the same toilet, provided it is in a separate room with a door that can be locked from the inside.

4. A washbasin with water, soap, and towels or dryers should be located close to the toilets.

7.1.6.2. Washing Facilities.

1. On all sites, provide basins large enough to allow people to wash their faces, hands and forearms All basins should have a supply of clean hot

and cold, or warm, running water. If mains water is not available, water supplied from a tank may be used.

2. Where the work is particularly dirty or workers are exposed to toxic or corrosive substances (e.g. during demolition and asbestos removal), showers should be provided.

3. Men and women can share basins used for washing their faces, hands and arms.

7.1.6.3. Rest Facilities.

1. Facilities should be available for taking breaks and meal breaks facilities should provide shelter from the wind and rain and be heated as necessary.

2. It should be possible for non-smokers to use the facilities without suffering discomfort from tobacco smoke. This can be achieved by providing separate facilities for smokers and non-smokers, or by prohibiting smoking in the rest facilities.

3. Rest facilities may be provided within the site office or site hut.

7.1.6.4. Storing and Drying Clothing and Personal Protective Equipment.

1. The contractor shall make sure there are proper arrangements for storing:

a) Clothing not worn on-site (e.g., hats and coats);

b) Protective clothing needed for site work (e.g., wellington boots, overalls, gloves, etc);

c) Personally issued equipment (e.g. ear defenders, goggles, harnesses, etc).

2. The site office may be a suitable storage area, provided it is kept secure. Where there is a risk of protective site clothing contaminating everyday clothing, store items separately.

3. Where necessary for propriety, men and women should be able to change separately.

7.1.6.5. Drinking-Water.

1. The proponent shall make sure there is a supply of drinking water. It is best if a tap directly from the mains is available, otherwise, bottles or tanks of water may be used for storage. If water is stored, it should be protected from possible contamination and changed often enough to prevent it from becoming stale or contaminated.

2. The tap should be marked if it is possible not to confuse the drinking water supply with other water supplies or other liquids such as:

a) Those not fit for consumption (e.g. water from storage tanks used for wheel washers); or

b) Certain toxic materials (e.g. from taps to pipelines in factories).

3. Cups or other drinking vessels should be available at the water tap unless the water is supplied as an upward jet that can be drunk from easily (e.g. a drinking fountain).

7.1.7. Good Order, Storage Areas, and Waste Materials.

1. Plan shall be made on how the site will be kept tidy and how housekeeping will be actively managed:

a) Keep walkways and stairways free of tripping hazards such as trailing cables, building materials and waste. This is especially important for emergency routes. Make sure that all flammable waste materials (such as packaging and timber off cuts) are cleared away regularly to reduce fire risks;

b) Keep inside floor areas clean and dry;

c) Outdoor footpaths should be level and firm and should not be used for storing materials

2. Designate storage areas for plant, materials, waste, flammable substances (e.g. foam plastics, flammable liquids, and gases such as propane) and hazardous substances (e.g. pesticides and timber treatment chemicals). Flammable materials will usually need to be stored away from other materials and protected from accidental ignition. Care must be taken to not store materials where they obstruct access routes or where they could interfere with emergency escape.

3. If materials are stored at height (e.g. on top of a container or on a scaffold gantry), make sure necessary guard rails are in place if people could fall when stacking or collecting materials or equipment.

4. All storage areas shall be kept tidy, whether in the main compound or on the site itself. Try to plan deliveries to keep the number of materials on-site to a minimum.

5. A decision must be made on how the waste stream will be managed to ensure it is timely and effective. The contractor should consider whether to be responsible for collecting their waste or whether you will provide someone

to do this for the site. Don't forget that waste materials also need storing safely before their removal from the site and make sure that to make allowance for sufficient space for waste skips and bins. If you are collecting waste in skips you will need to decide where the skips can be positioned and how often they will need to be collected Consider waste generated inside and whether you need to provide wheeled bins to enable it to be brought out of the building safely

7.1.8. Emergency Procedures.

1. At most sites, the most obvious emergency is fire. The general principles for dealing with fire risks can be applied to planning for other emergencies. Plan emergency procedures before work begin and put general precautions in place from the start of work.

2. Some emergencies may require the evacuation of the site or part of the site, while others might involve the rescue of an injured person. For example, it may be necessary to plan how someone injured in a fall can be attended to by first aiders and the emergency services before being taken to a place of safety.

7.1.8.1. Planning for an Emergency.

1. When planning emergency procedures, routes, and exits, the following should be into account:

a) The type of work being done on-site (e.g. extra precautions may be required to maintain routes downstairs during demolition);

b) The characteristics and size of the site and the number and location of workplaces on the site. A large site with people working at many locations will probably need bells or sirens at several places to raise the alarm. On small sites with only two or three people working, an air horn may be adequate;

c) The plant and equipment being used (e.g. consider tower crane drivers, people working on suspended access equipment or where the exit may be obstructed by equipment);

d) The number of people that are likely to be present on the site at any one time should be accounted for. On sites where many people work, escape routes need to be wide enough to allow everyone to get through doorways or downstairs easily without them becoming overcrowded; and

e) The physical and chemical properties of substances or materials on or likely to be on the site (e.g., work at petrochemical installations or at sites where flammable paints or glues are in use may require an increased standard of ventilation).

2. Take precautions to ensure:

a) The likelihood of emergencies arising is as low as possible;

b) Everyone on site can be alerted in an emergency;

c) Everyone working on site (including contractors who may only be at the site for a few hours) knows what signal will be given if there is an emergency and knows what to do;

d) Someone who has been trained in what to do is on-site while work is in progress and will take responsibility for coordinating procedures;

e) Emergency routes are available, kept clear, signed, and adequately lit. When the site is not adequately lit by daylight for all periods when people are at work, provide lighting that will come on automatically in an emergency;

f) There are arrangements for calling the emergency services. It is good practice to let the Fire Brigade know about any work in tunnels, confined spaces or above 18 m (above this height they may require specialist access equipment) and anywhere else where specialized rescue equipment may be needed;

g) There is adequate access to the site for the emergency services and that access does not become blocked by plant or material building up;

h) Arrangements for treating and recovering injured people are available;

i) If an emergency does arise, someone is posted at the site entrance, or in another prominent position, so that they can direct the emergency services

7.1.8.2. Precautions to Prevent Fires.

The following precautions should be taken to prevent fires:

1. Use less-easily ignited and fewer flammable materials, e.g. use water-based or low-solvent adhesives and paint;

2. Keep the quantity of flammables at the workplace to a minimum;

3. Always keep and carry flammable liquids in suitable closed containers;

4. If work involving the use of flammable materials is being carried out, stop people smoking and don't allow other work activities involving potential ignition sources to take place nearby. For example, if floor coverings are being laid using solvent-based adhesives, don't allow soldering of pipes at the same time;

5. Ensure that pipes, barrels, tanks, etc. which may have contained flammable gases or liquids are purged or otherwise made safe before using hot cutting equipment, such as a cutting torch or angle grinder. A pipe or container may appear to be empty, but can contain enough material on its sides, or within rust or other sediments, to produce a flammable or explosive atmosphere within it when heated or disturbed. Specialist advice may be required;

6. To minimize the risk of gas leaks and fires involving gas-fired plant:

a) Close valves on gas cylinders when not in use;

b) Regularly check hoses for wear and leaks;

c) Prevent oil or grease from coming into contact with oxygen cylinder valves;

d) Do not leave bitumen boilers unattended when alight;

7. Store flammable solids, liquids, and gases safely. Separate them from each other and from oxygen cylinders or oxidizing materials. Keep them in ventilated secure stores or an outdoor storage area. Do not store them in or under occupied work areas or where they could obstruct or endanger escape routes;

8. Have an extinguisher to hand when doing hot work such as welding or using a disc-cutter that produces sparks;

9. Check the site at lunchtime and at the end of the day to see that all plant and equipment that could cause a fire is turned off. Stop hot working an hour before people go home, as this will allow more time for smouldering fires to be identified; and

10. Provide closed metal containers to collect rubbish and remove them from the site regularly. Collect highly flammable waste such as solvent-soaked rags separately in closed fire-resisting containers.

7.1.8.3. Precautions in Case of Fire.

If a fire should break out, people must be able to escape from it. To achieve this considers the following procedures:

1. Means of giving alerting people.

Set up a system to alert people on-site; this could be a temporary or permanent mains operated fire alarm (which should be tested regularly, e.g. weekly), a klaxon, an air horn, or a whistle, depending on the size and complexity of the site. Any warning needs to be distinctive, audible above other noise, and recognizable by everyone.

2. Means of escape.

Plan escape routes and ensure they remain available and unobstructed. For work areas above or below ground, provide well separated alternative ways to ground level where possible. Protect routes by installing the permanent fire separation and fire doors as soon as possible. It is important that escape routes give access to a safe place where people can assemble and be accounted for. In a large chemical plant this may be a safe refuge, while on a small site the pavement outside may be adequate. Signs will be needed if people are not familiar with the escape routes Make sure that adequate lighting is provided for enclosed escape routes – emergency lighting may be required.

3. Means of fire fighting.

a) As well as providing fire extinguishers for hot work, fire extinguishers should be located at identified fire points around the site. The extinguishers should be appropriate to the nature of the potential fire:

- Wood, paper, and cloth – Water extinguisher;
- Flammable liquids – Dry powder or Foam extinguisher;
- Electrical – Carbon Dioxide (CO_2) extinguisher.

b) Nominated people should be trained in how to use extinguishers.

7.1.9. First Aid.

Factories (First-Aid) Order required by section 50(1) of the Act requires the occupier to provide first-aid boxes or cupboards at the workplace which are adequate and appropriate

for the equipment, facilities and personnel to enable first aid to be given to their employees in case of injuries or become illness at work. The minimum provision for all sites is:

1. A first aid box with enough equipment to cope with the number of workers on-site as per the order;

2. An appointed person to take charge of first-aid arrangements;

3. Information telling workers the name of the appointed person or first aider and where to find them. A notice in the site hut is a good way of doing this.

The first-aid arrangements should cover shift working, night and weekend working where this is carried out. This may mean appointing or training several people to ensure adequate cover.

7.1.10. Reporting Injuries, Diseases, and Dangerous Occurrences.

1. Employers have a duty under the law (OSHA, 2007) to report to DOSHS certain types of accidents that happen to their employees. Whoever is in control of the site also has a legal obligation to report certain accidents which involve a self-employed worker or members of the public and certain dangerous occurrences.

2. Generally, you have to report deaths, serious injuries, and dangerous occurrences immediately and less serious injuries within seven days. Certain occupational ill-health issues and diseases also have to be reported. Further details of when you must report an accident, disease, or dangerous occurrence are given in Factories and other places of work (Safety and Health Committees) Rules.

7.1.11. Site Rules.

It is recommended to enact certain safety precautions while construction work is in progress. It may assist everyone if site rules are applied. Site rules might cover, for example, the use of personal protective equipment, traffic management systems, pedestrian routes, site tidiness, fire prevention, emergency procedures, or permit-to-work systems. It should be very clear where site rules apply. Make sure everybody knows and follows the rules relevant to them.

7.1.12. Site Management and Supervision.

This should entail making provision of either all or some of the following.

1. Safety while working at height.

2. Selecting the right means of access and work equipment.

3. Safe working platforms.

4. Inspections and reports.

5. General access scaffolds.

6. Guard rails, toe boards, and brick guards.

7. Tower scaffolds.

8. Mobile access equipment.

9. Suspended access equipment.

10. Safety nets and soft-landing systems.

11. Rope access techniques.

12. Safety harnesses.

13. Ladders and stepladders.

14. Roof work and fragile surfaces.

15. Roof truss installation.

16. Management of site traffic and mobile plant.

17. Moving goods safely.

18. Hazardous substances and processes.

19. Personal protective equipment.

20. Electricity safety.

21. Prevention of slips and trips.

22. General public safety.

7.2. Climate Change Risks Associated with the Proposed Project.

The climate change risk associated with the proposed project will significantly come from carbon emitted due to processes associated with its construction, operation and decommissioning, the emitted carbon will contribute cumulatively to global warming thus climate change.

The proposed project's embodied carbon will come from the manufacture and supply of construction products and materials, as well as the construction process itself. Also, during the construction phase natural resources will be consumed, their extraction consumes energy, degrades the environment and contributes invariably to global warming.

During the operational phase substantial amounts of energy, water and emission of greenhouse gases from the proposed project will also contribute to the change of climate.

To reduce this impact, it is recommended to incorporate renewable energy sources into the proposed project, energy saving designs and as much as possible recycling and reuse of resources materials.

7.3. Environmental Risk Assessment (ERA).

Environmental Risk Assessment (ERA) was conducted to assess and report environmental conditions to assist in decision making for the proposed project. The environmental Risk Assessment process entailed estimating the likelihood or probability of an adverse outcome or event due to pressures or changes in environmental conditions resulting from proposed project activities.

7.3.1. ERA Rationale and Methodology.

The methodology adopted in deriving the environmental risk for the proposed project was adopted from (Ansis Melko and Janis Ievins, 2012), who defined risk as the degree of adverse effects arising from a hazard, taking into account the probability of damage and side effects

Risk index = Probability x Consequences, or Ri=Q x P

Where

Ri – Risk Index for Environmental Impacts

Q – Probability (Probability of an accident)

P – Consequences (Amount of the loss).

See table 11 for risk index ranking and table 12 for the matrix to determine risk index.

This formula is the basis for several quantitative risk analysis methods and can be applied to each adverse impact. Thus, summarizing the environmental risks in all cases, it is possible to assess the overall risk of the proposed project. By contrast, the probability is

characterized by relative frequency – for example, the incidence of certain accidents in a certain amount of time divided by the total number of cases throughout the whole period. Environmental risk index for the proposed project is calculated by calculating an average risk index Ri for the proposed project; it is calculated by dividing the proposed project's total risk by the largest possible index value, in this case, 20 points. See table 29 for risk index ranking and table 30 below for the matrix to determine risk index.

Table 29: The level of risk and its compliance with the environmental risk index.

No.	Risk Index.	The Level of the Risk.
1.	Ri = 1..3	I – Insignificant risk
2.	Ri = 4..6	II – Acceptable risk
3.	Ri= 8..10	III – Tolerable risk
4.	Ri = 11..15	IV – Significant risk
5.	Ri = 16..20	V – Intolerable risk

Adopted and modified from, (Ansis Melko and Janis Ievins, 2012),

Table 30: Matrix to determine the environmental risk index.

Probability of the Negative Impact.	**Consequences of the Negative Impact.**			
	p1 Insignificant.	**p2** Tolerable.	**p3** Significant.	**p4** Very dangerous.
Q 1 Very little.	1	2	3	4
Q 2 Unlikely.	2	4	6	8
Q 3 Rare.	3	6	9	12
Q 4 Possible.	4	8	12	16
Q 5 Frequent.	5	10	15	20

Adopted and modified from, (Ansis Melko and Janis Ievins, 2012),

7.3.2. Environmental Risk Assessment for the Proposed Project Construction Phase.

See table 31 below for the ERA analysis for the construction phase of the proposed project.

Table 31: ERA for the Construction Phase of the Proposed Project.

No.	Impact	Probability of Envisaged Negative Environmental Impacts, (Q).	Consequences of the Negative Impacts, (P).	Risk Index (Ri)	Residual Probability of negative environmental impacts (Q_R)	Residual Consequences of negative impacts (P_R)	Residual risk index. (RRi)
1.	Risk of non-compliance with statutory requirements.	4	3	12	1	2	2
2.	Potential damage to public facilities and utilities.	3	2	6	2	1	2
3.	Restriction of accessibility and general inconvenience to the public.	2	2	4	1	1	1
4.	Risk to flora and fauna.	2	2	4	1	1	1
5.	Risk of land degradation.	2	2	4	2	1	2
6.	Noise and excessive vibrations pollution.	4	3	12	3	2	6
7.	Risk of air pollution.	3	2	6	1	1	1
8.	Potential for occupational safety and health compromise.	4	3	12	2	2	4
9.	Negative social impacts.	4	3	12	3	2	6
10.	Risk of water pollution.	4	2	8	3	2	6
11.	Increased heavy traffic in the area.	3	3	9	3	1	3
12.	Solid waste generation.	4	3	12	2	1	2
Total		**39**	**30**	**101**	**24**	**17**	**36**

7.3.2.1. Environmental Risk Assessment Results Discussion.

$Ri_{\text{Construction phase}} = \frac{\text{Total risk index}}{12}$ Therefore: $Ri_{\text{Construction phase}} = 101/12 = 8.4$

$RRi_{\text{Construction phase}} = \frac{\text{Total residue risk index}}{12}$ Therefore: $RRi_{\text{Construction phase}} = 36/12 = 3$

The risk index for the construction of the proposed housing project is 8.4, which in reference to table 29 above is a tolerable risk. After factoring in the proposed mitigation measure the residue risk index for the proposed project in the construction phase is 3, which is an insignificant risk.

7.3.3. Environmental Risk Assessment for the Proposed Project Operational Phase.

See table 32 below for the ERA analysis of the operational phase.

Table 32: Environmental Risk Assessment for the Operational Phase of the Proposed Project

No.	Impact	Probability of Envisaged Negative Environmental Impacts, (Q).	Consequences of the Negative Impacts, (P).	Risk Index (Ri)	Residual Probability of negative environmental impacts (Q_R)	Residual Consequences of negative impacts (P_R)	Residual risk index. (RRi)
1.	Visual impacts.	4	3	12	3	2	6
2.	Risk of Non-compliance with the statutory requirements.	3	2	6	1	1	1
3.	Solid waste generation.	4	2	8	2	1	2
4.	Effluent waste generation.	4	3	12	2	2	4
5.	Increase energy consumption and demand.	4	3	12	2	2	4
6.	Increased water demand and consumption.	4	2	8	3	1	3
7.	Increased strain on utilities and existing infrastructure.	3	2	6	2	1	2
8.	Surface and ground water pollution.	3	2	6	2	1	2
9.	Occupational safety and health risk.	4	3	12	2	1	2
10.	Negative social impacts.	4	3	12	3	2	6
11.	Population influx.	4	2	8	4	1	4
Total		**41**	**27**	**102**	**26**	**15**	**36**

7.3.3.1. Environmental Risk Assessment Results Discussion for the Operational Phase.

$Ri_{\text{Operation Phase}} = \frac{\text{Total risk index}}{11}$ Therefore: $Ri_{\text{Operation Phase}} = 102/11 = 9.3$

$RRi_{\text{Operation Phase}} = \frac{\text{Total residue risk index}}{11}$ Therefore: $RRi_{\text{Operation Phase}} = 36/11 = 3.3$

The average risk index for the operation of the proposed project is 7.9 which in reference to table 29 is tolerable risk. After incorporating the mitigation measure the residue risk index for the proposed project in the operational phase is 3.3 which is an insignificant risk.

7.3.4. Environmental Risk Assessment for the Proposed Project Decommissioning Phase.

See table 33 below for the ERA analysis of the decommissioning phase of the proposed project.

Table 33: ERA for the Decommissioning Phase of the Proposed Project.

No.	Impact	Probability of Envisaged Negative Environmental Impacts, (Q).	Consequences of the Negative Impacts, (P).	Risk Index (Ri)	Residual Probability of negative environmental impacts (Q_R)	Residual Consequences of negative impacts (P_R)	Residual risk index. (RRi)
1.	Risk of non-compliance with statutory requirements.	4	3	12	3	2	6
2.	Noise and excessive vibrations pollution.	4	2	6	2	2	4
3.	Generation of decommissioning waste.	4	3	12	2	1	2
4.	Displacement of residents.	4	3	12	2	2	4
5.	Potential for occupational safety and health concerns.	4	3	12	2	1	2
6.	Livelihood and economic losses.	4	3	12	2	2	4
7.	Dust and air emissions pollution.	4	3	12	2	1	2
8.	Risk of external damage of adjacent facilities and infrastructure.	3	2	6	2	1	2
Total		**31**	**22**	**84**	**17**	**12**	**26**

7.3.4.1. Environmental Risk Assessment Results Discussion for the Decommissioning Phase.

$Ri_{\text{Decommissioning Phase}} = \frac{\text{Total risk index}}{8}$ Therefore: $Ri_{\text{Decommissioning Phase}} = 84/8 = 10.5$

$RRi_{\text{Decommissioning Phase}} = \frac{\text{Total residue risk index}}{8}$

Therefore: $RRi_{\text{Decommissioning Phase}} = 26/8 = 3.25$

The average risk index for the decommissioning of the proposed project is 10.5 which is a tolerable risk in reference to table 29. After application of the proposed mitigation measures, the residue risk index for the proposed project in the decommissioning phase is 2.86 which is an insignificant risk.

7.3.5. Total Project Risk.

$$\text{The Total Initial Project Risk} = \frac{Ri_{\text{Construction phase}} + Ri_{\text{Operation Phase}} + Ri_{\text{Decommissioning Phase}}}{3}$$

$$\text{The Total Initial Project Risk} = \frac{8.4 + 9.3 + 10.5}{3} = 9.4$$

$$\text{The Total Residue Project Risk} = \frac{RRi_{\text{Construction phase}} + RRi_{\text{Operation Phase}} + RRi_{\text{Decommissioning Phase}}}{3}$$

$$\text{The Total Residue Project Risk} = \frac{3 + 3.3 + 3.25}{3} = 3.18$$

The total proposed project risk (after application of the proposed mitigation measures) within the project lifecycle is 3.18 - which in reference to table 29 above is insignificant risk.

CHAPTER EIGHT: ANALYSIS OF PROJECT ALTERNATIVES.

8.1. Introduction.

This ESIA study report will be submitted to the National Environmental Management Authority. This will help in evaluating and examining the effects of the project on the environment. After the evaluation and under the proposed development alternative, an Environmental Impact Assessment (EIA) license would be issued. This way, NEMA would approve the implementation of the project. However, the development has to ensure that all environmental measures are complied with during the construction operational and decommissioning phase. The alternatives consist of the proponent's final proposal with the inclusion of the NEMA guidelines and regulations and procedures. This is as stipulated in the Environmental Management and Co-ordination Act (EMCA) of 1999, which aims at reducing environmental impacts to the maximum extent practicable.

8.2. No Project Alternative.

The No Project alternative is one of the options available for the proponent of the proposed project, this means that the status quo of the proposed project site is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will, however, involve several losses both to the landowner and the community as a whole. The landowner will continue to pay land rates on the plot while the property remains underutilized. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The proponent will continue to pay land rates but receive no value from it.
- The economic status of the people in the area would remain unchanged.
- No employment opportunities will be created for Kenyans who would have been used to implement the project directly and indirectly.
- Increased urban poverty and which results in the unintended consequences of crime in Kenya.
- No housing units shall be provided to alleviate a critical shortage.
- The area will not become more attractive for investors

• The impetus for the development of infrastructural facilities (roads, electrical, etc.) will not be undertaken.

From the analysis above, it is apparent that the no project alternative is not the best route to be taken as the proponent, local people, Kenyans in general, and the county and national government.

8.3. Sites Alternative.

The proposed project site is one of the many sites which the CGHB have. The site was considered best suited for this specific project based on the immediate availability; the size could accommodate the proposed number of unit envisaged. If an alternative was to be chosen, the CGHM and NHC would have to search for suitable land that can accommodate the scale and size of the proposed project, sealing of the official transaction, and changing of ownership may take a long period. Furthermore, it is not assured that suitable land would be available. Then the proposed project proponent would have to spend additional time on design and approvals of the plans by the relevant departments. The Project design and planning before this stage of implementation would call for an extra cost; already encountered in the proposed project i.e. whatever has been done and paid for to date would be counted as a loss to the proponent. Assuming the project will be given relevant approvals (after relocation) by the relevant authorities including NEMA, it (proposed project) would have been delayed for a long period before implementation. This would also lead to a situation like No action Alternative (as explained above). The other consequence of this is that it would discourage both foreign and local investors, especially in the housing sector. Considering the above concerns and assessment of the current proposed site, relocation of the project is not a suitable option.

8.4. Technology Alternative.

• **Energy –** the proposed project will source its energy during the operational phase from the Kenya Power Company national grid. An alternative for energy would be the installation of solar panels for lighting, water heating, and a backup power source. The proponent is encouraged to install power efficient lighting, security, and other appliances in the proposed project.

• **Effluent Management** – the proposed project effluent management alternative would be to utilize a soak pit and septic tanks to dispose of effluent waste; an alternative to the use of septic tank is the installation of bio-digesters that will treat black and grey water before disposing of the water or reusing it to irrigating landscaping. The proponent has ongoing plans of connecting to the HOMAWASCO trunk sewer line to the sewer treatment plant which within the vicinity of the proposed project site, this is considered the best option since the trunk line and the treatment plant has adequate capacity to handle the increased demands.

• **Solid Waste Management** – the proposed project will generate a lot of solid wastes. Therefore, the proponent will give priority to Reduction at the Source of the materials. This option will demand a solid waste management awareness program right from construction, occupancy up to decommissioning. Recycling, Reuse, and composting of the waste will be the second alternative for waste management. This will require for source segregation mechanism to be put in place.

• **Water supply** – incorporation of water harvesting mechanisms to the proposed project to reduce water demand by the project. The proposed project site will be connected is connected to the HOMAWASCO water system line.

8.5. Material Alternative.

The proposed project will utilize available local materials; quarry stone and ballast *inter alia* this will promote local business from whom the materials will be sourced from. The alternative would be to use Expanded Polystyrene (EPS) construction panels produced at NHC factory. The use of the EPS construction panels is not deemed the best alternative since is does not promote local business and live hoods in line with AHP development framework guideline.

8.6. Analysis of Alternatives.

The implementation of the proposed project remains the most viable option to the proponent, the local community, the county, and the national government as it will create more and standard commercial infrastructure, provide business to the contractors involved and suppliers, and would provide employment directly and indirectly to the

Kenyan population. It will also provide jobs for the workers during construction. After completion more jobs would be generated by the businesses within the project. Under the No Action Alternative, there would be no development at all and therefore, no benefits will accrue from the site, and neither would there be any environmental impact. The proponent is encouraged to adopt technology alternatives that will make the proposed project more environmentally sustainable.

CHAPTER NINE: ENVIRONMENTAL MITIGATION MEASURES AND ENVIRONMENTAL MANAGEMENT PLANS.

9.1. Introduction.

This chapter deals extensively with mitigation measures to be put in place for the anticipated negative impacts, the environmental management plan will give information on the responsible persons to implement the mitigation measures, the time-frame for which the measures will be executed, and the cost for implementing the set measures. All this aims at ensuring that the negative impacts are minimized to low or tolerable levels.

9.2. Monitoring and Evaluation.

Monitoring and Evaluation (M & E) is important at ensuring the plans are carried out as they ought to be. M & E also helps in assessing milestones in terms of short-term and long-term goals and in this case assessing if the recommended measures are being complied to. The monitoring and evaluation process gives projections of what should be expected as it gives early warning signs of possible environmental degradation. The frequency of conducting monitoring depends on the nature of the project and the adversity of the impacts it generates.

Below in tables 34, 35, and 36 is the recommended environmental management plan for the proposed project it covers the construction, operational, and decommissioning phase.

9.3. Environmental Management and Monitoring Plan.

9.3.1. Environmental Management Plan Construction Phase.

See table 34 below for the EMP of the construction phase of the proposed project.

Table 34: EMP for the Construction Phase.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
Risk of non-compliance with statutory requirements	• It is recommended to submit the proposed project architectural drawing to the County Government of Homa Bay for approval before Commencement of the project. • It is recommended to apply and pay for water supply and sewer connection to HOMAWASCO. •It is recommended to conduct an EIA for the proposed project and submit the EIA study report and obtain an EIA License from NEMA before the commencement of the proposed project. • It is recommended to ensure that a copy EIA License and the EIA study report are filed at the project site at all times during the construction phase. • It is recommended to register the proposed project with NCA before the commencement of the project. • It is recommended to register the proposed project construction site as a workplace with DOSHS before commencement of the project. • It is recommended to submit the architectural drawings to DOSHS for approval.	Proposed project Proponent.	Records Report.	Pre-construction and During construction.	250,000.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended to the contractor nominate a safety supervisor for the construction and submit the nominees' name to DOSHS relevant office. • It is recommended to strictly adhere to the general and construction phase EIA License conditions.				
Potential damage to public facilities and utilities.	• It is recommended that the contractor meet the cost where the relevant approving authority may require the contractor to pay such deposit or give such security, as it may require to cover the costs of the repair of any damage which may be caused by such work • It is recommended for the contractor to make good the damage to the damage to such public facilities and utilities to the satisfaction of the relevant regulatory / lead agency.	Contractor.	Records / Reports	During Construction phase	1,000,000
Restriction of accessibility and general inconvenience to the public.	• It is recommended to develop plans for Employee / trades parking, materials delivery and storage, and truck staging that optimize usage of the available space on site or other private property as applicable. • It is recommended to contain construction works, materials, and equipment on site.	Contractor.	Records / Reports.	During Construction phase.	100,000.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended to develop plans to communicate effectively with stakeholders including the neighborhood, the general public, and other appropriate jurisdictions. If feasible website and other social media tools are encouraged as effective communication tools. • It is recommended to coordinate activity with other major projects and events affecting the neighborhood transportation network including roadways, highways and walkways. • It is recommended to develop silt/dust control implementation plans. • It is recommended to commit to respond to neighborhood concerns and to resolving and reasonable complaints in a timely manner. • It is recommended to develop traffic Management Plans & Works Schedule.				
Risk to flora and fauna.	• It is recommended to clear the unused materials from the site at the end of the construction phase to allow for the regeneration of vegetation. • It is recommended that after construction has been concluded to restore the land through appropriate landscaping.	Project Manager NHC / Contractor.	Report.	During excavation and site clearance.	No additional cost.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended that the employment of appropriate soil conservation measures to reduce the erosion effect be ensured.				
Risk of land degradation.	• It is recommended if feasible to schedule excavation during low rainfall periods to reduce erosion impact. • It is recommended to excavate immediately before construction instead of leaving soil exposed for extended time (months/years). • It is recommended to control concentrate flow and run-off to reduce the volume and velocity of water from work sites. • It is recommended to erect wind erosion where wind erosion is a concern.	Contractor.	Report.	During excavation and site clearance.	No additional costs.
Noise and excessive vibrations pollution.	• It is recommended to provide the workers with appropriate and sufficient Personal Protective Equipments (PPEs) like earplugs to protect them from the noises generated and enforced their use. • It is recommended that the vehicles utilized during construction are well serviced; speed limits should also set to reduce noise propagation. • It is recommended that the machinery and vehicles used be those that produce minimum noise and vibrations and otherwise they be fitted with silencers. • It is recommended to notify the neighbours of the impending construction and what to expect during the construction hours.	Contractor.	Report Records.	Throughout the construction phase.	150,000.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
Risk of air pollution.	• It is recommended to provide the workers with appropriate and sufficient Personal Protective Equipments (PPEs) like respiratory masks to reduce the amounts of dust they inhale and enforce their use. • It is recommended that the contractor regulate the speed at which construction site associated vehicles move to reduce the dust emission. • It is recommended to water the site where /when necessary at least twice a day to reduce dust pollution. • It is recommended and advised that the machinery used during the construction be adequately maintained to enhance fuel efficiency and curb fume emissions. • It is recommended that the contractor come up with a dust suppression plan. • It is recommended that the excavated soil be used to fill dug up pits (Cut and fill) and the surplus disposed of or enclosed and watered to suppress the dust it may produce during windy days.	Contractor.	Reports.	Throughout the construction phase.	80,000.
Potential for occupational safety and health compromise	• It is recommended to provide adequate PPEs for use by workers at the required time for the required purpose and enforce their use. • It is recommended to provide adequate fully stocked first aid kit at the site and designate trained first aiders. • It is recommended that the contractor ensure that all equipment and machinery are used for the prescribed function or purpose.	Project Manager NHC Contractor.	Records / Report.	Throughout the construction phase.	50,000.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended to ensure that all persons handling different machinery and or equipments understand the technical operations, in addition to providing instruction manuals for the various equipment and machinery. • It is recommended to have an incident(s)/accident(s) register on site. • It is recommended to provide relevant emergency signage at the site, adequate lighting and barriers where need be. • It is recommended that the contractor obtains WIBA insurance for construction workers at the construction site.				
Negative social impacts	• It is recommended to give the local residents priority in employment to avoid conflicts and enhance project acceptance. • It is recommended to put in place formal communication mechanism between workers, contractors and the neighbours which will address among other complaints raised. • It is recommended to create awareness and sensitization on matters HIV/AIDS and sexually transmitted diseases. • It is recommended to make available stocked condom dispensers on the construction site. • It is recommended that the contractor/proponent to provide security system and personnel onsite.	Project Manager NHC / Contractor.	Records Report Checking awareness levels.	Throughout the construction phase.	80,000.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
Risk of water pollution.	• It is recommended that no construction camps be put within 50 m of drainage line and standing water source. • It is recommended that no mixing of concrete occur within 50 m of a watercourse. • It is recommended that appropriate containment structures be provided. • It is recommended that all fuel storage be appropriately bunded. • It is recommended that construction machinery to have drip trays to contain any potential leakages of fuels and oils. • It is recommended to provide ablutions facilities for construction workers.	Project Manager NHC / Contractor.	Report Inspection.	Throughout the construction phase.	No additional costs.
Increased heavy traffic in the area	• It is recommended to erect warning/informative signs (billboards at the site). These should indicate the operation hours (start and completion times); the signs should be positioned where it is easily viewed by the public and most motorists. • It is recommended that construction vehicles use designated routes, and enter and exit the site at controlled points only. • It is recommended to erect speed bumps with corresponding signage to give warning and direct the traffic as necessary. • It is recommended that where necessary, walkways will be protected by the placement of temporary barriers.	Project Manager NHC / Contractor.	Records Report Increased pressure on roads.	Throughout the construction phase.	40,000.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended to further mitigate the negative impacts due to traffic by the contractor and proponent adherence to County Government of Homa Bay traffic by-laws and Kenya traffic laws. • It is recommended that the traffic along connecting routes be controlled during the construction phase and especially when large trucks are turning into and out of the site. • It is recommended that all project vehicles adhere to speed limits determined by the contractor or the legal speed limit, whichever is lower, and be enforced and subjected to monitoring by the contractor.				
Solid waste generation	• It is recommended that material segregation bins and skips for waste generated be provided to facilitate salvaging, recycling, reusing, and disposal of waste. • It is recommended that waste collection areas are kept neat, clean, and marked. • It is recommended to contract a NEMA licensed waste collector and Licensed transporter for waste disposal.	Project Manager NHC / Contractor.	Records.	Throughout the construction phase.	200,000.

9.3.2. Environmental Management Plan Operational Phase.

See table 35 below for the EMP for the Operational phase of the proposed project.

Table 35: EMP for the Operational Phase of the Proposed Project.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
Visual impacts.	• It is recommended to incorporate in the design stage features that will reduce visual intrusion and enhance seamless integration into the surrounding area. • It is recommended that the proposed project wall cladding match with the existing architecture in the area. • It is recommended to include landscaping in the design of the proposed project that will enhance the blending of the proposed project to its surrounding.	Chief Architect.	Records.	Throughout the operational phase.	Cost in operational budget.
Risk of non-compliance with statutory requirements.	• It is recommended to adhere to general and operation phase EIA License conditions. • It is recommended to have well-maintained document records to efficiently maintain reports and optimize licenses. • It is recommended to have clearly defined roles and responsibilities that outline the EMP implementation protocol.	General Manager Estates / Management Company.	Observation Records.	Throughout the operational phase.	Cost in operational budget.
Solid waste generation.	•It is recommended to contract a NEMA registered licensed waste handler to collect and dispose off the wastes at NEMA designated sites. •It is recommended to put measures to ensure frequent and regular waste collection.	General Manager Estates / Management Company.	Records Report Inspection.	Throughout the operational phase.	Cost in operational budget.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	•It is recommended that the residents be provided with NEMA licensed waste bags on regular basis, the bags should be branded flat and color-coded. •It is recommended to have a designated waste collection point where all residents will deposit their wastes. • It is recommended that the waste chambers are appropriately located within the development but away from the main gates				
Effluent waste generation.	•It is recommended that the proponent ensure frequent maintenance of the effluent system and prompt repairs and unblocking of the sewer system. • It is recommended to ensure that storm water and effluent are separately channelled into the respective systems to avoid overloading the sewer system. •It is recommended that the proponent apply for authorization from HOMAWASCO for connection to the public trunk sewer line. •It is recommended to develop an Effluent Discharge Control Plan (EDCP) for the operation of the proposed project.	General manager estate / Management Company.	Records Checking awareness levels.	Project Design. Throughout the operational phase.	Cost in operational budget.
Increased energy consumption and demand.	• It is recommended if feasible for the installation and use of solar powered street and common areas lighting.	Chief Architect / Management Company.	Records Checking awareness levels.	Project Design. Throughout the operational phase.	Cost in operational budget.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended to incorporate energy-efficient fitting and features in the proposed project design and operations. • It is recommended to install large window for natural lighting and ventilation to cut cost on lighting and air conditioning.				
Increased water demand and consumption.	• It is recommended if feasible to consider roof rain water harvesting and storage. • It is recommended for the storage of water for consumption in tanks. • It is recommended to put in place a leak detection mechanism like regular checks and routine maintenance that will help save considerable amounts of water. • It is recommended that development be fitted with water-efficient fitting and installations.	Chief Architect.	Observation.	Project design.	Cost in operational budget.
Increased strain on utilities and existing infrastructure.	• It is recommended to liaise with CGHB for upgrade bulk sewerage infrastructure or ensure the system installed can handle the anticipated population increase.. • It is recommended to construct a bulk water storage reservoir. • It is recommended that the proponent liaise with KPC to upgrade the existing power supply to one that can serve the anticipated increase population. • It is recommended if feasible for installation power saving mechanisms into the project like solar powered streetlights, energy saving lighting and large window that will allow sufficient natural lighting and ventillation.	Chief Architect / General Manager Estates / Management Company.	Observation Records.	Project design. Throughout the operational phase.	Cost in operational budget.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended for upgrading and expansion of the project feeder roads to cater for increased traffic and improve accessibility.				
Probable ground and surface water pollution	• It is recommended that all sewerage be channelled and contained within the effluent management systems. • It is recommended that surface runoff water should not mix with the effluent and should be channelled appropriately to run off drains. • It is recommended for regular maintenance, and prompt repair of the sewer system and run-off drains.	Residents.	Report. Inspection.		Cost in operational budget.
Occupational safety and health risk	• It is recommended that the proposed project design incorporate anti slip and fall flooring. • It is recommended to put in place a fire safety system – fire extinguishers, fire hose reel connection points, and fire hydrants. • It is recommended that fire fighting water reservoir be put in place and be filled with water at all times.	General Manager Estates / Management Company.	Checking awareness levels. Records.		Cost in operational budget.
Negative social impacts	• It recommended for establishment of code of conduct for the housing unit owners / resident to regulate operations of the residential estate and bring order.	General Manager Estates.	Increased pressure on infrastructure.		Cost in operational budget.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended adopation, and operationalization of the 'Nyumba Kumi' initiative within the proposed project to increase cohesion within the project. • It is recommended that the residents establishes a resident to articulate their common issue. • It is recommended for establishment of a management company by to be transferred to unit owners after payment to ensure efficient and orderly management of the property.				
Population influx.	•It is recommended that the developer will improve the access road to the project site which provides access to the project area. • It is recommended to upgrade the drainage along with this road network. •It is recommended that the proposed project incorporate social amenities like recreational facilities, street lighting, community hall, playfield, open spaces, and commercial centres. to ease pressure on existing utilities and infrastructures. •It is recommended that the proponent incorporate water and energy-saving features in the project design to ease pressure on water and power supply needs.	Chief Architect.	Records.	Throughout the operational phase.	Cost in operational budget.

9.3.3. Environmental Management Plan Decommissioning Phase.

See table 36 below for the EMP for the decommissioning phase of the proposed project.

Table 36: EMP for the Decommissioning Phase of the Proposed Project.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
Risk of non-compliance with statutory requirements.	• It is recommended to adhere to general and decommissioning phase EIA License conditions. • It is recommended to undertake a decommissioning EIA and submit it to NEMA. • It is recommended to develop a decommissioning plan and submit it to NEMA three months before the commencement of the actual decommissioning work. • It is recommended to register the decommissioning site with DOSHS.	NHC Environmental Planner.	Reports Records.	Pre-decommissioning	Cost in Decommissioning Budget.
Noise and excessive vibrations pollution.	• It is recommended to minimize noise and vibration through sensitization of drivers to avoid gunning vehicle engines or hooting especially when passing through sensitive / silent zone / areas such as school, churches, residential areas, and hospitals. • It is recommended to ensure demolition trucks are kept in good condition to reduce noise generation. • It is recommended to insulate all generators and heavy-duty equipment or place them in enclosures to minimize high noise levels.	Contractor / Project Manager.	Records.	Throughout the decommissioning phase.	Cost in operational budget.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended to avoid blasting methods during decommissioning unless it is absolutely necessary.				
Generation of decommissioning waste.	•It is recommended to ensure segregation of waste by separating hazardous from non-hazardous wastes for appropriate disposal. •It is recommended to provide waste collection containers in accessible locations. •It is recommended that waste be safely and appropriately disposed of where feasible, recycle recoverable wastes. •It is recommended to contract a NEMA licensed waste firm to collect waste from the site for dumping at an approved site.	Contractor / Project Manager.	Observation Records.	Throughout the decommissioning phase.	Cost in operational budget.
Displacement of residents and loss of investment and houses for the buyers.	• It is recommended that adequate notices to be given all Interested and Affected Parties (IAP) concerning the impending decommissioning to allow seeking of alternative housing arrangements. • It is recommended depending on the reasons for decommissioning the property owner at the residential development if feasible to be appropriately and adequately compensated for the loss of their property(ies)	Contractor / Project Manager	Record of Emigrants	Throughout the decommissioning phase.	Cost in operational budget
Occupational safety and health concerns	• It is recommended that for issuance of appropriate Personal Protective Equipments (PPEs) for all deserving workers and to enforce their use.	Contractor / Project Manager.	Records Report.	Throughout the decommissioning phase.	Cost in operational budget.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended to do capacity building and training of staff/workers with respect to Occupational Health, Safety, and Environment. • It is recommended to provide a fully stocked first aid kit within the site and designate a qualified and trained first aider(s). • It is recommended that where the workforce exceeds 20, the contractor should facilitate the formation and operations of a Safety and Health Committee, per the Health and Safety Committees Rules, 2004.				
Livelihood and economic losses.	• It is recommended that adequate notices are issued to the business associated with the development of the intention of decommissioning in good time for them to undertake relevant adjustment(s). • It is recommended that the workers be notified early about the decommissioning plan for them to find other alternative sources of income or compensated for the loss of their means of livelihood.	Contractor / Project Manager.	Records.	Throughout the decommissioning phase.	Cost in operational budget.
Dust and air emissions pollution.	• It is recommended that the contractor provide all the construction workers with appropriate and adequate Personal Protective Equipment and enforced their usage. • It is recommended to minimizing dust from open area sources like stokepiles, by using control measures such as enclosures and covers and watering the site and exposed soils.	Contractor / Project Manager.	Report.	Throughout the decommissioning phase.	Cost in operational budget.

ISSUES	PROPOSED MITIGATION MEASURES	RESPONSIBILITY	MONITORING	TIME	COST IN (KSHS)
	• It is recommended that all machinery be regularly serviced and maintained to reduce emissions. • It is recommended to control vehicle speed limits with and around the decommissioning site to minimize dust generation. • It is recommended to sprinkle traffic routes with water regularly.				

CHAPTER TEN: RECOMMENDATIONS AND CONCLUSIONS.

10.1. Recommendations.

The ESIA findings and sufficient mitigation measures for the anticipated negative impacts of the proposed project on the environment have been well documented in this ESIA study report. The proposed mitigations measures are comprehensively provided in the EMP. It is therefore recommended that these proposed mitigation measures be fully implemented. It is further recommended that all the statutory requirements as highlighted in the report are adhered to. In addition, it is recommended to exercise environmental, health and safety good practices during the entire project cycle by the responsible parties. It is highly recommended to put in place a comprehensive monitoring and evaluation mechanism, specifically in undertaking the statutory annual environmental audits and implementing the recommendation therein. This will ensure that the proposed project will continue to be environmentally sustainable.

10.2. Conclusions.

Environmental and Social Impact Assessment is an important tool in the management of the environment. If the finding and recommendations of the ESIA are comprehensively addressed, a win-win situation will be achieved for the affected and interested parties and the goal of environmental sustainability will be realized. This ESIA study report was conducted with respect to set out objectives and terms of reference. The report conforms to the provisions of the; Environmental Management and Coordination Act, (EMCA), 1999; the Kenya Gazette Supplement No. 56, 13th June 2003; The Environmental (Impact Assessment and Audit) regulations, 2003; and the Environmental Impacts Assessment Guidelines and Administrative Procedures of 2002. The ESIA team of experts concluded that the proposed project will provide significant gains to the proposed project partners, the general public and national governments, through provision of modern affordable housing, accrued earning from the investment, and boosting development in the area, offer temporary and permanent employment to the area residents and Homa-Bay County, improve road networks, among others. The project does not pose any serious or adverse impacts to the physical, socio-economic and biological environment. It is the opinion and

conclusion of the ESIA team of experts, based on this ESIA that the proposed project is environmentally viable.

REFERENCES.

1. African Union. (1968). *African Convention on Conservation of Nature and Natural Resources* .
2. GOK. (2019). *Amendement of the Second Schedule, Kenya Gazette Supplement No. 62, Legal Notice .31* . Nairobi: Kenya Government Printer.
3. GoK. (2016). *Climate Change Act.* Nairobi: Government Printers.
4. GoK. (2013). *County Governments Act.* Nairobi: Government Printers.
5. GoK. (2018). *Environmantal Management and Coordination Act, 1999. (Revised 2018).* Nairobi: Governement Printers.
6. GOK. (2014). *Environmental Management and Coordination (Air Quality) Regulations,* . Nairobi.: Government Printer.
7. GOK. (2009). *Environmental Management and Coordination (Noise and Excessive Vibrations Pollution Control) Regulations,* . Nairobi.: Government Printer.
8. GOK. (2006). *Environmental Management and Co-Ordination (Waste Management) Regulations,* . Nairobi.: Government Printer.
9. GOK. (2006). *Environmental Management and Coordination (Water Quality) Regulations.* Nairobi.: Government Printer.
10. GOK. (1953). *Housing Act Chapter 117.* Nairobi: Government Printers.
11. GoK. (2007). *Kenya Vision 2030.* Nairobi: Government Printers.
12. GOK. (2017). *National Building Regulations* . Nairobi.: NCA.
13. GoK. (1994). *National Environmental Action Plan.* Nairobi: Government Printers.
14. GoK. (2014). *National Environmental Policy Sessional Paper No.10* . Nairobi: Government Printers.
15. GoK. (2004). *National Housing Policy.* Nairobi: Government Printers.
16. GoK. (2007). *Occupiers' Liability Act (Cap 34).* Nairobi: Government Printers.
17. GOK. (2019). *Physical and Land Use Planning Act* . Nairobi: Government Printer.
18. GoK. (1999). *Policy Paper on Environment and Development (Sessional Paper No. 6 of 1999).* Nairobi: Government Printers.
19. GoK. (2010). *The Constitution of Kenya.* Nairobi: Government Printers .
20. GOK. (2003). *The Environment (Impact Assessment and Audit) Regulations.* Nairobi.: Government Printer.

21. GOK. (2011). *The Environment and Land Court* . Nairobi: Government Printers.
22. GOK. (1999). *The Environmental Management and Coordination Act.* Nairobi: Government Printers.
23. GOK. (1968). *The Local Government (Adoptive By-Laws) (Building) Order.* Nairobi: Government Printers.
24. GoK. (2011). *The National Construction Authority Act (NCA),* . Nairobi: Government Priters.
25. GOK. (2007). *The Occupational Health and Safety Act* . Nairobi.: Government Printer.
26. GOK. (2012). *the Penal Code.* Nairobi.: Government Printers.
27. GoK. (2012). *The Public Health Act (Cap. 242).* . Nairobi: Government Printers.
28. GoK. (2002). *The Water Act.* Nairobi: Government Printers.
29. GOK. (2011). *Urban and Cities Act* . Nairobi.: Government Printers.
30. GOK. (2007). *Work Injury Benefits Act* . Nairobi.: Government Printers.
31. Government of Kenya. (2010). *The National Climate Change Response* . Nairobi.: Government of Kenya.
32. Government of Kenya (2015). *The Environmental Management and Coordination (Amendment) Act.* Nairobi: Government Printers.
33. Homa Bay County Government. (2022). *Homa Bay County Annual Development Plans.* Homa Bay.: Homa Bay County Government.
34. Homa Bay County Government. (2018). *The Second County Integrated Development Plan* . Homa Bay.: Homa Bay County Government.
35. Homa Bay County. (2021). *Homa Bay County Climate Change Policy.* Homa Bay: Homa Bay County Government.
36. Homa Bay Municipality . (2019.). *Homa Bay Municipality Integrated Urban Development Plan* . Homa Bay.: Homa Bay Municipality.
37. Homa Bay Municipality. (2019). *Solid Waste Management Policy.* Homa Bay.: Homa Bay Municipality.
38. Ievins, A. M. (2012). Methods of the Environmental Risk Analysis and Assessment, the Modified Method of the Risk Index. *Safety of Technogenic Environment* , 50-56.
39. ILO. (1988). *Safety and Health in Construction Convention, 1988.*

40. International Labor Organization. (1937). *Safety Provisions (Building) Convention.* Geneva: International Labor Organization.
41. NHC & CGHB. (2022). *The Affordable Housing Development Project Agreement.* Nairobi: NHC & CGHB.
42. NHC. (2022). *BQ for Proposed Construction of Homabay Affordable Housing Project Phase One Sector A – Homabay County.* Nairobi: NHC.
43. SDHUD. (2018). *Kenya Affordable Housing Programme Development Framework Guidelines.* Nairobi: SDHUD.
44. UN. (1992). *Convention on Biological Diversity (CBD),*
45. UN. (1998). *Kyoto Protocol.* Kyoto.
46. UN. (2015). *Paris Protocol.* Paris.
47. UN. (1992). *United Nations Framework Convention on Climate Change (UNFCCC).*
48. UNDP. (2015). *Sustainable Development Goals.*

APPENDICES.

Appendix I: Copies of EIA Lead NEMA Practicing Licenses.

Appendix II: Copy of the Proposed Project Site Legal Document of Ownership – Certificate of Lease.

Appendix III: Proposed Project Bills of Quantity.

Appendix IV: Ambient Air Quality Measurement Report.

Appendix V : Ambient Noise Measurement Report.

Appendix VI: Part Development Plan (PDP) for the proposed project site.

Appendix VII: Copies of Document of Evidence of Consultation and Public Participation - Questionnaires.

Appendix VIII: Copies of Document of Evidence of Consultation and Public Participation – Lead Agencies Feedback Forms.

Appendix XIV: Copies of Document Evidence of Consultation and Public Participation – Minutes of CPP Meetings and Attendance Lists.

Appendix XV: Copies of the Proposed Project Approved Architectural Drawings.