

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE  
PROPOSED DEVELOPMENT OF AGGREGATED INDUSTRIAL PARK AT CHIFIRI LOCATION,  
WAYU WARD, TANA NORTH IN TANA RIVER COUNTY**



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**CERTIFICATION**

**Certification by the Lead EIA/EA Expert**

I hereby certify that this Environmental Impact Assessment study report has been done under my supervision and that the assessment criteria, methodology and content reporting conforms to the requirements of the Environmental Management and Coordination Act Cap. 387 and Legal Notice No. 101 of 2003 (Environmental Impact Assessment and Audit Regulations).

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**Certification by Proponent**

This Environmental Impact Assessment study has been undertaken under the authority of County Government of Tan River and shall implement the mitigation measures proposed and undertake to implement further instructions as NEMA may deem appropriate in relation to the findings and from time to time as inspections may inform.

Signature: .....Date: .....

Name.....

Position.....

## **ACKNOWLEDGEMENTS**

Many people have directly contributed to this Environmental Impact Assessment exercise. It would be impossible to thank each and every one of them individually. The consulting team hopes that its efforts in rendering the collective findings of this exercise will do justice to the many who assisted and facilitated this work.

The team must however acknowledge the logistical support provided by the proponent. We also recognize all project stakeholders and neighbours for agreeing to participate in the public consultative process. To all who helped and have not been mentioned individually, kindly accept our sincere thanks.

## EXECUTIVE SUMMARY

This Environmental and Social Impact Assessment (ESIA) study was conducted and on behalf of the proponent, The County Government of Tana River in compliance with the Environmental Management and Coordination Act Cap. 387 which requires that ESIA study be carried out for activities such as the proposed. Provisions of the Environmental Management and Coordination (Environmental Impact Assessment and Audit) Regulations, 2003 also dictate the submission of such assessment to the National Environment Management Authority (NEMA). The proposed project requires ESIA study report so that all the anticipated impacts can be screened and examined to detail as dictated on second schedule of Legal Notice (LN) No. 101 of 2003.

The proponent is proposing to establish a County Aggregated Industrial Park (CAIP) at Chifiri Location in Tana River County. CAIPs are special zones being set up in Kenya's 47 counties as a joint venture between the national and county governments to spur industrialization and increase exports of locally produced goods. CAIPs are one of the flagship projects to create more jobs and higher value addition in manufacturing sectors. The proposed CAIP will be a mixed use Special Economic Zone (SEZ) to be developed on a 60.75-hactare piece of land providing suitable investment in production capacity in value chains from various sectors. The CAIP will put into consideration to key aspects of livelihood strategies that will promote employment within the locality. The park shall include the following value chains:

- Indigenous chicken;
- Apiculture;
- Beef;
- Rice;
- Maize;
- Mango; and,
- Green gram processing.

The project site lies within geo-reference points 1°16'13.2"S 39°43'34.7"E (-1.270333, 39.726306) and is situated about 2.8Km from Chifiri Primary School. The project is estimated to cost Ksh. 500,000,000.00.

The assessment examined the potential impacts of the proposed project on the immediate surroundings with due regard to all the phases of construction through to operation and decommissioning. It encompassed all aspects pertaining to the physical, economical, ecological, socio-cultural, health & safety conditions at the site and its environs. The assessment was based on laid down scientific qualitative procedures with the most recent methodologies and analysis required in EIA and strictly adheres to the relevant legislative framework.

Both positive and negative impacts will result from the design, implementation, operation and possible decommissioning of the CAIP. Implementation of the project will have potential negative and positive environmental and social impacts. The positive impacts include value chain addition to products, creation of job opportunities, general infrastructural improvement & development in the fringes of the site, inducement of additional investments within the locality, job creation/employment opportunities will be realized due to the proposed investment, stimulation of skills transfer and, stimulation of economic development.

Possible negative environmental and social impacts during construction phase include: interference with the physical setting of the area including the loss of vegetation, increased noise and vibration, visual intrusion, air pollution/dust emission, increased waste generation, accidental spillages, increased use and extraction of construction materials and possible encounter with physical cultural resources. Other adverse health impacts

include Occupational Safety and Health (OSH) risks, which may result to health and safety risks due to truck movements in and out of the site, fire hazards, spread of communicable diseases and other infections including increase in HIV/AIDS prevalence and other STIs. Negative social impacts include; labour influx, cases of violation of individual rights and gender inequalities, possible cases of conflict and insecurity, sexual exploitation and abuse, child labour, cases of work and community related grievances.

Potential impacts during operation phase include: fire risks, air pollution from emissions from power back up gensets OSH risks for healthcare workers, OHS risks to waste handlers, increased water use, community health risk, increased solid/liquid waste generation, and increased energy use.

This ESIA report outlines appropriate mitigation measures for the anticipated environmental and social negative impacts. The following mitigation measures are recommended; landscaping of disturbed areas and controlling earthworks to prevent compacting the loose soils, provision of Personal Protective Equipment (PPE) to all workers at the site and enforcement of their use, fencing of the site appropriately and limiting access to informed personnel/visitors, implementation of best management practices and use of best available technology for pollution control and development of pollution of prevention plans. Further appropriate mitigation measures have been proposed and elaborate Environmental Management Plan (EMP) outlined in this ESIA study report. All the negative impacts will be mitigated to the highest degree.

An extensive public consultation process was engaged in gauging the sentiments of a variety of stakeholders in the development of this project. Besides the fact that this is a regulatory requirement under the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003, it was an excellent opportunity to offer the public an opportunity to ventilate their fears and concerns. Public participation was implemented using semi-structured interview strategy, questionnaires and a consultative meeting. The public participation process engaged for this exercise demonstrates overall acceptance of the project by the respondents.

This report examines CAIP at the level of primary infrastructural installations and zoning but not actual operations for each value chain. On the basis of the evaluation of the development proposal, the project does not occasion environmentally significant negative impacts that could lead to environmental degradation on an appreciable throughout the project cycle. This EIA project report presents a “Findings of No significant Impacts”. The development of this project is considered economically viable, socially acceptable and environmentally sound. This project should be favored with license subject to the conditions that NEMA may impose during the decision making process. It is strongly recommended that each operation be subjected to EIA.

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## ABBREVIATIONS AND ACRONYMS

DOSH	Directorate of Occupational Safety and Health
EA	Environmental Audit
EDL	Effluent Discharge License
EIA	Environmental Impact Assessment
EMC	Environmental Management and Coordination
EMCA	Environmental Management and Coordination Act, Cap. 387
EMP	Environmental Management Plan
ESMPs	Environmental and Social Management Plans
GPS	Global Positioning System
HCVs	Heavy Commercial Vehicles
KPLC	Kenya Power and Lighting Company
LN	Legal Notice
LWH	Length Width Height
mm	Millimetres
NCA	National Construction Authority
NEMA	National Environmental Management Authority
Nos.	Numbers
PPE	Personal Protective Equipment
WARMA	Water Resource Management Authority

## 1.0 INTRODUCTION

### 1.1 Background Information

For a long time, the world over, policy makers have been directing all their efforts in economic development without due regard to the nature of the resource base on which the economic development depend on. As a result, there has been unprecedented environmental degradation, during project implementation and operation stages, due to lack of integration of environmental concerns into the project design, planning and management, thereby resulting into unsustainable development. To ensure sustainability and revitalization of the degraded environment, all proposed development projects' activities and their subsequent operations are now required to be critically examined to evaluate the impacts (both positive and negative) they would have on the environment before they are implemented and to enhance Sustainable Environmental Management as well as controlling and revitalizing the much – degraded environment.

Some of the Environmental Management tools used to achieve this is EIA, done before the implementation of a new project and an Environmental Audit (EA) done on existing projects. All these are emphasized in Cap. 387. An EIA identifies both negative and positive impacts of the proposed project, how it affects people, their property and the general environment. Environmental Experts registered by NEMA should conduct the EIA and EA studies. Appendix 1 includes the experts' practicing licenses.

The proponent is proposing to establish a county aggregated industrial park at Chifiri Location in Tana River County. Such undertaking is listed under the Second Schedule of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya as high risk and should therefore undergo EIA Study process. To fulfill this legal requirement, the proponent contracted EIA experts to carry out the Study.

### 1.2 Overview of the project

The proponent is proposing to establish a County Aggregated Industrial Park (CAIP) at Chifiri Location in Tana River County. CAIPs are special zones being set up in Kenya's 47 counties as a joint venture between the national and county governments to spur industrialization and increase exports of locally produced goods. CAIPs are one of the flagship projects to create more jobs and higher value addition in manufacturing sectors. The proposed CAIP will be a mixed use SEZ to be developed on a 60.75-hactare piece of land providing suitable investment in production capacity in value chains from various sectors. The CAIP will put into consideration to key aspects of livelihood strategies that will promote employment within the locality. The park shall be a set of permanent sheds that shall include the following value chains:

- Indigenous chicken;
- Apiculture;
- Beef;
- Rice;
- Maize;
- Mango; and,
- Green gram processing.

The proposed infrastructure and utilities that are planned for construction include roads, power, substations, water supply, borehole, wastewater and sewerage treatment plant and storm water channeling system.

### 1.3 Project Location and Neighbourhood

#### 1.3.1 Project Location

The proposed project will be undertaken at Chifiri Location in Tana River County. The site lies within geo-reference points  $1^{\circ}16'13.2''S$   $39^{\circ}43'34.7''E$  (-1.270333, 39.726306) and is situated about 2.8Km from Chifiri Primary School. The image below shows the location of the site.

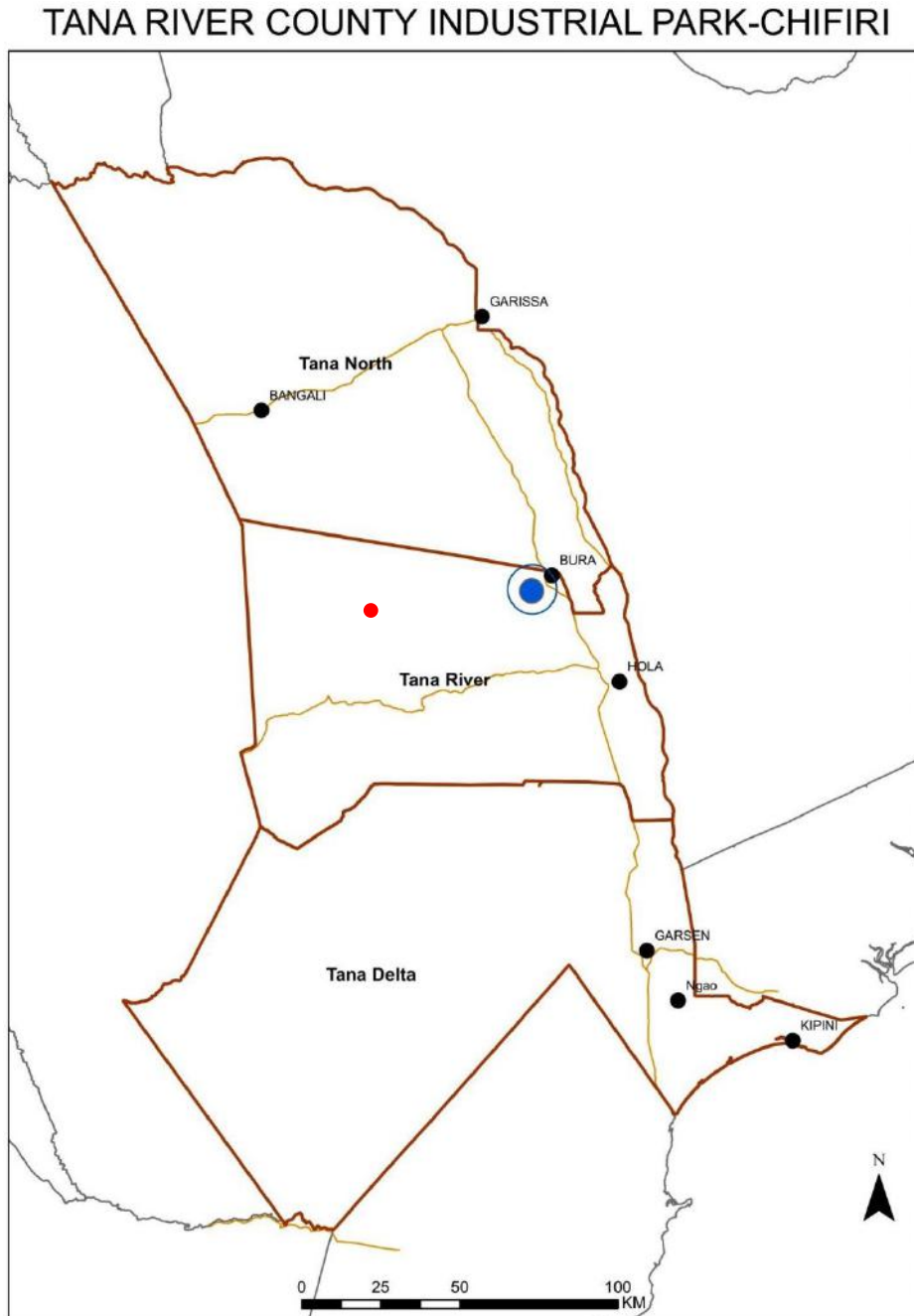


Figure 1: Site Location

#### 1.3.2 Site and Neighbourhood

The site is situated about 2.8Km from Chifiri Primary School. The site has not been developed but by the time of this assessment, the site had been cleared. The immediate land parcels have not been developed and form part of community land that is used for livestock grazing.



Figure 2: A section of the site.



Figure 3: Site access road.

## **1.4 Study Approach and Methodology**

### **1.4.1 Introduction**

The methods adopted for preparing the ESIA study report were guided by the Third Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. The consultants prepared a scoping report and Terms of Reference (TORs) as required under Regulation 11 of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003 and submitted them to NEMA for consideration for approval.

### **1.4.2 Data Collection**

A site visit was undertaken in January 2024 for purposes of area reconnaissance, assessing the baseline environmental conditions of the proposed project site and screening of environmental risks associated with the



proposed development as well as the applicable environmental safeguards and standards. An environmental screening criterion was informed by the Second Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. As per this schedule, the issues considered by the experts included ecological impacts, socio-economic issues, landscape changes, land use character and water.

## **1.5 Analysis of Alternatives**

### **1.5.1 Introduction**

Investigating the available alternatives to the development proposal is an important aspect of the EIA process that could invariably help in mitigating the impacts predicted in the preceding chapters of this report. In this analysis, the consultant considered alternatives on the following basis:

- The arguments for or against the implementation of the project i.e. the “No” versus the “Yes” project alternatives;
- Siting of the project;
- Technological alternatives; &
- Scale and extent.

### **1.5.2 The ‘No Project’ Alternative**

This alternative is the best in terms of mitigating the anticipated environmental challenges of the project since it maintains the status quo of the environmental conditions of the project area. However it does not add value to the status of the piece of the land under consideration. This alternative will in addition deny the proponent, contractors and other workers a reliable income; deny the government revenue from the tax obtained on materials and licenses related to construction/installation and operation of the facility.

### **1.5.3 The “Yes Project” Alternative**

This option is considered as the most viable because of the following reasons:

- The proposed development will largely contribute to employment creation and revenue to the government.
- The proponent will accrue profits from the investment;
- The proposal is consistent with the existing land use character of the area; and,
- It will provide income to the government and other business ventures.

### **1.5.4 Siting Alternatives**

Siting alternatives would be considered under the following assumptions:

- That the space proposed for the project is insufficient for the scale and extent of the project;
- The project is incompatible with the existing land use systems of the area; &
- The site hosts sensitive ecosystems and the anticipated impacts cannot be reasonably mitigated.

Since the above concerns are not applicable to the proposed project site, it is deemed suitable for the proposed project site. Choosing another site is negated by the requirement for additional capital and the availability of suitable land for the development in the event that the capital is available.

### **1.5.5 Technological alternatives**

Technological alternatives are driven by the need for a cleaner production technology and conservation of raw materials, construction labour, energy water resources. For the proposed development, we recommend the following options:

- Implement best available pollution control technology;
- All water for use shall be metered to determine consumption levels;
- Raw materials will be purchased from sources that are NEMA compliant and are environmental friendly; and,
- All electrical fittings should comply with the set standards and shall not contain ozone depleting substances.

#### **1.5.6 Project Scale and Extent**

The scale and extent of the project is considered adequate given the availability of sufficient land resource upon which the project will be implemented and readily available raw materials.

#### **1.5.7 Project Scale and Extent**

The scale and extent of the project is considered adequate given the availability of sufficient space upon which the project will be implemented.

## 2.0 BASELINE INFORMATION OF THE PROJECT AREA

### 2.1 Introduction

The following baseline information details on environmental, ecological and bio-physical characteristics of the site. It is expected that it will provide for a benchmark for continued monitoring and assessment of the impact of the proposed activities on the environment.

### 2.2 Physiographic and Natural Conditions

#### 2.2.1 Physical and Topographic Features

The major physical features in Tana River County is an undulating plain that is interrupted in a few places by low hills at Bilibil (around Madogo) and Bura administrative sub-units which are also the highest points in the county. The land in Tana River generally slopes south eastwards with an altitude that ranges between 0m and 200m above sea level. The most striking topographical feature is the river Tana that traverses the county from the Aberdares in the North to the Indian Ocean in the South covering a stretch of approximately 500km. Besides the river Tana, there are several seasonal rivers in the county popularly known as *lagas*, which flow in a west-east direction from Kitui and Makueni Counties draining into river Tana and eventually into the Indian Ocean. The river beds support livestock as well as wildlife during the dry season since they have high ability to retain water. River beds are most appropriate sites for shallow wells, sub-surface dams as well as earth pans.

#### 2.2.2 Ecological Conditions

The county is divided into four agro- ecological zones namely: CL 3 Coconut – Cassava zone (non ASAL), CL4 Cashew nuts- Cassava zones where the main economic activity is peasantry mixed farming; CL5 Lowland Livestock zone and CL6 Lowland Ranching zones where the locals are involved in pastoral activities. The soils range from sandy, dark clay and sandy loam to alluvial deposits. The soils are deep around the riverine environments but highly susceptible to erosion by water and wind. Soils in the hinterlands are shallow and have undergone seasons of trampling by livestock, thus are easily eroded during rainy seasons.

The vegetation ranges from scrubland to thorny thickets within the riverine area. Shrubs and annual grasses dominate most parts of the region. However, there are enclaves of trees and perennial grasses dominating wetter parts. An invasive tree species called *Prosopis Juliflora*, commonly known in the area as ‘*Mathenge*’ (named after the person who introduced it) has spread rapidly in the area and is threatening to replace most of the indigenous vegetation. It was introduced for fuel-wood production in the Bura Pilot Irrigation Scheme. It grows fast and chokes other vegetation, watering points and the canals, and is colonizing most of the areas that are not cropped, including the riparian environments.

#### 2.2.3 Climatic Conditions

The region has a hot and dry climate within ecological zones ranging from III (in the very high grounds) to VII (in the plains or lowlands). Average annual temperatures are about 30°C with the highest being 41°C around January-March and the lowest being 20.6°C around June-July. Rainfall is low, bimodal, erratic and conventional in nature. The total annual rainfall ranges between 280 mm and 900 mm with long rains occurring in April and May, short rains in October and November with November being the wettest month. The Inter Tropical Conventional Zone (ITCZ), which influences the wind and non-seasonal air pattern for the river Tana, determines the amount of rainfall along the river line. The dry climate in the hinterland can only support nomadic pastoralism.

### **2.3 Land and Land Use**

The land in the county is largely non-arable covering 29,798.7 km<sup>2</sup>. The rest is either under forest 3,457 km<sup>2</sup>, arable land covering 2,547 km<sup>2</sup>, and 3,059.5 km<sup>2</sup> under national reserves.

#### **2.3.1 Mean Holding Size**

The mean holding land size in the county is 4 ha, especially in the irrigation schemes of Hola and Bura. In the settlement schemes of Witu I and Witu II, the mean land holding size is 15 acres while Ngao adjudication area, the mean holding size is 5 acres. Though the mean holding land size is 4 ha, there is a variation on land holding with some farmers in Bura and Hola irrigation schemes having between 0.6 ha and 3 ha.

#### **2.3.2 Percentage of Land with Title Deeds**

Only about 4.3 per cent of the land in the county has title deeds. Most land owners have no title deeds since the land is communally held in trust by the County Government/Government of Kenya.

#### **2.3.3 Land Tenure System**

About 90% of land in Tana River County has not been registered, and is either community land or government land. The inhabitants do not therefore have title deeds which can be used as security to acquire loans from banks. This is a major loophole which land prospectors and the National Government take advantage of acquiring land at the expense of the locals this has and can be potential source of conflicts, especially land within and around the county headquarters and along the coast line. The absence of individual or group parcels land title deeds has in some cases led to underutilization of land resources. The challenge for the county is therefore to ensure that land regimes in the county are favourable for productive activities.

### **2.4 Crops, Livestock and Fish Production**

#### **2.4.1 Main Crops Produced**

The main crops produced in the county are mangoes, cowpeas, bananas and green grams. Farmers in the county mainly rely on rain fed and flood recession farming systems with only a few practicing irrigated farming. Maize production also takes place in the irrigation scheme.

#### **2.4.2 Acreage under Food Crops and Cash Crops**

The total acreage of farms under food crop production is 7,527 hectares while that under cash crop production is 7,063 hectares.

#### **2.4.3 Average Farm Sizes**

The arable area in the county is 2,547 Km<sup>2</sup> with the average farm size being 0.71 ha. Farmers normally grow subsistence crops.

### **2.2 Climate**

The project site lies in Chifiri location, Wayu Ward, Tana North Tana River County. The region has a hot and dry climate within ecological zones ranging from III (in the very high grounds) to VII (in the plains or lowlands). Average annual temperatures are about 30 degrees Celsius with the highest being 41-degree Celsius around January-March and the lowest being 20.60C around June-July Rainfall is low, bimodal, erratic and conventional in nature. The total annual rainfall ranges between 280 mm and 900 mm with long rains occurring in April and May, short rains in October and November with November being the wettest month. The Inter Tropical Conventional Zone (ITCZ), which influences the wind and non- seasonal

air pattern for the river Tana, determines the amount of rainfall along the river line. The dry climate in the hinterland can only support nomadic pastoralism

### **2.3 Topography**

The major physical features in Tana River County is an undulating plain that is interrupted in a few places by highest point at Kaniki, Kuriti and Bilbil. The land in Tana River generally slopes south eastwards with an altitude that ranges between 0m and 200m above sea level. The most striking topographical feature is the river Tana that traverses the county from the Kora National Park in the North to the Indian Ocean in the South covering a stretch of approximately 765km. Besides the river Tana, there are several seasonal rivers in the county popularly known as *lagas*, which flow in a west-east direction from Kitui and Makueni Counties draining into river Tana and eventually into the Indian Ocean. The river beds support livestock as well as wildlife during the dry season since they have high ability to retain water. River beds are most appropriate sites for shallow wells, sub-surface dams as well as earth pans.

The Tana River Delta Ramsar Site is the second most important estuarine and deltaic ecosystem in Eastern Africa, comprising a variety of freshwater, floodplain, estuarine and coastal habitats with extensive and diverse mangrove systems, marine brackish and animal species. It covers 163,600 ha and protected under the Ramsar Convention on wetlands. The County also has several ox-bow lakes especially in the Tana Delta. These include Shakababo, Kongolola, Singwaya, Siloa and Mudhana among others. The county has the Boka Springs.

### **2.4 Soils**

The soil of the Chifiri is controlled and influenced by the physiographic and the geology of the area. Most of the higher surfaces carry little soil cover, Most of the higher surfaces carry little soil cover, The lower hill slopes are usually covered by screed soils and broken boulder rocks while the pediments area surrounding the hills, as well as the featureless plains are covered by talus and thick red sandy soils.

### **2.5 Population**

The projected population of Tana River County in 2022 was estimated at 341,080 with 171,183 being female and 169,897 males. This is expected to increase to 341,079 in 2022 and to 391,199 by 2027, reflecting about 15 per cent increase. The county has an inter census population growth rate of 2.78 per cent slightly lower than the national average of 2.9 per cent. The ratio of male to female is 99:100 and the pattern is projected to remain the same over the plan period.

### **2.6 Land Use and Economic Activities**

Land use in the wider county is mixed use characterized by housing, industries, and commercial facilities. The proposed site location is commercial/ industrial area.

### **2.7 Infrastructure and Social Amenities**

#### **2.7.1 Energy**

The main energy supplier to Tana County is The Kenya Power and Lighting Company (KPLC) through the National Power Grid.

#### **2.7.2 Roads**

The total road network in the county is 3,377km with about 55 per cent in motorable condition. The total road network is composed of 1,108km (class A – E) of classified roads and 2,269 km (class U) of unclassified roads. Out of this only 449km is bitumen surfaced. The major roads in the county include the Madogo – Hola – Malindi road which is dilapidated and impassable at various points during rains. The

Kenya National Highways Authority (KeNHA) has however put in place plans to upgrade the 330km stretch to bitumen standard, and the project is in the design phase and construction is set to begin as soon as funds are available. The county boasts of seven airstrips with major ones located at Hola, Bura and Garsen. The county has a 76 Km sea front with Kipini operating as a fish landing site which can be potential sea port for fishing vessels. The LAPSSSET project will potentially open up the county with road and rail network

### **2.7.3 Information and Communication Technology**

The county is served by three mobile phone service providers that cover 55 per cent of the county. These services are however concentrated along the Garissa- Malindi road. There are three post offices in the whole county located at Bura, Hola, Tarasaa and Garsen. The landline is in deplorable state and does not function in most areas. There are five courier service providers in the county. Internet connectivity is still low with most people using modems from mobile phone service providers. Investments in DSTV, Zuku and other free to air satellite television has nevertheless made access to local and international broadcasts possible in the county. The Kenya Broadcasting Corporation (KBC) Radio is the only media house which has a signal in the county.

## **2.8 Environmental Quality**

### **2.8.1 Water Supply**

No adequate sources of water supplies are at present available around the Location. Tana North has water for within the river Tana. Most of the communities depend on the river for watering their animals, domestic use and the agricultural activities. Water resources will be investigated comprehensively during the ESIA study.

### **2.8.2 Solid Waste Management**

The main sources of solid waste in Tana River County are domestic, commercial ventures, hotels, markets, industries and institutions including health facilities. All types of waste are transported to designated transfer stations awaiting disposal in the main dumpsites.

### 3.0 POLICY, INSTITUTIONAL AND LEGAL FRAMEWORK

#### 3.1 Introduction

The relevant legislation which the project must comply with is intended to ensure project's sensitivity to environmental concerns. In response to environmental degradation, the Kenya parliament enacted the EMCA Cap. 387 No. 8 to comprehensively address the challenges of environmental management in Kenya. Later Legal Notice (LN) No. 101 was *gazetted* in 2003 as an attendant regulation to EMCA, Cap 387. Under this legal framework major changes in land use are required to undergo an EIA study which is later submitted to a statutory body i.e. NEMA for approval and granting of an EIA license. Similarly existing projects with a potential to impact on the environment, health and safety of the environment are required to undergo an initial environmental audit to determine compliance with environmental legislation and integrate environmental concerns into the operational stages of the project life cycle.

Environmental degradation is a major global challenge especially in terms of how to maintain sustainable development without degrading the natural environment on which people are dependent (UNEP & ACTS, 2002). It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound (Okidi and Mbote, 2001). Among the major environmental problems being experienced in Kenya today include land and habitat degradation, loss of biodiversity, environmental pollution and water management. The broad objectives of the national environmental policy include the following;

- Integrate environmental conservation and economic activities into the process of sustainable development,
- Optimal use of natural land and water resources in improving the quality of human environment,
- Undertake appropriate reviews and evaluations of developmental plans and operations to measure their progress and to ensure compliance with this policy.
- Sustainable use of natural resources to meet the needs of the present generations while preserving their ability to meet the needs of the future generations,
- Encourage concern and respect for the environment, emphasize on every Kenyan's responsibility in environmental performance and ensure appropriate operating practices and training of generations,
- Communicate with the public on environmental matters to facilitate improvements in environmental performance, and,
- Meet national goals and international obligations by conserving biodiversity, arresting desertification, mitigating effects of disasters, protecting ozone layer and maintaining ecological balance on the earth.

Under Cap. 387, regulations have been established to facilitate the process of EIA and EA studies. These are contained in the Kenya Gazette Supplement No. 56 legislatives Supplement No. 31, LN No. 101 of 13<sup>th</sup> June 2003 and are known as the Environmental (Impact Assessment and Audit) Regulations 2003. Several other statutes and national policies to enhance environmental conservation and sustainable development are in place in Kenya. Several of these policies and legal provisions are briefly described in the following subsections.

#### 3.2 Policies

##### 3.2.1 National Policy on Water Resources Management and Development

While the National Policy on Water resources Management and Development (1999) enhances systematic development of facilities in all sectors for promotion of the country's socio-economic progress, it also

recognizes the by-products of this process as wastewater. It therefore calls for development of appropriate sanitation systems to protect people's health and water resources from institutional pollution. Industrial and business development activities therefore should be accompanied by corresponding waste management systems to handle the wastewater and other waste emanating from their activities. The same section requires that such projects should also undergo comprehensive Environmental Impact Assessment (EIA) that will provide suitable measures to be taken to ensure environmental resources and people's health in the immediate neighborhood and further downstream are not negatively impacted by their emissions.

As a follow-up to this, EMCA Cap 387 requires annual environmental audits to be conducted in order to ensure that mitigation measures and other improvements identified during EIA studies are implemented. In addition, the policy provides for charging levies on waste on the basis of quantity and quality. The "polluter-pays-principle" applies in which case parties contaminating water are required to meet the appropriate cost of treatment. The policy provides for establishment of standards to protect water bodies receiving waste water, a process that has been accomplished through the gazettment of LN No. 120 of 2006 (Water Quality Regulations).

### **3.2.2 Policy Paper on Environment and Development**

The key objectives of the Policy on Environment and Development include:

- To comply with and make provisions for effluent treatment standards that will conform to acceptable NEMA guidelines.
- To ensure that an independent environmental impact assessment (EIA) report is prepared for any industrial venture or other development before implementation; &
- To ensure that from the onset, all development policies, programs and projects take environmental considerations into account.

### **3.3 Institutional Framework**

To implement the legal framework outlined in the preceding sub topics, the government has established a number of institutions with varying mandates of implementation. These include;

- The National Environment Management Authority to implement the Environmental Management and Coordination Act and subsidiary Regulations.
- The Directorate of Occupational Safety and Health Services to implement the Occupational Safety and Health Act alongside the subsidiary legislation.
- The Water Resources Authority to implement the Water Act.
- The County Government of Kwale to implement the County Government Act, its by- laws and the Public Health Act.

### **3.4 Legal Framework**

The key national laws that govern the management of environment resources in the country have been briefly discussed in the following paragraphs. Note that wherever any of the laws contradict each other, the Environmental Management and Coordination Act 1999 prevail.

#### **3.4.1 The Constitution of Kenya (2010)**

The Constitution of Kenya 2010 is the supreme law of the land. Any other law that is inconsistent with the Constitution is null and void to the extent of its inconsistency. Under Chapter IV, article 42 provides for the right to a clean and healthy environment for all. Further, Chapter V of the Constitution deals with Land and Environment. Specifically Part 2 elaborates on the following components regarding the protection of the environment:



- Enforcement of environmental rights;
- Obligations in respect of the environment;
- Agreements relating to natural resources; and,
- Legislation relating to the environment.

*Under the Constitution the proponent is entitled to carry out the project within legal limits and a fair administrative decision making process from NEMA and other State organs. On the other hand, he is required to ensure:*

- *That the project is carried out in an ecologically, economically and socially sustainable manner;*
- *That all the applicable provisions of the Constitution are observed at all times; &*
- *That the right to a clean and healthy environment for all is upheld in all phases of the development.*

### **3.4.2 The Environmental Management and Co-ordination Act (EMCA, Cap. 387)**

The purpose of this Act aims at improving the legal and administrative co-ordination of the diverse sectoral initiatives in the field of environment so as to enhance the national capacity for its effective management. It has several Regulations that are discussed in the proceeding sections.

#### **3.4.2.1 The Environmental Management and Co-ordination (EIA/EA) Regulations, 2003 (LN No. 101 of 2003)**

The EIA/EA Regulations are meant to ensure the implementation of Sec. 58 of EMCA. It makes it illegal for anyone to undertake developments without an EIA license and stipulates the ways in which environmental experts should conduct the Environment Impact Assessment and Audits reports in conformity to the requirement stated. It is concise in its report content requirements, processes of public participation, licensing procedures, inspections and any possible offences and penalties under the Act.

#### ***Relevance to the proposed project***

*Acquisition of EIA license prior commencement of the project. The operations of the project are similarly licensed since the EIA report contains an Environmental Management Plan which forms the basis for approval of the project by NEMA and imposition of conditions to safeguard the environment. Due to its transparent nature, the EIA process builds neighborhood support and sustainability into the project.*

#### **3.4.2.2 Environmental Management and Co-ordination (Water Quality) Regulations (LN No. 120 of 2006)**

Water quality regulations were gazetted as a legislative supplement to mainly address the challenges of pollution of water sources and conservation. It consists of VI parts and eleven schedules dealing with protection of water sources for domestic use to miscellaneous provision. Effluent discharge and water for industrial use are dealt with under part III which sets out the following:

- Standards for discharge into the environment;
- Standards for discharge monitoring; and,
- Application for Effluent Discharge License (EDL).

Generally the act addresses the challenges of pollution of water resources as well as their conservation. The regulation provides guides for water use and conservation as well as effluent standards for discharge.

***Relevance to the proposed project***

*Important in protection of ground water sources. Since there is a potential of work force effluent to be discharged into the environment, the proponent will ensure that such effluent is managed accordingly. EDL has to be sought prior operations.*

**3.4.2.3 The Environmental Management and Co-ordination (Waste Management) Regulations, 2006 (LN No. 121 of 2006)**

In pursuit of the provisions of the Environmental Management and Coordination Act, Cap 387, the Minister for Environment in 2006 gazetted the waste management regulations focusing on management of solid wastes, industrial wastes, hazardous wastes, pesticides and toxic substances and radioactive substances. The regulations are aimed at addressing the following concerns;

- Licensing of waste disposal sites and transportation of wastes,
- Reduction of waste through adoption of cleaner methods of production,
- Responsibilities for waste generators and obligations for disposal,
- Proper transportation and disposal of wastes,
- Management of waste disposal sites,
- Waste treatment requirements,
- Application of existing regulations in relation to waste management,
- Licensing of waste handlers and disposal sites, and
- Licensing fees and procedures for waste handlers and pollution penalties

***Relevance to the proposed project***

*The proponent should ensure there is proper contractual agreement with licensed solid waste handlers and that solid wastes are disposed on the manner prescribed. These could include PPE, packaging, plastic wrappings, etc. All solid wastes shall be disposed of by a contracted NEMA licensed solid waste handler. Onsite disposal of the hazardous material shall be done as per the guidelines issued by NEMA. To comply with Regulations 11, 24 & 25, the proponent shall seek license to Own/Operate a Waste Treatment Plant/Disposal Site.*

**3.4.2.4 The Environmental Management and Co-ordination (Excessive Noise and Vibrations Pollution Control) Regulations, 2009 (LN No. 61 of 2009)**

These Regulations were gazetted to manage noise levels to levels that do not cause a disturbance to the public. The proposed activities will however have a potential for the production of noise above the acceptable limits.

***Relevance to the proposed project***

*Ensure compliance with the set noise level limits for the site especially during construction. The contractor should ensure that employees are not exposed to noise levels above 85 dB (A) and in such cases provide suitable personnel protection equipment (ear protective devices).*

**3.4.2.5 The Environmental Management and Coordination (Air Quality) Regulations, 2014 (LN No. 34 of 2014)**

These regulations were aimed at controlling, preventing and abating air pollution to ensure clean and healthy ambient air. The activities of the proposed project will have a potential to pollute the air from construction works and potential dust. The proponent should implement recommended measures to minimize air pollution and undertake quarterly air quality monitoring.

### 3.4.3 The Water Act, 2016

The Water Act provides the legal framework for sustainable utilization and management of water resources through an elaborate governance framework. It has four key institutions charged with separate functions and decentralized decision making systems. These institutions are summarized in the table 3 below.

Table 1: Water Resources Management Institutions and their roles as established under the Water Act, 2016.

Institution	Role
Water Service Boards (WSBs)	Development and maintenance of regional water provision infrastructure
Water Service Providers (WSPs)	Provision of reticulated water supply
Water Resources Authority (WRA)	The Authority is responsible, among other things, for the issuance of permits for boreholes
Water Services Regulatory Board (WSRB)	License all providers of water and sewerage services who supply water services to more than twenty households

#### ***Relevance to the proposed project***

*The Water Act provides for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water, to provide for the regulation and management of water supply and sewerage services. The proponent will obtain water from the reticulated supply by Kwale Water Supply and Sanitation Company Limited supplemented by with water from bowsers.*

### 3.4.4 The Occupational Safety and Health Act 2007, OSHA

The OSHA 2007 repealed the Factories Act, Cap 514 Laws of Kenya which had been originally adopted in 1962 and revised in 1972, underwent further and extensive amendments in 1990. The provisions of OSHA have far reaching implications on safety and health at the work place. The OSHA sets out to make provisions that aim to eradicate or minimize accidents at the work place. Throughout the world, work related accidents are a major concern for Governments and industry, the hospitality industry included. The ILO estimates that there are over 250 million work related accidents per year; 160 million work related ill health every year and that 3000 people are killed at work per day. Many of the accidents could be avoided if appropriate safety practices and information were used. Work related accidents affect not only the injured employee, but others as well – employers, family, co-workers, clients, suppliers, community etc.

The OSHA 2007 commenced on 26th October 2007. It is an Act to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces. Although the OSHA 2007 repealed the Factories and Other Places of Work Act, Cap 514 Laws of Kenya, it inherited all the subsidiary legislation issued under Cap 514. Examples of subsidiary legislation inherited include:

- Electric Power Special Rules L.N 340 of 1979
- First Aid Rules L.N 87 Of 1964
- Docks Rules L.N 306 of 1962
- Eyes Protection Rules L.N 44 of 1978
- Building Operations and Works of Engineering Construction Rules L.N 40 of 1984
- Cellulose Solutions Rule L.N 87 of 1964
- Health and Safety Committee Rules L.N 31 of 2004
- Medical Examination Rules L.N 24 of 2005

- Noise Prevention and Control Rules L.N 25 Of 2005
- Fire Risk Reduction Rules L.N 59 Of 2007
- Hazardous Substances Rules L.N 60 of 2007

Of particular importance to the project site is the requirement that all work places must be registered with the Department of Occupational Safety and Health Services. Further, there is a requirement that a Safety and Health Committee must be put in place and that employee and members of this committee must be inducted and trained on the provisions of the Act accordingly. The Act imposes various obligations on both employers and employees. These are all necessary for the health and safety of persons accessing and using the premises of the proposed site. Strict provisions are made for in respect of equipment containing self-acting machines, hoists and lifts and the requirement for supervision and training of inexperienced workers. There must be put in place an SHC and proper training to be done.

***Relevance to the proposed project***

*The proponent should ensure that the site is registered with the (Directorate of Occupational Safety and Health) DOSH as a work place. Further an abstract of the facility's safety and health policy should be exhibited at a conspicuous location within the property.*

**3.4.5 The Public Health Act (Cap 242)**

Part IX, section 115 of the Act states that no person\institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires local authorities to take all lawful, necessary and reasonable and practicable measures to maintain areas under their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Such nuisance or conditions are defined under section 188 as wastes, sewers, drains or refuse pits in such a state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or waste flowing or discharged from any premises into a public street or into the gutter or side channel or watercourse, irrigation channel or bed not approved for discharge is also deemed as a nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbor rats or other vermin.

**3.4.5 The Occupiers Liability Act Cap.34**

The Act regulates the duty that an occupier of premises owes to his visitors in respect of dangers due to the state of the premises or to things done or omitted to be done on them.

***Relevance to the proposed project***

*The Act requires that the occupier warn the visitors of the likelihood of dangers within his premises to enable the visitor to be reasonably safe.*

**3.4.6 The County Government Act, 2012**

The constitution of Kenya grants County Governments the powers to grant or to renew business licenses or to refuse the same. To ensure implementation of the provisions of the new constitution, the County Governments are empowered to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of health, safety and well-being of the general public.

***Relevance to the proposed project***

*The Act gives right to access private property at all times by the County Government officers and servants*

*for inspection purposes.*

### **3.4.7 The Penal Code (Cap. 63)**

Section 191 of the Penal Code states that any person or institution that voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons/institution in dwellings or business premises in the neighbourhood or those passing along public way, commit an offence.

#### ***Relevance to the proposed project***

*This statute controls public nuisance including safety and security from construction activities.*

### **3.4.8 HIV/AIDS Prevention and Control Act (Act No.14 of 2006)**

Part 11, Section 7 requires HIV and AIDs education in the work place. The government is expected to ensure provision of basic information and instruction on HIV and AIDs prevention and control to; Employees of all Government ministries, Departments, authorities, and other agencies; and, Employees of private and informal sectors. The information on HIV/AIDs is expected to be treated with confidentiality at the work place and positive attitudes shown towards infected employees and workers.

#### ***Relevance to the proposed project***

*During the project implementation the contractor is expected to create awareness to the employees and the local communities on the issues related to HIV/AIDS.*

### **3.4.9 Traffic Act (Cap. 403)**

Section 42 Part 1 forbids any driver to drive a vehicle at a speed exceeding fifty kilometers per hour on any road within the boundaries of any trading centre, township, municipality or city: The highway authority is expected to erect and maintain traffic signs as prescribed so as plainly to indicate to drivers entering or leaving such roads or areas where the fifty kilometer per hour speed limit restriction begins and ends.

Section 47 of the act states that any person who drives a motor vehicle on a road recklessly, or at a speed or in a manner which is dangerous to the public, shall be guilty of an offence and liable to a fine. Part VIII of cancelling any driving license or provisional driving license held by the offender and declaring the offender disqualified for holding or obtaining a driving license for such period as it thinks fit.

Section 52 Part 1, The driver of the vehicles are expected at all times to obey directions given by the police officer whether verbally or in signal, conform to the indications given by any traffic sign, and when any person in charge of any cattle raises his hand or in any manner signaling to stop, and keep it stationary for as long as it is reasonably necessary.

Section 52 A forbids any person who, being the driver of a vehicle from leaving the vehicle for a period in excess of the time, failing to comply with any traffic sign or leaving the vehicle in contravention of any traffic sign in any parking bay or parking area.

Under the Traffic sign rules part 13, temporary traffic sign signal unit may be used for purposes of controlling the movement of vehicles on the road where the road works are in progress or where the width of the carriageway is temporary restricted.

## 4.0 IMPACT IDENTIFICATION, ANALYSIS AND MITIGATION MEASURES

### 4.1 Introduction

This Chapter identifies both positive and negative environmental impacts likely to be occasioned by the project. Contained in this chapter is a detailed investigation of the proposed activity and site-specific potential impacts associated with the proposal. It discusses the nature of impacts, their magnitude, spatial and time extent and significance. Mitigation measures for negative impacts are also analysed.

### 4.2 Positive Impacts

The following positive impacts will be attributed to the project:

- Inducement of additional investments within the locality;
- Job creation/employment opportunities will be realized due to the proposed investment;
- Stimulation of skills transfer: Due to the nature of their operations, the proponent will have to implement a training programme for operations staff; and,
- Stimulation of economic development.

### 4.3 Potential Negative Impacts and Mitigation

#### 4.3.1 Potential negative impacts and mitigation during construction phase

##### 4.3.1.1 Impact of raw materials at points of origin

- Raw materials for the construction of the development proposal will originate from quarries, wetlands and industries which will have an impact on the environment through;
- Destruction of the physical environment where mining is involved or wood materials are required,
- Disposal of pollutants into the environment from industries manufacturing raw materials
- Threat to water resources in the case of sand harvesting, and,
- Occupational hazards on the part of the people employed by industrial establishments that supply raw materials.

#### Mitigation measures

- The contractor will obtain raw materials from sources that are compliant with NEMA Regulations.
- The contractor will procure quantities that are sufficient for the intended works only.
- Recycling as far as practical to stem wastage is recommended.
- The contractor shall commit to extensive use of recycled raw materials as will be appropriate and in a manner that does not compromise the safety of the development.

##### 4.3.1.2 Destruction of the Physical Environment

The construction phase of the project will cause some destruction to the physical environment. The impacts on soil will be localized and will be caused by:

**Soil Compaction:** Construction activities are normally accompanied by some form of compaction. Compaction seals the soil on the surface hence hindering the penetration of air or water beneath the surface. This limits the aerobic activities of the organisms underneath the soil, hence affecting soil productivity. Compaction also hinders the infiltration of water into the surface hence increasing the surface run-off increasing the possibility of flooding downstream of the site. Surface run-offs eventually find their way to water sources thereby polluting them. The result is water borne diseases which affects the health adversely.

**Excavation:** Excavation creates loose soil that is easily carried away by water or wind. This causes soil erosion and disturbance in soil quality. Soil and wind erosion will lead to pollution of air and water sources. Air pollution results to breathing infections and thereby need for money for medication. Pollution of water sources can lead to water borne diseases therefore impacting negatively on the health of the workers and neighbours.

**Loss of bio-diversity:** The destruction to the physical environment will lead to loss of bio-diversity and thereby degrading the aesthetic value of the affected area.

#### **Mitigation measures**

- Landscaping disturbed areas.
- Planting trees and suitable indigenous grasses in the premises shall be undertaken where possible and as soon as the construction is completed.
- Preserve mature trees.
- Control of earthworks to prevent compacting the loose soils.

#### **4.3.1.3 Occupational Health and Safety Hazards**

The movement of materials into the construction site by workers and during construction per se may cause accidents with potential to cause injury. This will affect the health of the workers and their potential to work thereby impacting negatively economically. Actual construction work is associated with high levels of interactions with unlimited social distancing a factor that could fuel the spread of COVID-19. The latter is a serious and rapidly evolving global pandemic with more than 134 million confirmed cases as of August, 2021.

#### **Mitigation measures**

- Provision of adequate and appropriate Personal Protective Equipment (PPE) including safety shoes, helmets, gloves and overalls.
- Employees to be given the correct tools and equipment for the jobs assigned.
- Employees to be trained in the use of all equipment that they will be required to operate.
- The contractor will conduct periodic safety inspection and risk assessment.
- First aid services and an emergency vehicle to be readily available at site.
- Moving parts of machines and sharp surfaces to be securely protected with guards to avoid unnecessary contacts and injuries during installation phase.
- The contractor will fully implement the provisions of the Occupational Safety and Health Act, No. 15 of 2007.
- The proponent and contractor shall adhere to the Ministry of Health guidelines on Management of COVID-19 in Kenya.

#### **4.3.1.4 Workforce Sanitation**

Sanitation provisions for the work force will be an issue of concern during construction. The proponent will install portable toilets to be emptied by a licensed handler as per the provisions of LN No. 121 of 2006.

#### **4.3.1.5 Air Pollution**

During construction phase dust will be expected from excavation of soil and movement of vehicles. The dust generated may be aggravated especially during the South East Monsoon months (March – August) when

strong winds occur. If generated in large quantities dust may present a respiratory hazard and also cause visual intrusion hence presenting accident risks. Dust is also a mechanical irritant to the eye. Air emissions would also be expected from exhausts of vehicles delivering material. Stand-by generators that may be brought in to serve during power outages are likely to release some emissions to the atmosphere. The health impacts as a result of the air quality will reduce the production of workers at the site and also have financial impacts on their treatment and medication.

#### **Mitigation measures**

- Contractor to deploy fine dust screens at the site during construction.
- The contractor will implement sound project management strategies to ensure that installation works are completed in the shortest possible time taking advantage of low wind velocities.
- Sprinkle dust producing materials such as ballast with water on site.
- Retain vegetation as much as possible to reduce bare areas exposed to agents of soil erosion.
- Use low sulphur fuels to power delivery vehicles and site machinery.
- Truck drivers will maintain low speeds to avoid raising dust.
- Employees will be provided with dust masks and goggles.

#### **4.3.1.6 Solid Waste Generation**

Site preparation and construction activities are expected to generate significant quantities of solid waste such as overburden, rock rubbles, cuttings and rejected materials among others. Workers and visitors to the site will generate domestic wastes such as food left overs, plastics and wrappings among others. Poor disposal of solid waste is an eyesore, can harbor pests and disease causing pathogens as well as pollute the environment. Therefore, there is need for proper solid waste management and disposal.

#### **Recommended mitigation measures**

- Procure and strategically place adequate solid waste collection bins with a capacity for segregation within the construction site
- Procure a sizeable central solid waste collection bin with chambers to accommodate separated waste.
- Sensitize construction workers on the process of solid waste collection, segregation and proper disposal.
- Procure the services of a NEMA licensed waste handler to dispose of the solid waste
- Comply with the Environmental Management and Coordination (Waste Management) Regulations, 2006.

#### **4.3.1.7 Noise and Excessive Vibrations**

Noise is expected from movement of vehicles and equipment. It would also arise from construction activities at the site as such loading and offloading of material, lifting, etc. Vibrations are likely to occur during excavation to lay the foundation as well as from use of heavy equipment. Noise may lead to hearing impairments which will reduce the efficiency of the employees at work and also affect their finances due to treatment and medication. Vibrations, if in excess may lead to adverse effects to human health.

#### **Mitigation measures**

- Serviceable machines will be used for excavation to ensure vibrations are kept at below risk levels.



- Construction work and delivery of raw materials will be limited to daytime on weekdays only.
- Employees using equipment that produce peak sounds shall be provided with earmuffs.
- The contractor will deploy compact machinery and fit them with mufflers and vibration dampers.
- The contractor will deploy acoustic screens around noisy working areas to contain noises.
- The contractor will endeavor to comply with Noise Regulations, 2009.

#### **4.3.1.8 Traffic Impact**

This will occur as contractors' vehicles bring in deliveries at the site and as workers leave or come to the site. The vehicles use diesel or petrol which after combustion produces fumes. These are potential air pollutants adversely affecting the health of workers and neighbors and increasing greenhouse gases that cause global warming.

#### **Mitigation measures**

- Heavy Commercial Vehicles (HCVs) delivering material shall observe designated speed limits for the area.
- Proper signage and warnings shall be placed at appropriate places to forewarn other motorists of HCVs turning.
- Delivery of material for the installation shall only be undertaken off-peak hours.
- All materials will be offloaded on the site and adequate space for that have been provided for.
- Flagmen / traffic marshals shall be deployed at the entrance to guide traffic.

#### **4.3.1.9 Increased Water Demand**

Construction projects utilize significant quantities of water for mixing and casting concrete. Water will also be required for human use including drinking and sanitary needs.

#### **Mitigation measures**

- The contractor will ensure water conservation and in all activities.
- Water will be recycled as far as is practice without compromising on quality and health.
- The contractor to ensure prudential use of water resources during construction by avoiding wastage such as running pipes and taps.
- The contractor will put in place sound water storage reservoirs that are leak proof.
- The contractor will instill water use discipline among employees.
- The contractor will seek alternative water source e.g. from bowsers, etc. apart from the reticulated supply.

#### **4.3.1.10 Possible collapse of buildings/structures whilst under construction**

A building may collapse while still under construction. This can be attributed to lack of geo-technical investigations and subsequent poor workmanship.

#### **Mitigation measures**

- Geotechnical investigations will be executed by geotechnical engineers prior onset of construction works to acquire information regarding the physical characteristics of soil and rocks. The purpose of geotechnical investigations is to design earthworks and foundations for structures, and to execute earthwork repairs necessitated due to changes in the subsurface environment.

- All construction works will be done under constant supervision of engineers and architect.
- Construction works shall adhere to the KS Code (2009) - Building Code of the Republic of Kenya (2009 Edition).

#### **4.3.1.11 Insecurity within the locality**

Construction sites in Kenya attract all manner of people not directly engaged in the work. These will include people hoping to secure some form of casual work, outside caterers and idlers. This introduces an element of insecurity at the construction site.

#### **Mitigation measures**

- The contractor together with the proponent will undertake the following to mitigate insecurity:
- Engage workers with good conduct.
- Formulate and instil place of work conduct.
- Secure the site and have security personnel manning the site.
- The contractor to give out information of suspecting conduct within the site to the local administration.
- Vet all employees before engagement.
- Hire services of security firm to monitor personnel or visitor movement within and close to the site.

#### **4.3.1.12 Visual Intrusion**

The establishment of a construction site will not be in sync with current land use. The construction activity will therefore alter the normal scenery within the area.

#### **Mitigation measures**

The following should be undertaken to mitigate visual intrusion:

- The contractor should ensure tidiness throughout construction period. Construction materials and equipment should be kept in good order and all trash and debris contained;
- The contractor should install visual barriers to obstruct undesirable views of construction staging areas;
- Project landscaping will be implemented where landscaping is able to improve project aesthetics, provide visual screening, and restore vegetation affected by construction. Features such as landscape berms, combined with tree and shrub plantings will be used to help screen built features from existing viewpoints by allowing for additional height;
- Project proponent will consider design details to ensure that infrastructure and buildings structures are complementary of one another so that these facilities do not create further visual discordance in the landscape; and,
- Ancillary project features will be constructed with low sheen and non-reflective surface materials to reduce potential for glare.

#### **4.3.1.13 Increased Energy Demand**

Construction activities will use machinery that requires fossil fuel inputs such as diesel and generators whose application will increase the demand for energy.

#### **Mitigation measures**

- Switch off engines when not in use.

- Use well serviced construction machinery that is efficient in fuel consumption.
- Maximize the use of natural lighting by limiting construction works to day time.
- Create awareness among workers on the importance of conservation of energy resources.
- Employ technologies that demand less energy consumption.
- Use energy saving lighting systems.

### **4.3.2 Potential Negative Impacts and Mitigation during Operation Phase**

#### **4.3.2.1 Increased Water Demand**

The proposed premises will rely on significant volume of water to run. Water will be sourced from reticulated supply. Water will be used for ablution, sanitary and drinking purposes among others. It should be noted that actual operation designs ought to be further examined and subjected to further EIA and screening.

#### **Mitigation measures**

- The proponent will install sanitation facilities such as water closets that use minimal amounts of water and self-closing taps.
- Create awareness among employees and visitors on water conservation.

#### **4.3.2.2 General Waste Generation**

During operations, both solid wastes and effluent will be generated. Solid wastes will include mainly domestic waste from the workers and visitors to the site. Effluent will be generated from washrooms. Both the solid waste and effluent generated will need to be managed appropriately.

#### **Recommended mitigation measures**

- Provide litter bins with a capacity for waste segregation within the facility.
- Procure the services on a NEMA licensed waste contractor to dispose of wastes from the facility.
- Design and construct a septic tank – soak pit system for waste water management.
- Apply for and obtain an Effluent Discharge License (EDL) from NEMA.
- Monitor the quality of effluent discharged from the proposed soak pit to ascertain conformity to the Third Schedule of Environmental Management and Coordination (Water Quality) Regulations, 2006.
- Comply with the Environmental Management and Coordination (Waste Management) Regulations, 2006.
- Comply with the Environmental Management and Coordination (Water Quality) Regulations, 2006.

#### **4.3.2.3 Increased Energy Demand**

Operation activities will use machinery including HCVs that requires fossil fuel inputs such as diesel and generators whose application will increase the demand for energy.

#### **Mitigation measures**

- Switch off engines when not in use.
- Use well serviced operation machinery that is efficient in fuel consumption.
- Maximize the use of natural lighting by limiting construction works to day time.
- Create awareness among workers on the importance of conservation of energy resources.

- Employ technologies that demand less energy consumption.
- Use energy saving lighting systems.

#### **4.3.2.4 Increased Water Demand**

The proposed premises will rely on significant volume of water to run. Water will be sourced from reticulated supply. Water will be used for sanitary and drinking purposes among others.

##### **Mitigation measures**

- The proponent will put in place structural provisions for rain water harvesting to supplement huge demand by the facility.
- Install sanitation facilities such as water closets that use minimal amounts of water and self-closing taps.
- Create awareness among employees and visitors on water conservation.

#### **4.3.2.5 Traffic Impact**

This will occur as clients vehicles bring in disposal waste to the site and as workers leave or come to the site. The vehicles use diesel or petrol which after combustion produces fumes. These are potential air pollutants adversely affecting the health of workers and neighbors and increasing greenhouse gases that cause global warming.

##### **Mitigation measures**

- HCVs delivering material shall observe designated speed limits for the area.
- Proper signage and warnings shall be placed at appropriate places to forewarn other motorists of HCVs turning.
- Delivery of material for the installation shall only be undertaken off-peak hours.
- All materials will be offloaded on the site and adequate space for that have been provided for.
- Flagmen / traffic marshals shall be deployed at the entrance to guide traffic.

#### **4.3.2.6 Effluent generation and possible water quality degradation**

Wastewater comprises an important source of pollution and its improper disposal can have far reaching implications on underground water resources. The proposed project is expected to produce wastewater as from laundry, ablution and toilets which will be connected to the municipal sewer line.

#### **4.3.2.7 Solid waste generation**

Substantial amount of solid waste may be accumulated if not segregated and disposed of regularly.

##### **Mitigation measures**

- Use of an integrated solid waste management system (i.e. through a hierarchy of options: Reduce Reuse, Recycling and Dispose) is recommended.
- Install a central waste receptacle.
- Dispose of waste at the designated dumpsites.
- Transportation of wastes from the site to be done by a NEMA registered solid waste handler who will use appropriate vehicles for conveyance of wastes from site to designated sites.
- Compliance with the provisions of LN No. 121 of 2006.

#### **4.3.2.8 Storm water management**

There is an expected influx of surface water during heavy down pours an attribute to large impervious surfaces.

#### **Mitigation measures**

- Consider storm water harvesting and surplus to be connected to the municipal storm drain.
- Plumbing to be undertaken by competent personnel.
- Rain water will be harvested by rain gutters that will be feeding water storage tanks. The gutters will be very effective at keeping building egress areas clear of falling water.

#### **4.3.3 Decommissioning Phase Negative Impacts and Mitigation Measures**

A decommissioning phase is possible in the event of end of project life, closure by government agencies due to non-compliance with environmental and health regulations, an order by a court of law due to non-compliance with existing regulations, potential natural calamities and change of user of land. Decommissioning of the project will be accompanied by negative economic, social and environmental impacts. At the decommissioning stage, the proponent will prepare a due diligence decommissioning audit report in line with LN No. 101 of 2003 and submit it to NEMA for approval at least three months in advance. For the purposes of prediction and information, the environmental and social concerns which may arise during decommissioning include;

- Loss of the disposal site,
- Economic decline,
- Safety and health risks,
- Waste generation,
- Insecurity.

##### **4.3.3.1 Economic Decline**

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. In the event of decommissioning of the proposed development, the proponent will incur huge financial losses and the employees will also lose their livelihoods. In addition, the government will lose revenue earned from the operations of the facility leading to economic decline.

#### **Recommended mitigation measures**

- Train employees on alternative livelihoods prior to decommissioning.
- Prepare and issue recommendation letters to employees to seek alternative employment opportunities.
- Review potential job opportunities in other ongoing contracts by the proponent and recommend the employees who qualify.
- Comply with labor laws by paying the employees their terminal dues.

##### **4.3.3.2 Safety and Health Risks**

Safety and health risks during demolition and dismantling activities are likely to emanate from accidental falls and cuts, injuries from demolition and dismantling tools and machinery use. Noise and air pollution from demolition and dismantling works could pose safety and health risks to workers, neighbors and visitors to the site.

**Recommended mitigation measures**

- Contract a licensed construction company to carry out demolitions.
- Install signage to forewarn people on ongoing demolition activities.
- Provide adequate and enforce the use of PPE throughout the demolition works.
- Avail first aid kits on site throughout the entire period.
- Ensure workers are given the correct hand tools and equipment for the jobs assigned.
- Comply with the Environmental Management and Coordination (Air Quality) Regulations, 2014.
- Comply with the Environmental Management and Coordination (Waste Management) Regulations, 2006.
- Comply with the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.
- Comply with the provisions of the Occupational Safety and Health Act, 2007.

**4.3.3.3 Waste generation**

Demolition activities will result in generation of both effluent and solid waste. The waste generated will include wood cuttings, roofing waste and building rubbles among others. If not properly managed, these generated wastes will pose safety and health risks and environmental pollution.

**Recommended mitigation measures**

- Recover re-usable materials for sale or use in other project sites.
- Contract a NEMA licensed waste handler to handle and dispose both solid waste and effluent generated from the demolition activities.
- Comply with the Environmental Management and Coordination (Waste Management) Regulations, 2006.
- Comply with the Environmental Management and Coordination (Water Quality) Regulations, 2006.

**4.3.3.4 Insecurity**

Insecurity will result from the site when it's abandoned after decommissioning. Unoccupied structures within the site will act as criminal dens and the security boost that had been provided by the depot to the local community would be lost.

**Recommended mitigation measure**

The proponent should extend the tenure of contracted security firm during the decommissioning phase of the facility.

**4.4 Environmental Impacts Analysis**

In this sub-section, the significance of each potential environmental impact is evaluated. The anticipated impacts of the proposed project on the environmental elements are both positive and negative. The magnitude of each impact is described in terms of being significant, low significant or highly significant, short-term or long term, specific (localized) or widespread, reversible or irreversible. On the basis of information gathered during both the desktop and field study, the potential environmental impacts of the proposed project are as tabulated below.

**Table 2: Impact significance matrix**

	<b>IMPACTS</b>	<b>ST</b>	<b>LT</b>	<b>R</b>	<b>IR</b>	<b>L</b>	<b>W</b>	<b>S</b>
<b>Construction Phase.</b>	Inducement of additional investments in the area	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		+
	Job opportunities	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		+
	Stimulation of skills transfer	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		+
	Stimulation of economic development	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		+
	Impact of raw materials at points of origin	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		XX
	Destruction of the physical environment	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		XX
	Occupational health and safety hazards	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		XX
	Workforce sanitation	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		XX
	Air pollution	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		XX
	Solid waste generation	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		XX
	Noise and excessive vibrations	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		XX
	Traffic impact	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		XX
	Increased water demand	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		XX
	Possible collapse of structures	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		XX
	Insecurity within the locality	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		XX
Visual Intrusion	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		XX	
Increased energy demand	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		XX	
<b>Operational Phase.</b>								
	Income to the proponent		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		+
	Job creation		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	+
	Inducement of additional investments in the area		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		+
	Stimulation of skills transfer		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	+
	Stimulation of economic development		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	+
	Increased pressure on water and energy		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		X
	General waste generation		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		X
	Hazardous waste generation and accumulation		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		XXX
	Increased effluent waste generation		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		X
Traffic impact	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		XX	
Soil and water contamination		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		XXX	
<b>Decommissioning phase</b>	Creation of employment opportunities	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		+
	Recovery of recyclable materials	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		+
	Rehabilitation of site	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		+
	Economic decline	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		XX
	Loss of the disposal site	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		XX
	Noise and excessive vibrations pollution	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		X
	Insecurity	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		X

Weightings of significance in the table above range from 0-3 (denoted by number of X) whereby “0” represents no significance; “X” represents low significance; “XX” means there will be significant effect and “XXX” represent high environmental significance.

**Key:**

<b>X</b> – Not significant	<b>XX</b> – Low significance	<b>XXX</b> – Significant	<b>XXXX</b> – Highly significant
<b>ST</b> – Short term	<b>LT</b> – long term		
<b>R</b> – Reversible	<b>IR</b> – Irreversible		
<b>L</b> – Local	<b>W</b> – Wide spread		
<b>+</b> – Positive			
<b>S</b> – Significance			

It should be noted that with the adequate implementation of the proposed mitigation measures the proposed undertaking can be of low significance.

## **4.5 Risk Assessment**

### **4.5.1 Occupational Health and Safety (OHS)**

All appropriate precautions should be taken to ensure that all workplaces are safe and without risk of injury to the safety and health of workers, to protect persons present at or in the vicinity of a construction site from all risks which may arise from such site.

#### **4.5.1.1 Site Access**

There should be safe access onto and around the site for people and vehicles. Plan how vehicles will be kept clear of pedestrians, especially at site entrances where it may be necessary to provide doors or gates to achieve this segregation. Doors that open onto traffic routes may need viewing panels or windows.

#### **4.5.1.2 Housekeeping**

A suitable housekeeping programme should be established and continuously implemented on each construction site which should include provisions for:

- The proper storage of materials and equipment; and,
- The removal of scrap, waste and debris at appropriate intervals.

#### **4.5.1.3 Precautions against fall of Materials and Persons, and Collapse of Structures**

Adequate precautions should be taken such as the provision of fencing, look-out men or barriers to protect any person who might be injured by the fall of materials, or tools or equipment being raised or lowered. Adequate safety nets or safety sheets should be erected and maintained

#### **4.5.1.4 Prevention of Unauthorized Entry**

Construction site should be fenced to prevent the entry of unauthorized persons. This will also protect people from site dangers and the site from vandalism and theft. Visitors should not be allowed access to construction sites unless accompanied by or authorized and provided with the appropriate PPE.

## **4.5.2 Workers Welfare**

### **Drinking water**

Adequate supply of wholesome drinking water shall be provided at suitable points conveniently accessible



to all workers.

### **Sanitary facilities**

Sufficient and suitable sanitary conveniences for the workers shall be provided, maintained and kept clean. The number of toilets required will depend on the number of workers on site. Adequate washing facilities should be provided as near as practicable to toilet facilities.

### **Washing facilities**

The contractor shall provide and maintain adequate and suitable facilities for washing, which shall be conveniently accessible and shall be kept in a clean and orderly condition.

### **Accommodation for clothing**

The contractor / proponent shall provide and maintain adequate and suitable accommodation for clothing not worn during working hours.

## **4.5.3 Emergency Response Plan**

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 begins and put general precautions in place from the start of work. Some emergencies may require 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.

### **4.5.3.1 Fire Prevention and Firefighting**

All appropriate measures should be taken by the contractor to avoid the risk of fire, control quickly and efficiently any outbreak of fire and bring about a quick and safe evacuation of persons.

- Secure storage areas should be provided for flammable liquids, solids and gases such as paints and other such materials in order to deter trespassers.
- There should be no naked flames or similar means of ignition.
- Adequate ventilation should be provided.
- Provide suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible;
- Fire-extinguishing equipment should be properly maintained and inspected at suitable intervals by a competent person. Access to fire-extinguishing equipment such as hydrants, portable extinguishers and connections for hoses should be kept clear at all times.
- Sufficient number of workers should be trained in the use of fire- extinguishing equipment, so that adequate trained personnel are readily available during all working periods.
- Workers should be suitably trained in the action to be taken in the event of fire, including the use of means of escape.
- Where appropriate, suitable visual signs should be provided to indicate clearly the direction of escape in case of fire.
- Means of escape should be kept clear at all times.
- Sufficient and suitable means to give warning in case of fire should be provided where this is necessary to prevent danger. Such warning should be clearly audible in all parts of the site where persons are liable to work.
- There should be an effective evacuation plan so that all persons are evacuated speedily without

panic and accounted for.

- Notices should be posted at conspicuous places indicating the nearest fire alarm and the telephone number and address of the nearest emergency services.

#### 4.5.3.2 Other Causes of Accidents

Other causes of accidents in construction sites include the following:

**Accidental falls:** People fall because access to and from the workplace is not adequate, or the workplace itself is not safe.

**Construction equipment:** Construction equipment can cause accidents if not properly handled. A hammer can cause significant damage to an unfortunate person standing under tool. Heavier and larger tools can do even more damage, and cause accidents to workers on the work site.

**Falling material and collapses:** People are struck by material falling from loads being lifted and material that rolls or is kicked off work platforms; others are struck or buried by falling materials when, buildings or structures collapse. Structural collapses can range from walls, to buildings.

**Electrical accidents:** Workers can suffer electric shock when they use unsafe equipment.

#### 4.5.4 Personal Protective Equipment

The contractor shall provide suitable PPEs to protect workers against the risk of accidents or injury to health. The contractor shall require and ensure proper use of the PPEs. Workers should be instructed in the use of personal protective equipment.

##### Types

Workers should be provided with and wear the following personal protective equipment:

- **Head Protection**

Safety helmets or hard hats to protect the head from injury due to falling or flying objects, or due to striking against objects or structures.

- **Eye Protection**

Goggles when likely to be exposed to eye or face injury from airborne dust or flying particles, dangerous substances, harmful heat, light or other radiation, and in particular during welding, flame cutting, concrete mixing or other hazardous work.

- **Hand Protection**

Protective gloves and suitable protective clothing to protect hands or the whole body as required when exposed to heat radiation or while handling hot, hazardous or other substances which might cause injury to the skin.

- **Hearing Protection**

Use appropriate earmuffs or ear plugs if you work with or near a noisy machine and make sure they fit properly and are comfortable.

- **Foot Protection**

Workers should wear work shoes or boots with slip-resistant and puncture-resistant soles for protection from foot injuries.

#### **4.5.5 First Aid**

Factories (First-Aid) Order section 50(1) of the Act requires the occupier to provide The first-aid boxes or cupboards at a work place which are adequate and appropriate equipment, facilities and personnel to enable first aid to be given to your employees if they are injured or become ill at work. The minimum provision for all sites is:

- A first aid box with enough equipment to cope with the number of workers on site as per the order;
- An appointed person to take charge of first-aid arrangements;
- 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.

## **5.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**

### **5.1 Introduction**

The preceding section has analyzed and identified the potential environmental and social impacts of the proposed county aggregated industrial park as well as the mitigation measures to address the impacts. Under this section, three Environmental and Social Management Plans (ESMPs) are proposed to guide the proponent in implementing the mitigation measures. These are ESMPs for the construction, operational and possible decommissioning phases. Each of the ESMP is organized into five sections comprising of the environmental concerns, recommended mitigation measures, implementing party, timeframe and a budget. The strategies for mitigation include preventing the impact from occurring in the first place, minimizing the impact, taking corrective action where impact occurs among others. The overall focus is to ensure that the project complies with the substantive EIA Principle of ensuring the right to a clean and healthy environment during the entire project cycle. The objectives of the ESMPs are:

- To guide the project implementer to prioritize environmental matters in project planning;
- To guide the project implementer on the likely environmental impacts of the project and when they are likely to occur;
- To assess the capacity requirements for the implementation of the ESMPs;
- To guide the project implementer in allocating adequate resources needed to implement all the mitigation measures.

### **5.2 Plan Period**

The ESMPs provided here is to cover the first year of the project's operations. It is then expected that an Environmental Audit (EA) will be undertaken at the end of the year to evaluate conformity to the ESMP as well as identify any gaps and recommend corrective adjustments to the plan. This will then be addressed through a loop mechanism from construction phase to operational phase to identify the success of the project versus the failures. This should be analyzed through the environmental management criteria of impact and mitigation.

### **5.3 Environmental and Social Management Plan for the construction phase**

At the construction phase, the focus on the ESMP is on addressing impact of raw materials at points of origin, destruction of the physical environment, occupational health & safety hazards, workforce effluent, air pollution, solid waste generation, noise and excessive vibrations, traffic impact, increased water demand, possible collapse of structures, insecurity within the locality, visual intrusion and increased energy demand.

### **5.4 Environmental and Social Management Plan for the operational phase**

The main environmental concerns at this phase include occupational safety and health risks, and emergency preparedness, air and noise pollution, use of environmental resources, pollution of environmental media, community concerns and storm water management..

### **5.5 Environmental and Social Management Plan for the decommissioning phase**

The decommissioning ESMP is important in the event of end of project cycle, natural calamities and non-compliance with environmental and health regulations among others. The key issues of concern at this stage will be the economic decline, waste generation, safety and health risks and insecurity.

## 5.6 EMSP for Project Construction

**Table 3:** Construction Phase ESMP.

Anticipated Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh.)
Impact of sourcing of raw materials from environment	<ul style="list-style-type: none"> <li>– Obtain raw materials from sources that are compliant with NEMA Regulations.</li> <li>– Procure quantities that are sufficient for the intended works only.</li> <li>– Recycle as far as practical to stem wastage.</li> <li>– Commit to extensive use of recycled raw materials as will be appropriate and in a manner that does not compromise the safety of the development</li> </ul>	Project Contractor	Throughout construction period	No Cost
Destruction of the physical environment	<ul style="list-style-type: none"> <li>– Landscape disturbed areas.</li> <li>– Planting trees and suitable indigenous grasses as soon as the construction is completed.</li> <li>– Preserve mature trees.</li> <li>– Controlling of earthworks to prevent compacting the loose soils.</li> </ul>	Project Contractor & Proponent	Throughout construction period	412,000. 00
Occupational health & safety of employees at the workplace	<ul style="list-style-type: none"> <li>– Provide adequate and appropriate PPEs.</li> <li>– Train employees in the use of all equipment that they will be required to operate.</li> <li>– Observe rest times and breaks as necessary.</li> <li>– Give employees the correct tools and equipment for the jobs assigned.</li> <li>– Hire the right number of workers to avoid over working them.</li> <li>– First aid services and an emergency vehicle should be readily available on site.</li> <li>– Securely protect moving parts of machines and sharp surfaces with guards to avoid unnecessary contacts and injuries during construction phase.</li> <li>– Ensure adequate provision for artificial or natural lighting in all parts in the working areas.</li> <li>– Ensure that all chemicals used in construction are appropriately labeled or marked.</li> <li>– The contractor should implement the provisions of the OSHA No. 15 of 2007.</li> </ul>	Project Contractor	Throughout construction period	180,000.00 for acquisition of PPE for workers

	<ul style="list-style-type: none"> <li>- The construction site should be registered as a workplace with DOSH.</li> <li>- Obtain insurance cover for the workers at the site</li> <li>- Ensure proper storage and management of flammable materials within the project site</li> </ul>			
Workforce effluent	<ul style="list-style-type: none"> <li>- Procure at least two portable toilets to the workforce.</li> <li>- Provide adequate running water.</li> <li>- Comply with the provisions of LN No. 120 of 2006.</li> <li>- Comply with the provisions of LN No. 121 of 2006</li> </ul>	Project Contractor	Entire construction period	No cost
Air pollution (dust and fumes)	<ul style="list-style-type: none"> <li>- Secure the site using appropriate dust screens where applicable.</li> <li>- Ensure strict enforcement of on-site speed limit regulations.</li> <li>- Avoid excavation works in extremely dry weather periods.</li> <li>- Ensure all construction equipment is serviced regularly to avoid excessive fumes.</li> <li>- Insist on use of low sulphur diesel &amp; other environmentally friendly fuels.</li> <li>- Provide dust masks to all employees and ensure their proper utilization.</li> <li>- Sprinkle building materials that are likely to produce dust such as ballast with water before use to suppress dust.</li> <li>- Access road and dust surfaces at the construction site should be sprinkled with water twice a day.</li> <li>- Employees will be provided with appropriate dust masks</li> <li>- Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3. Reuse 4. Disposal.</li> <li>- Through estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed, rather than cutting them to size, or having large quantities of residual materials.</li> <li>- Dispose of waste at the designated dump sites.</li> <li>- Comply with the provisions of LN 121 of 2006.</li> </ul>	Project Contractor	Entire construction period	286, 000.00

Solid waste generation	<ul style="list-style-type: none"> <li>- Transportation of wastes from the site to be done by a NEMA registered solid waste handler who will use appropriate vehicles for conveyance of wastes from site to designated sites.</li> </ul>	Project Contractor	Entire construction period	114, 000.00
Noise	<ul style="list-style-type: none"> <li>- Restrict construction activities to day time only.</li> <li>- Ensure that noisy construction equipment is fitted with silencers where possible.</li> <li>- Provide workers with PPE for noise impact reduction.</li> <li>- Locate machinery that is likely to produce noise as far as practical from neighbouring properties.</li> <li>- Service machinery and equipment regularly to ensure that they are in good condition to minimize excessive noise.</li> <li>- Comply with the Noise and Excessive Vibration (Pollution Control) Regulations, 2009.</li> <li>- Sensitize truck drivers to avoid unnecessary hooting and running of vehicle engines.</li> </ul>	Project Contractor	Throughout construction period	40,000.00
Traffic management	<ul style="list-style-type: none"> <li>- Prepare and implement a traffic management plan.</li> <li>- Provide sufficient parking for HCVs and machinery at the site.</li> <li>- Vehicles delivering raw materials shall observe designated speed limits for the area.</li> <li>- Personnel shall be deployed at site entry and exit to direct traffic in and out of the site.</li> <li>- Proper signage to be placed on the access route to forewarn other motorists on the use of the road by HCVs.</li> <li>- Offload construction materials on the site but not on the road reserves to ensure smooth flow of traffic.</li> <li>- All the drivers must be competent and licensed to operate respective vehicles.</li> <li>- Comply with the Traffic Act, 2016.</li> </ul>	Project Contractor & Proponent	Throughout construction period	10,000.00
Increased water demand	<ul style="list-style-type: none"> <li>- Install self-regulating water taps for sinks and basins.</li> <li>- Seek water extraction permit from WARMA if a borehole is to be sunk onsite.</li> </ul>	Project Contractor	Throughout construction period	10,000.00

	<ul style="list-style-type: none"> <li>- Create awareness among employees on the importance of conservation of water resources.</li> <li>- Re-use recycled water where possible.</li> </ul>			
Structural collapse	<ul style="list-style-type: none"> <li>- Undertake geotechnical investigations prior structural installations.</li> <li>- Engage competent and skilled labourers.</li> <li>- All constructions to be supervised by competent engineer and architect.</li> </ul>	Project Contractor, Geotechnical Engineer & Proponent	Throughout construction period	310,000.00
Insecurity	<ul style="list-style-type: none"> <li>- Engage workers with good conduct.</li> <li>- Formulate and instil place of work conduct.</li> <li>- Secure the site with a stone boundary wall.</li> <li>- The contractor to give out information of suspecting conduct within the site to the local administration.</li> <li>- Vet all employees before engagement.</li> <li>- Hire services of security firm to monitor personnel or visitor movement within and close to the site.</li> </ul>	Project Contractor	Throughout construction period	50,000.00
Visual intrusion	<ul style="list-style-type: none"> <li>- Ensure tidiness throughout construction period.</li> <li>- Construction materials and equipment should be kept in good order and all trash and debris contained.</li> <li>- Install visual barriers to obstruct undesirable views of construction staging areas.</li> <li>- Undertake project landscaping.</li> <li>- Consider design details to ensure that infrastructure and buildings structures are complementary of one another so that these facilities do not create further visual discordance in the landscape.</li> <li>- Construct ancillary project features with low sheen and non-reflective surface materials to reduce potential for glare.</li> </ul>	Project Contractor	Throughout construction period	150,000.00
Increased energy demand	<ul style="list-style-type: none"> <li>- Create awareness among workers on the importance of conservation of energy resources.</li> <li>- Employ technologies that demand less energy consumption.</li> <li>- Use energy saving lighting systems.</li> </ul>	Project Contractor	Throughout construction period	100,000.00



	<ul style="list-style-type: none"> <li>- Use well serviced construction machinery that is efficient in fuel consumption.</li> <li>- Maximize the use of natural lighting by limiting construction works to day time.</li> </ul>			
Stakeholders grievances	Develop and implement a grievances redress mechanism	Proponent/ community	Throughout construction	Nil

### 5.7 ESMP for Project Operational Phase

Table 4: Operation Phase ESMP.

Anticipated Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh.)
Increased water demand	<ul style="list-style-type: none"> <li>- Ensure sources of water for use meets the standards specified under schedule I of Legal Notice No. 120 of 2006 (standards for domestic supply)</li> <li>- Install self-regulating water taps for sinks and basins</li> <li>- Create awareness among residents/guests on the importance of conservation of water resources</li> <li>- All water for use shall be metered to determine consumption levels and yields of the underground water sources</li> <li>- Rain and storm water harvesting is recommended as a measure to provide for water for gardening and landscaping and/or supplement groundwater resources</li> <li>- Seek water extraction permit from WARMA if a borehole is to supplement the reticulated supply.</li> </ul>	Proponent and management	Throughout operational phase	50,000.00
Solid waste generation	<ul style="list-style-type: none"> <li>- Use of an integrated solid waste management system i.e. through a hierarchy of options: Reduce Reuse, Recycling and Dispose.</li> </ul>	Operations manager	Throughout operation phase.	200,000.00 pa

	<ul style="list-style-type: none"> <li>- Dispose of waste at the designated dumpsites.</li> <li>- Transportation of wastes from the site to be done by a NEMA registered solid waste handler who will use appropriate vehicles for conveyance of wastes from site to designated sites.</li> <li>- Comply with the provisions of LN No. 121 of 2006.</li> </ul>			
Traffic management	<ul style="list-style-type: none"> <li>- Vehicles delivering raw materials and dispatching products to observe designated speed limits for the area.</li> <li>- Deploy personnel at site entry and exit to direct traffic in and out of the site.</li> <li>- Place proper signage and warnings on the access roads to forewarn other motorists on the use of the road by heavy commercial vehicles.</li> </ul>	Operations manager	Throughout operational phase	50,000.00 pa
Workforce effluent	- Design and construct a septic tank – soak pit system for waste water management.	Project Contractor	During construction	190,000.00
	- Monitor the quality of effluent discharged from the proposed septic tank – soak pit system.	Proponent	Quarterly on operation	12,000.00 per sample
	- Apply for and obtain an EDL from NEMA.	Proponent	Annually	105,000.00 pa
	- Procure the services on a NEMA licensed waste contractor to dispose of wastes from the facility	Proponent	Throughout operational	8,000.00 pm
	- Provide adequate running water.	Proponent	Throughout operational	200,000.00 pa
	- Comply with the provisions of LN No. 120 of 2006. - Comply with the provisions of LN No. 121 of 2006	Proponent	Throughout operational	Nil
Medical emergencies	<ul style="list-style-type: none"> <li>- Have well trained first aid personnel at the premises site at all times.</li> <li>- Ensure first aid facilities are adequate and staffs have been trained.</li> <li>- Have contact numbers of reliable health facilities and professional health practitioners.</li> <li>- Ensure that there is always a standby ambulance for transportation in case of emergencies.</li> </ul>	Proponent	Throughout operational phase	To be determined on a need by need basis
Accidents and	Implement a health and safety program to address and minimize internal accidents and	Proponent	Throughout	Contingency

incidents	safety incidents.		operational phase	fund to be established
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## 5.8 ESMP for Decommissioning Phase

Table 5: Decommissioning Phase ESMP

Anticipated Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh.)
Economic decline	Train employees on alternative livelihoods	Proponent	Prior to decommissioning	50,000. 00
	Prepare and issue recommendation letters to employees to seek alternative employment opportunities	Proponent	Prior to decommissioning	Nil
	Review potential job opportunities in other ongoing contracts by the proponent and recommend the employees who qualify	Proponent	Prior to decommissioning	Nil
	Comply with labor laws by paying the employees their terminal dues	Proponent/ workers	Prior to decommissioning	Nil
Health & safety risks	<ul style="list-style-type: none"> <li>– Contract a licensed construction company to carry out demolitions.</li> <li>– Install signage to forewarn people on ongoing demolition activities.</li> <li>– Provide adequate and enforce the use of PPE throughout the demolition works.</li> <li>– Avail first aid kits on site throughout the entire period.</li> <li>– Ensure workers are given the correct hand tools and equipment for the jobs assigned.</li> <li>– Comply with the Environmental Management and Coordination (Air Quality) Regulations, 2014.</li> <li>– Comply with the Environmental Management and Coordination (Waste Management) Regulations, 2006.</li> <li>– Comply with the Environmental Management and Coordination (Noise and</li> </ul>			To be calculated at the time

	Excessive Vibration Pollution) (Control) Regulations, 2009. – Comply with the provisions of the Occupational Safety and Health Act, 2007.			
Decommissioning waste generation	<ul style="list-style-type: none"> <li>– Use of an integrated solid waste management system i.e. through a hierarchy of options: Source reduction; Recycling; Composting and reuse; Combustion; and, Sanitary Land filling.</li> <li>– Transportation of wastes from the site to be done by a NEMA registered solid waste handler who will use appropriate vehicles for conveyance of wastes from site to designated sites.</li> <li>– Ensure compliance with the provisions of Waste Management Regulations, 2006.</li> <li>– Comply with the Water Quality Regulations, 2006.</li> </ul>	Proponent & contractor	Throughout decommissioning phase	To be calculated at the time
Traffic management	<ul style="list-style-type: none"> <li>– Vehicles carrying waste to observe designated speed limits for the area.</li> <li>– Deploy personnel at site entry and exit to direct traffic in and out of the site.</li> <li>– Place proper signage and warnings on the access roads to forewarn other motorists on the use of the road by heavy commercial vehicles.</li> </ul>	Contractor	Throughout decommissioning phase	To be calculated at the time
Noise	<ul style="list-style-type: none"> <li>– Restrict construction activities to day time only.</li> <li>– Ensure that noisy equipment is fitted with silencers where possible.</li> <li>– Provide workers with PPE for noise impact reduction.</li> </ul>	Contractor	Throughout decommissioning phase	To be calculated at the time
Insecurity on site	Extend the tenure of contracted security firm during the decommissioning phase of the facility	Proponent/ contractor	Throughout the decommissioning	Tender

## **6.0 ENVIRONMENTAL MONITORING PROGRAMME**

### **6.1 Overview of Monitoring Programme**

A monitoring plan is essential to assess the impact of the development on the environmental setting of the area where it is located. The principles underlying an environmental monitoring plan as it relates to any given development is to document, track and report any changes in environmental parameters over time that would be associated with the project. These changes would in principle vary over time in both magnitude and direction. In the case of the latter it is important to bear in mind that changes in environmental parameters may be positive or negative. Thus in principle a monitoring program for the project would not necessarily focus only on the perceived or anticipated negative changes precipitated by a given development activity, but also on the positive or beneficial changes. The parameter chosen are those that have been identified in the analytical process as being affected in the most significant way by the proposed development.

### **6.2 Specific monitoring issues**

The proposed monitoring plan for the project will entail those parameters and ecosystem components that have been identified through the mitigation matrix and other mitigation components. A number of these issues have also been highlighted in the mitigation plans and matrices associated with the previous section. These issues include:

- Occupational safety and health monitoring plan;
- Air quality monitoring plan;
- Noise monitoring plan;
- Wastewater quality monitoring plan; and,
- Solid waste monitoring plan.

The proposed monitoring program has been developed not only in relation to satisfying the statutory requirements of the EIA process, but also as a proactive tool for the proper implementation of the proposed development, within the context of its relationship to the integrity of the environment as well as the stakeholders in the area.

#### **6.2.1 Occupational safety and health monitoring plan**

##### **6.2.1.1 Introduction**

Potential safety and health risks during construction and subsequent operational phases will emanate from accidents from the use of machinery, noise and air pollution, health related problems due to inhalation of dust among others. All these have a potential to cause injures, permanent disability or even death to workers, neighbours and visitors to the site. The purpose of health and safety monitoring plan is to assess existing controls alongside potential health and safety risks in order to develop an effective plan of action and to ensure compliance with Occupational Safety and Health Act, 2007.

##### **6.2.1.2 Monitoring strategy**

The proponent should be committed to ensuring, as far as is reasonably practicable, the health and safety of the workers, visitors to the site and neighbours are not put at risk during the construction phase and from the operations of the disposal site. This will be achieved by:

- Conducting occupational safety and health reviews and reports;
- Hazard identification by analyzing activities that can be an immediate threat or cause harm over a period of time;

- Ensuring that all accidents and incidents occurring at the site are promptly reported and investigated;
- Keeping statistics of accidents, incidents and dangerous occurrences and ensuring that reportable cases are filed with the health, safety and environment officer;
- Administration of safety awareness and motivation scheme;
- Routine inspections of the facility and equipment;
- Visual inspection as well as interviewing key personnel to identify areas of improvement;
- Undertaking and reviewing of fire, energy and risk assessment reports;
- Review of safety awareness, fire drills and fire safety training requirements;
- Evaluation of the effectiveness of health and safety training to the workforce;
- Action plans related to significant findings of the risk assessment;
- Having emergency evacuation plans and emergency routes and safety signage among others; and,
- Assessment of risks involving hazardous substances i.e. receipt, storage & handling.

The responsibility for implementing this monitoring plan will be vested in the Department of Occupational Safety and Health Services and overall the management.

#### 6.2.1.3 Indicator of success

The ideal indicators of success will include zero accidents and fatalities and reduction in the number of incidents and accidents at the site.

### 6.2.2 Air quality monitoring plan

#### 6.2.2.1 Introduction

There are potential sources of air pollution during the construction phase and operation phases. Air pollution above acceptable limits are toxic to ecological systems and to human health. The purpose of the air quality monitoring plan is to ensure the concentrations air emissions from the construction and subsequent operations of the facility are within the stipulated standards set under the First Schedule of the Environmental Management and coordination (Air Quality) Regulations, 2014. In addition, the results will be used to evaluate if the adopted air pollution controls and management are effective.

#### 6.2.2.2 Monitoring parameters

Construction sites are listed as sources of fugitive emissions under the Fifth Schedule of the Environmental Management and coordination (Air Quality) Regulations, 2014. Additionally, operations especially during dry weather could be sources of fugitive emissions. Therefore, the proponent should monitor fugitive emissions as per the First Schedule of the Environmental Management and coordination (Air Quality) Regulations, 2014.

**Table 6:** Ambient air quality tolerance limits for fugitive emissions.

Pollutant	Time weighted average	Industrial area
Sulphur oxides (SO <sub>x</sub> )	Annual Average*	80 µg/m <sup>3</sup>
	24 hours**	125 µg/m <sup>3</sup>
Oxides of Nitrogen (NO <sub>x</sub> )	Annual Average*	80 µg/m <sup>3</sup>
	24 hours	150 µg/m <sup>3</sup>
Nitrogen Dioxide	Annual Average	150 µg/m <sup>3</sup>

	24 hours	100 µg/m <sup>3</sup>
Suspended Particulate Matter (SPM)	Annual Average	360 µg/m <sup>3</sup>
	24 hours	500 µg/m <sup>3</sup>
Respirable particulate matter (< 10µm) (RPM)	Annual Average*	70 µg/m <sup>3</sup>
	24 Hours**	150 µg/Nm <sup>3</sup>
PM2.5	Annual Average	35 µg/m <sup>3</sup>
	24 Hours	75 µg/m <sup>3</sup>
Lead (Pb)	Annual Average*	1.0 µg/Nm <sup>3</sup>
	24 hours**	1.5 µg/m <sup>3</sup>
Carbon monoxide/ Carbon dioxide	8 hours	5.0 mg/m <sup>3</sup>
	One hour	10 mg/m <sup>3</sup>
Hydrogen Sulphide	24 hours**	150 µg/m <sup>3</sup>
Non methane hydrocarbons	Instant Peak	700ppb
Total VOC	24 Hours**	600 µg/m <sup>3</sup>
Ozone	One hour	200 µg/m <sup>3</sup>
	8 hour (Instant Peak)	120 µg/m <sup>3</sup>

Source: First Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014.

### 6.2.2.3 Monitoring location

Air quality monitoring should be carried out within the project site.

### 6.2.2.4 Monitoring frequency

Air quality monitoring should be done on a quarterly basis during the construction and subsequent operational phases in collaboration with a NEMA designated laboratory.

## 6.2.3 Noise monitoring plan

### 6.2.3.1 Introduction

Potential sources of noise pollution will emanate mainly during construction activities, machinery use and from vehicle movement in and out of the facility. Noise may lead to hearing impairments which will reduce the workmanship of the employees. The purpose of noise monitoring plan is to therefore ascertain the extent of the impact due to the construction and subsequent operation of the disposal site in compliance with the Environmental Management and Coordination (Noise and Excessive Vibrations Pollution Control) Regulations, 2009.

### 6.2.3.2 Monitoring location

Noise monitoring should be carried out within the project site.

### 6.2.3.3 Monitoring frequency

Noise monitoring should be done on a quarterly basis in collaboration with a NEMA designated laboratory. Noise levels will be measured in dB (A).

**Table 7:** Maximum permissible levels for construction sites.

Zone	Maximum Noise Level Permitted (Leq) in db(A)	
	Day	Night

(i)	Health facilities, educational institutions, homes for disabled etc.	60	35
(ii)	Residential	60	35
(iii)	Areas other than those prescribed in (i) and (ii)	75	65

Source: Second Schedule of Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009.

**Table 8:** The Maximum permissible intrusive noise levels.

Zone		Sound Level Limits dB		Noise Rating Level (NR)	
		(A) Leq, 14 h		Leq, 14 h	
		Day	Night	Day	Night
A	Silent Zone	40	35	30	25
B	Place of worship	40	35	30	25
C	Residential: Indoor	45	35	35	25
	Outdoor	50	35	40	25
D	Mixed Residential (with some commercial and places of entertainment)	55	35	50	25
E	Commercial	60	35	55	25

Day: 6.01 a.m. – 8.00 p.m. (Leq, 14 h) Night: 8.01 p.m. – 6.00 a.m. (Leq, 10h)

Source: First Schedule of Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009.

## 6.2.4 Wastewater quality monitoring plan

### 6.2.4.1 Introduction

Sources of effluent from the development will be from sanitary facilities. The proponent should put in place a consistent wastewater quality monitoring plan targeting the quality of effluent discharging from the proposed septic tank – soak pit system. The objective of the monitoring plan is to provide data and information to improve water quality and management of the effluent in order to comply with the standards prescribed under the Third Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006.

### 6.2.4.2 Monitoring parameters

Effluent from the sewage treatment plant should be monitored pursuant to the Third Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006.

**Table 9:** Water quality monitoring parameters and the standards.

Parameter	EMC (Water Quality) Regulations, 2006 Standards
PH Value	6.5-8.5
BOD; mg/L	30max
COD; mg/L	50 max



Total Suspended Solids; mg/L	30 max
Ammonia-NH <sup>+</sup> ; mg/L	100 Max
Total Dissolved Solids; mg/L	1200 Max
E. Coli Colonies; count/100ml	Nil
Total coliform; count/100ml	1000/100ml

Source: Third Schedule of Environmental Management and Coordination (Water Quality) Regulations, 2006.

#### 6.2.4.3 Monitoring location

Effluent sampling should target the discharge point of the proposed septic tank – soak pit system.

#### 6.2.4.4 Monitoring frequency

The frequency of wastewater monitoring should be quarterly in collaboration with a NEMA designated laboratory.

#### 6.2.4.5 Indicator of success

Apart from implementing measures to meet the legal standards, obtaining an EDL from NEMA will also form part of the indicators of success of the water quality monitoring plan.

### 6.2.5 Solid waste monitoring plan

#### 6.2.5.1 Introduction

Site preparation and construction activities are expected to generate significant quantities of solid waste such as overburden, rock rubbles, cuttings and rejected materials among others. Additionally, workers and visitors to the site will generate domestic wastes such as food left overs, plastics and wrappings among others. Poor disposal of the waste will cause odour problems, environmental pollution and therefore a health risk to the workers, visitors to the facility and neighbours. The purpose of the monitoring plan is to therefore ensure solid waste is managed in such a way that it protects both the public health and the environment.

#### 6.2.5.2 Monitoring frequency

The frequency of solid waste monitoring will differ from the collection to the disposal stage in order to ensure reduced odours and accumulated heaps of waste. Table 11 describes the outline for which the activity will be monitored but can be adjusted depending on the amount generated

**Table 10:** Sample outline for solid waste monitoring plan.

Activity	Frequency	Critical levels (Tons)	Target	Responsibility
Collection	Daily			
Storage	Daily			
Management	Daily			
Disposal	Weekly			

#### 6.2.5.3 Monitoring strategy

The solid waste monitoring plan will document the collection, storage and disposal of solid waste from the proposed development. There is need to code each of the collection points, note the capacity and critical levels, frequency of disposal and the personnel and contractor responsible. In addition, it will be important to characterize the waste streams at the collection points to inform investments in segregation infrastructure.

#### **6.2.5.4 Indicator of success**

Indicators of success will include timely collection and disposal of waste by the contractors, waste disposal tracking documents and certificates issued at the disposal sites.

## **7.0 PUBLIC AND STAKEHOLDER CONSULTATIONS**

### **7.1 Introduction**

Public and stakeholders participation in the ESIA process is a legislative requirement under Part 2, Section 69 (1d) of the Kenya Constitution 2010 and Regulation 17 of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. The aim of public and stakeholders consultations was to obtain and document comments, views and concerns that the neighbours and stakeholders have regarding the proposed project

An extensive public consultation process was engaged in gauging the sentiments of a variety of stakeholders in the development of this project. Besides the fact that this is a regulatory requirement under the Environmental Management and Coordination (EIA/EA) Regulations (2003), it was an excellent opportunity to offer the public an opportunity to ventilate their fears and concerns.

### **7.2 Methodology**

Public participation for the proposed project was undertaken using two strategies:

- Administration of questionnaire to the neighbours and stakeholders. Questionnaires have been appended to this ESIA study report; and,
- Public consultative meeting held on January 15<sup>th</sup>, 2024 at the site. Minutes for the proceedings have been appended to this ESIA study report.

The respondents were purposively sampled targeting the immediate neighbours to the site, the sub-county ward administrator and the local administration including the area Chief.



**Figure 4:** The area chief during public participation meeting.



**Figure 5:** Tana North Sub-County ward administrator during public participation meeting.



**Figure 6:** Some participants in during the consultative meeting onsite.



**Figure 7:** Some participants in during the consultative meeting onsite.

#### **7.4 Summary on findings**

All the participants agreed to support the operation of the project.

## **8.0 CONCLUSIONS AND RECOMMENDATIONS**

### **8.1 Conclusion**

The proposed project will ensure industrialization and development through the utilization of the locally available resources to catalyze diversified industrial development coherent with Kenya's Vision 2030. This report examines CAIP at the level of primary infrastructural installations and zoning but not actual operations for each value chain. On the basis of the evaluation of the development proposal, the project does not occasion environmentally significant negative impacts that could lead to environmental degradation on an appreciable throughout the project cycle. This EIA project report presents a "Findings of No significant Impacts". The development of this project is considered economically viable, socially acceptable and environmentally sound.

### **8.2 Recommendations**

This project should be favored with license subject to the conditions that NEMA may impose during the decision making process. It is strongly recommended that each operation be subjected to EIA.

## 9.0 REFERENCES

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- Google Maps (2023), -1.270333, 39.726306

## **10.0 LIST OF APPENDICES**

- EIA/EA expert’s practising license.
- Bills of quantities.
- Architectural drawings.
- Minutes of public consultation meeting.
- Public consultation questionnaires.