

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) STUDY REPORT



**PROPOSED SUGAR FACTORY ON L.R. NOS. NANDI/KAMOIYWO 26381, 179, 177
& 2599 IN CHESUMEI SUB-COUNTY, NANDI COUNTY**

(Latitude 0.346682° and longitude 35.066910°)

Prepared for:

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CERTIFICATION

Certification by Firm of Experts

This ESIA Study has been carried out in accordance with the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019.

Due diligence has been observed in data collection, consultations and preparation of the report. The report was compiled without prejudice and is exclusively confidential. Apart from the NEMA and the Environmental Assessor, no other party shall have access to this report without the express permission of the proponent.

We certify that the particulars in this report are correct and righteous to the best of our knowledge.

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NEMA expert certification of registration no: **8511**

Signature: _____



Lead Expert: **Kennedy Kijana**



NEMA expert certification of registration no: **1254**

Signature: _____



Date: _____

29/9/2026

Certification by Proponent

Signed for and on behalf of: **West Kenya Sugar Company Ltd**

Name: _____

MOSES O. APUNDA

Signature & Stamp: _____

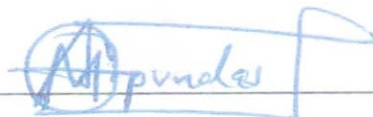


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Abbreviations

EA	Environmental Audit
EDL	Effluent Discharge License
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EMS	Environmental Management System
ETP	Effluent Treatment Plant
LTP	Leachate Treatment Plant
Ha	Hectare
KES	Kenya Shillings
KSB	Kenya Sugar Board
KPLC	Kenya Power & Lighting Company Limited
LR No	Land registration number
MDG's	Millennium Development Goals
NEAP	National Environment Action Plan
NEMA	National Environmental Management Authority
OSHA	Occupational Safety and Health Act
pH	Potential of Hydrogen
PPE	Personal Protective Equipment
UNCED	United Nations Conference on Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
WRA	Water Resources Authority

Non-Technical Summary

Introduction

West Kenya Sugar Company Ltd (trading as Kabras Sugar) is one of Kenya's leading privately owned sugar millers, headquartered in Kakamega County, Western Kenya. The company sources sugarcane predominantly through an extensive network of smallholder outgrower farmers rather than a nucleus estate and has progressively expanded its milling capacity and geographic footprint within the western sugarbelt over the past five decades.

As part of its expansion strategy, the proponent, West Kenya Sugar Company Ltd, proposes to establish a new 1,500 TCD milling and processing unit expandable to 3,000 TCD in Chesumei Sub-County, Nandi County. The Sub County is endowed with suitable natural conditions for increased sugar cane production and expansion. The proposed development aims to expand cane processing capacity in the North Rift Sugar belt, create a new market outlet for cane farmers in Nandi County and its environs, and generate direct and indirect employment opportunities within the local economy.

To comply with the requirements of the Environmental Management and Co-ordination Act (EMCA) of 2015 and the Environmental Impact Assessment and Audit Regulations 2003, the project owner has commissioned Gomake Consultancy Company Limited to prepare a comprehensive Environmental and Social Impact Assessment (EIA) Project Report. The environmental study was commissioned in July 2026. To initiate the public consultation process, standard public consultation forms/notices were issued to the immediate neighbours, clients and consultations were made with key lead agencies.

Terms of Reference

The Terms of Reference for this assessment are based on the Environmental Impact Assessment and Audit Regulations dated June 2003. The TOR was submitted to NEMA and given reference number NEMA/ENVIS/EIA/TOR/00744 which was reviewed and approved by NEMA on the 14th of September 2026, copy of which is attached to this report.

Project location and scope

The proposed sugar factory shall be located on L.R. Nos. Nandi/Kamoiywo 26381, 179, 177 & 2599 off the Chemuswa-Saniak Road, within Saniak Village, Saniak Sub-location, Kamoiywa Location, Chesumei Constituency, Chesumei Sub-County, Nandi County. The site is bordered by three neighbouring locations, namely Kapsisiwa, Kabisaka, and Sang'alo-Keplonik. The project shall comprise of the following components:

- Workshops;
- Administrative offices
- Weighbridge house;
- Cane yard;
- Mill House;
- Power house;
- Sugar house;
- Effluent treatment and recycling plant;

- Agricultural offices;
- Staff houses
- Stores;
- Access roads;
- Bagasse silos.
- Fuel station
- Water supply works (from a borehole)
- Electricity connection

The project shall also incorporate major land use change in the area involving sugarcane cultivation in partnership with the local farmers through leases. Currently in partnership with the local farmers the proponent has over **30,000** acres of land under sugarcane development.

Legal and regulatory compliance

The proponent is committed to comply with all applicable legal provisions and regulations which have been reviewed in the report:

- The Constitution of Kenya (2010)
- Environmental Management & Coordination Act, 1999 (Amended 2015) and Subsidiary Regulations
- Environmental Management and Co-ordination (Waste Management) Regulations 2024
- Environmental (Impact Assessment and Audit) Regulations, 2003
- EMCA (Water Quality) Regulations, 2024
- EMCA (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009
- Environmental Management and Coordination (Air Quality) Regulations, 2014
- Land Act 2012
- The Public Health Act (Cap 242)
- The Occupational Safety and Health Act, 2007
- The Water Act, 2016 and The Water Resources Management Rules, 2007
- The County Governments Act 2012
- The Sustainable Waste Management Act 2022
- Climate Change Act, 2023
- Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009
- Work Injury Benefits Act (WIBA), 2007
- The Energy Act 2019
- Penal code Cap 63(Section 191)
- The Traffic Act, 2012
- Physical and Land Use Planning Act, 2019
- Employment Act 2007
- Standards Act Chapter 496
- Food Drugs and chemicals substances Act (Cap 254)
- Sustainable Development Goals (SDGs)

Public Participation

Legal Notice of 101 of June 2003 requires that all environmental and social assessment process in Kenya to incorporate Public Consultation.

Key stakeholder consultation was undertaken in the project area. The team identified stakeholder who are key to implementation of the proposed project as well as those who rely on such services. The stakeholders included County Government officials, National Government officials, and Non-governmental organization among others.

PCMs – The Consultant, in collaboration with the national government led by the local chiefs and assistant chiefs, carried out public participation in the proposed Sugar factory project in Nandi. Two meetings were held to cover the four Locations: Kamoiywa Location (the proposed mill site), Kapsisiwa, Kabisaka, and Sang'alo-Keplonik. The third meeting involving the county and national government officials was held in Kapsabet Town on 22nd September 2026. In their consultations, the community sensitization meetings generally targeted all community members within and neighbouring the project area.

Project Impacts:

Construction phase

Project impacts and their mitigation measures have been discussed in the report and they include:

- Procurement of construction materials:
- Employment opportunities
- Enhancement of local economy / More cash in circulation
- Occupational health and safety hazards
- Energy utilization:
- Water Utilization
- Waste production:
- Influx of construction workers into the area:
- Construction traffic:
- Archaeological findings:

Operation phase

- Increased pressure on infrastructure – Stressed up service provision
- Pollution – Environmental Degradation
- Drain blockages – Back flooding
- Vector and rodents breeding grounds – Vulnerability to diseases
- Electricity consumption – pressure on supply
- Foul smell from factory effluent
- Gaseous emissions into the atmosphere
- Reduction in biodiversity in the area due to altered habitats
- Destruction of wetlands
- Limitation of grazing land for animals
- Seepage of fertilizers into water sources
- Possible use of pesticides for crop pest control
- Reduced distance to cane milling factories for farmers
- Reduction of area of arable land for food crops
- Possible changes in soil quality / soil erosion

- Possibility of human disease outbreaks (e.g. cholera) due to poor effluent and sewage disposal
- Reduction of rampant theft due to better incomes for the youth
- Employment opportunities
- Occupational health and safety hazards
- Threat to livestock breeding/rearing among the Maasai community
- Improvement of infrastructure and social amenities through CSR activities
- Water supply and consumption
- Soil degradation
- Deforestation
- Waste generation i.e. filter cake and bagasse
- Revenue generation
- Value-added products
- Climate change contribution

Decommissioning phase Impacts

- Solid Waste Generation
- Dust
- Noise and Vibration
- Labour work
- Occupational Health and Safety Hazards
- Contaminated sites e.g. pesticides, industrial chemicals used in sugar processing
- Land restoration
- Water resource recovery
- Air pollution reduction
- Rural economic decline
- Loss of revenue
- Decline in investment
- Infrastructure degradation i.e disuse of transportation networks
- Redevelopment of projects
- Diversification
- Environmental rehabilitation

Project Alternatives

Project alternatives discussed in the report include:

- Site alternative
- Alternative Technologies
- Alternative Bagasse management
- Alternative Equipment
- “No Project” Alternatives

Project Cost

The total project budget is approximated to be Four billion Two Hundred and Twelve Million Shillings only (Kshs 4,212,000,000) as per the attached summary of the bill of quantities. The NEMA fees are payable at 0.1% of the project cost, with a minimum of 10,000.00, whichever is

greater. Therefore, the total fee payable to NEMA is Four Million Two Hundred and Twelve Thousand Shillings (Ksh. 4,212,000.00).

Impact Matrix

The impact matrix below summarizes the positive and negative impacts by type and mitigation measures.

Environmental Impact	Impact Type								Mitigation	
	Positive		Negative							
	Significant	Not Significant	Significant	Not significant	Short term	Long term	irreversible	Cumulative	No mitigation	Mitigation Required
CONSTRUCTION AND INSTALLATION PHASE IMPACTS										
Employment opportunities	x				x				x	
Procurement opportunities	x				x				x	
More Cash in Circulation	x					x			x	
Occupational health and safety hazards			x		x	x				x
Energy utilization	x				x				x	
Water utilization	x			x	x					x
Waste production			x		x					x
Influx of construction workers	x			x	x					x
Increase in social vices e.g. prostitution,			x		x					x

Environmental Impact	Impact Type								Mitigation	
	Positive		Negative							
	Significant	Not Significant	Significant	Not significant	Short term	Long term	irreversible	Cumulative	No mitigation	Mitigation Required
STDs, HIV-AIDS										
Construction traffic			x		x					x
Archeological findings				x	x					x
OPERATION PHASE IMPACTS										
Employment opportunities	x					x		x	x	
Increased pressure on infrastructure				x		x		x		x
The bagasse menace				x				x		x
Land and water pollution – oil spills, effluent discharge			x					x		x
Air pollution / Emissions			x			x		x		x
Offensive smell from effluent			x			x				x
Electricity consumption	x					x				x

Environmental Impact	Impact Type								Mitigation	
	Positive		Negative							
	Significant	Not Significant	Significant	Not significant	Short term	Long term	irreversible	Cumulative	No mitigation	Mitigation Required
Noise and Vibration			x			x				x
Reduction in biodiversity				x		x		x		x
Destruction of wetlands				x		x	x	x		x
Vector and rodents breeding grounds			x			x		x		x
Limitation of grazing lands			x			x		x		x
Chemical pollution – fertilizer, pesticides and herbicides			x			x		x		x
Reduction of arable land for food crops				x		x		x		x
Reduced distance to milling factories	x					x		x	x	
Possibility of human disease outbreaks e.g. cholera			x			x				x

Environmental Impact	Impact Type								Mitigation	
	Positive		Negative							
	Significant	Not Significant	Significant	Not significant	Short term	Long term	irreversible	Cumulative	No mitigation	Mitigation Required
Possible changes in soil properties/quality				x		x		x		x
Reduction of theft by youth	x					x			x	
Employment opportunities	x					x		x	x	
Improved infrastructure and social amenities through CSR	x					x		x		x
Occupational health and safety hazards	x					x				x
Water supply and consumption	x		x			x				x
Land-use and landscape changes				x		x		x		x
Land degradation through soil erosion, soil compaction				x		x		x		x
Potential conflict with community of land ownership and succession			x		x	x	x	x		x

Environmental Impact	Impact Type								Mitigation	
	Positive		Negative							
	Significant	Not Significant	Significant	Not significant	Short term	Long term	irreversible	Cumulative	No mitigation	Mitigation Required
issues, late payment										
Increased accidents due to agricultural machinery traffic				x		x		x		x
Possibility of increased poverty due to late payment for cane			x			x		x		x
DECOMMISSIONING PHASE IMPACTS										
Solid waste generation				x	x					x
Dust			x		x					x
Noise and vibration			x		x					x
Rehabilitation	x				x				x	
Employment		x			x				x	
Occupational Health and Safety hazards			x		x					x

Conclusion

This ESIA Study Report has been prepared to provide sufficient and relevant information on the proposed project to enable NEMA to establish whether activities of the project are likely to have

significant adverse environmental impacts. Mitigation measures have been proposed for identified impacts in this report and an Environmental Management Plan (EMP) for the implementation of the proposed measures has been presented. The EMP presented in this report is a tool to be used by the Project Team during the construction, hand-over and operation periods.

1. INTRODUCTION AND SCOPE OF STUDY

1.1 *Introduction*

West Kenya Sugar Company Ltd (trading as Kabras Sugar) is one of Kenya's leading privately owned sugar millers, headquartered in Kakamega County, Western Kenya. The company sources sugarcane predominantly through an extensive network of smallholder outgrower farmers rather than a nucleus estate and has progressively expanded its milling capacity and geographic footprint within the western sugarbelt over the past five decades.

As part of its expansion strategy, the proponent, West Kenya Sugar Company Ltd, proposes to establish a new 1,500 TCD milling and processing unit expandable to 3,000 TCD in Chesumei Sub-County, Nandi County. The Sub County is endowed with suitable natural conditions for increased sugar cane production and expansion. The proposed development aims to expand cane processing capacity in the North Rift Sugar belt, create a new market outlet for cane farmers in Nandi County and its environs, and generate direct and indirect employment opportunities within the local economy.

The development zone will increase farm household incomes and promote sugarcane as the main cash crop. Moreover, if the income obtained from sugarcane cultivation can be partially invested in complementary agricultural or horticultural activities, then household food security and sustainable livelihoods could easily be attained.

1.2 *Background and Rational of the EIA*

To comply with the requirements of the Environmental Management and Co-ordination Act (EMCA) of 2015 and the Environmental Impact Assessment and Audit Regulations 2003, the project proponent has commissioned Gomake Company Consultancy Limited to prepare an Environmental and Social Impact Assessment (EIA) Project Report. Environmental study was commissioned in July 2026. To initiate the public consultation process, standard public consultation forms were issued to the immediate neighbours, clients, staff of the proposed sites, and consultations were made with key lead agencies.

1.3 *Scope*

As a requirement by the Environmental Management and Coordination (Amendment) Act 2015, of Kenya, a project proponent is required to undertake an Environmental Impact Assessment study before undertaking any project highlighted in Schedule 2 of the Act. This study undertakes to fulfil this requirement. This study is necessary at the planning stages of the undertaking to ensure that significant impacts on the environment are taken into consideration during the design, construction, operation, and decommissioning of the facility.

The project scope included literature review; detailed and updated description of the project design and proposed implementation schedule, costs, as well as suitable alternative options; an in-depth analysis of the environmental and social baseline conditions; an outline of policy, legal and institutional framework governing the sector with specific focus on agro-processing; inclusive public participation and meaningful stakeholder engagement; establishment of details of significant environmental and social impacts associated with the construction, operation,

decommissioning or after-use plans and post-decommissioning of the project; recommend appropriate mitigation measures for all adverse environmental and social impacts and enhancement of the benefits; and develop an Environmental and Social Management Plan (ESMP) for all the project's phases giving specific actions, responsibilities, cost estimates, timeframes and monitorable indicators.

1.4 Terms of Reference

The Terms of Reference for this assessment are based on the Environmental Impact Assessment and Audit Regulations dated June 2003. The TOR was submitted to NEMA and given reference number NEMA/ENVIS/EIA/TOR/00744 which was reviewed and approved by NEMA on the 14th of September 2026, copy of which is attached to this report.

1.5 Methodology

After preliminary visits to the proposed site, the following were carried out in the preparation of this document:

- i) Socio-economic survey;
- ii) Qualitative and quantitative data;
- iii) Observations, discussions with stakeholders and lead agencies;
- iv) Documentary review of the nature of the proposed project;
- v) Policy and legal frameworks, social and environmental setting of the area;
- vi) Checklists were prepared to identify possible environmental and human safety issues, photography, etc;
- vii) Review of the project designs and implementation plans and comprehensive discussions with the project proponent;
- viii) Report writing

1.6 Team of Experts

All partners coming from different disciplines and experiences have spearheaded the implementation of innovative and appropriate approaches to development thinking, namely scientific and well researched outcomes, participatory approaches that enhance dialogue, forge partnerships and encourage conflict management and resolution. The team's diverse disciplines are consistent with the multi/inter/trans- disciplinary nature of the environmental management tools and the code of practice for the registered EIA/EA firm of experts.

Table 1: Key experts for the ESIA study

Name	Expertise
Kennedy Kijana McAbongo	Team Leader/ Environmental Lead Expert
Allan Ochieng'	Sociologist
Fredrick Maseno	Safety and Health Advisor/ Fire Safety Expert

Jack Otieno	Environmental EIA/EA Associate Expert
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2. PROJECT DESCRIPTION

2.1 *Project Objectives*

The primary objective of this Project is to construct a factory building, install equipment and machinery for sugar cane processing with a capacity of 1,500 tonnes of cane per day (TCD) expandable to 3,000 TCD using state-of-the-art technology. The vacuum pan process employs intermediate automatic technology, which is not labour intensive, and requires no more than medium level production staff cadres for its operation and maintenance. It captures a high percentage of sugar in molasses such that no product is wasted, thus making the project more viable and cost effective. This inevitably results in low production overheads and ultimately low pricing of products at the consumer end that will;

- Reduce waste generation.
- Reduce energy consumption.
- Improve conversion efficiency.
- Produce better quality product
- Increase sustainability.
- Help the farming community to improve the economy
- Reduce transport cost to the nearest factory.
- Reduce carbon foot print
- Promote sustainable agricultural practices

2.2 *Proposed Project Components*

The proposed sugar factory development shall be located on L.R. Nos. Nandi/Kamoiywo 26381, 179, 177 & 2599 off the Chemuswa-Saniak Road, within Saniak Village, Saniak Sub-location, Kamoiywa Location, Chesumei Constituency, Chesumei Sub-County, Nandi County. The site is bordered by three neighbouring locations, namely Kapsisiwa, Kabisaka, and Sang'alo-Keplonik

The project shall comprise of the following components:

- Workshops;
- Administrative offices
- Weighbridge house;
- Cane yard;
- Mill House;
- Powerhouse;
- Sugar house;
- Effluent treatment and recycling plant;
- Molasses tank
- Agricultural offices;
- Staff houses
- Stores;
- Access roads;
- Bagasse silos.

- Fuel station
- Water supply works
- Electricity connection

The project shall also incorporate major land use change in the area involving sugarcane cultivation in partnership with the local farmers through leases. Currently in partnership with the local farmers the proponent has over **30,000** acres of land under sugarcane development.

2.3 *Proposed infrastructure and processing activities*

The proposed infrastructure and activities in the factory will include the following: -

2.3.1 Cane yard

The yard will consist of weighbridge and overhead gantry. The cane preparation equipment will consist of a cane carrier, a cane kicker to regulate feed cane knives and a fibrizer.

2.3.2 Milling

The extraction line will consist of roller milling tandem using a hydro-pneumatic pressure regulating system. The milling tandem will be driven by four AC electric motors with planetary type speed reducers. Auxiliary equipment will include a mill house crane. The mixed juice will be passed through a rotary juice screen before being pumped to the screened juice tank.

2.3.3 Clarification

The pumping of juice to clarification station will be done through automatic flow control to ensure uniform flow rate. Primary heating of juice will be done prior to liming and sulphitation. Before final heating, both liming and sulphitation will be done to the juice with proper control of pH. Control of liming will be automated. Finally, heated juice will be pumped through flask tank to clarifier for settling out mud and production of clear juice. The mud from the clarifier is de-sweetened in a rotary vacuum filter, with filtrate being returned to the screened juice tank, and mud removed and used as fertilizer on the fields.

2.3.4 Evaporation

The clear juice from the clarifier will be heated and then evaporated to form syrup. The evaporated set will consist of a quintuple effect. Exhaust steam from the turbine and boiler through pressure reducing station will be used as the heating medium for the first effect. Exhaust steam will be used in sequence so that the vapor leaving the first vessel will be used in the next vessel heat and so on; so that boiling will take place at reduced temperatures giving the advantage of minimizing destruction of sucrose, and for general steam company. Syrup, which consists of a concentrated clear juice will then be withdrawn from the last vessel and pumped to concentrated clear sugar juice will then be withdrawn from last vessel and pumped to Sulphitation Vessel to reduce color before pumping it to the Boiling House section of crystallization.

2.3.5 Boiling house (crystallization)

Batch vacuum pans will be used to boil syrup into A-massecuite while automatic continuous pans will be used to boil B- and C- massecuite. From the pans, A- & B- massecuite will flow under gravity to air cooled crystallizers. Vertical continuous crystallizer will be used for C-massecuite.

2.3.6 Crystal separation

A-sugar will be separated from A-molasses by Batch type Centrifugal machines. The centrifugal machines will be fully automated with a 1500kg/charge capacity, complete the accessories and drive. B&C sugars will be separated from B& C molasses with continuous centrifugal machines. The centrifugal will be of vertical type and have a total capacity to cure all the massecuities produced. The molasses produced will be pumped to the molasses storage tank.

2.3.7 Drying and bagging

Hot air will be blown into the sugar drier and the sugar will leave the batch centrifugal to dry it. Drying will occur in a multi-tray dryer with a hot air-blowing arrangement. Big sugar lumps will be separated in the last section of the tray. The sugar will then be cooled, sieved and conveyed to silos before packaging for sale.

2.3.8 Steam generating plant

The high-pressure steam needed will be generated in a 70 t/h (MCR) water tube boiler with heat recovery equipment (an economizer and air pre-heater). The steam at 44Bar and 415°C will be generated using bagasse with 50% moisture. The flue gasses will be passed through mechanical grit collectors to meet the emission standards.

2.3.9 Spray ponds

Hot water from the condenser will be taken to the spraying pond where it will be cooled and re-used.

2.3.10 Effluent treatment plant

During processing, the water effluent from the plant, mainly consisting of bagacillo and floor washings, which are rich in BOD, will be taken to a modern effluent treatment plant to reduce the level of biological oxygen demand (B.O.D) to less than 30ppm and remove suspended matter.

2.3.11 Maintenance

The milling process will normally run for ten months per year, with monthly shutdowns of approximately 24 hours for servicing, cleaning/maintenance. These activities will include cleaning of heat exchangers, lubrication repairs and general cleaning.

During the two months off crop for replacement /rebuilding of wearing parts like mill rollers and general maintenance on all equipment and machinery will be done.

2.4 Cane Production Process

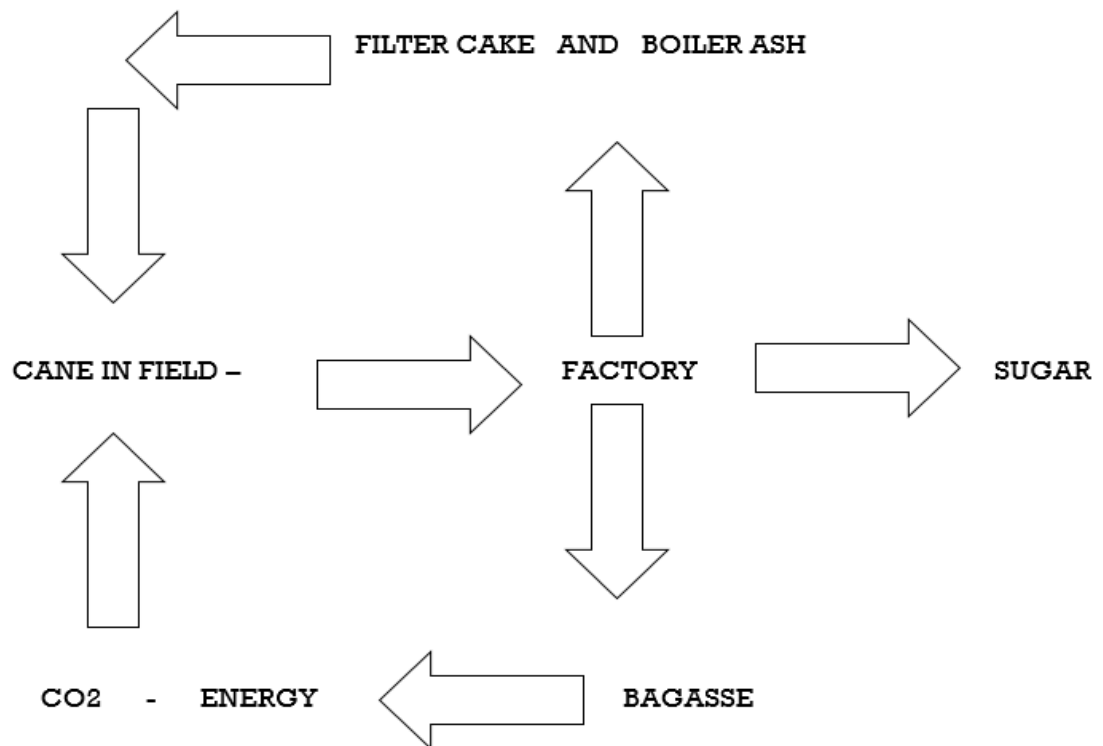


Figure 1: Summary of the sugar process

2.5 Project Implementation

The project will be implemented in four phases: design and construction, equipment installation, operation and decommissioning.

2.5.1 Design Phase

This phase is the concept of the planned development and the designing of a structure that was envisaged to be functional and to take care of every environmental concern such as liquid and solid wastes and security. This has already been completed.

2.5.2 The Equipment Installation Phase

This phase will be based on the building standards, code and all other relevant regulations applicable in Kenya. All the proposed works will follow standard environmental guidelines, health and safety measures.

- a) Equipment installation Activities
 - i) Construction activities

This will have to be undertaken to provide support and shelter for the additional equipment to be installed. The construction of the building walls, foundation, floor pavement, and drainage system, among other component of the project will involve minimal masonry works and related activities. General masonry and related activities will include concrete mixing, plastering, slab construction, construction of foundation and curing of fresh concrete surfaces. These activities are known to be labour intensive hence may be supplemented by machinery such as concrete mixers.

ii) Roofing and sheet metal works

Roofing activities will include laying of iron sheets, and structural steel to the roof and fastening the roofing materials to the roof.

iii) Electrical Works

Electrical work during both construction and operation will involve installation of electrical gadgets and appliances including electrical cables, lighting apparatus, sockets etc.

2.6 *Equipment to be installed*

The proponent intends to achieve its objectives by installing the following equipment within the facility:

2.6.1 Shredder

The shredder is designed to achieve very fine preparation of sugar cane by separating the fibres and opening the cell wall efficiently. This allows the subsequent extraction process to maximize the removal of the sucrose bearing juice from the prepared cane. It shall ensure:

- Cane preparation for juice extraction
- Fibre and juice separation
- Increased sugar recovery
- Excellent fibre particle size distribution
- Improved final bagasse moisture
- Higher imbibition efficiencies at each stage
- Improved boiler performance/efficiency
- Consistently higher bagasse densities
- Lower bagasse pol loss

2.6.2 Cane carrier

Completely made from steel the cane carrier will have adequate column and support hence facilitating to feed the required cane capacity.

2.6.3 Pressure feeders

The new pressure feeders will have built-in overload protection, besides ensuring smooth and safe operation. They will have a compact, low-weight design that fits the available space without costly adjustments.

2.6.4 Boiler

As one kind of environmental protection industrial boiler, biomass fired boiler will be used in sugar factory, which can burn bagasse. With large quantity of sugar cane bagasse expected at the sugar factory, a lot of fuel cost will be saved.

2.6.5 FFE-Falling Film Evaporator

Falling film evaporator concentrates the juice coming from the purification station and sends the concentrated juice (syrup) to the crystallization station. The way an evaporator plant works has a crucial impact on the heat economy of sugar factories and refineries. Perfectly tailored to the overall process, it allows effective action to increase the energy efficiency of upstream or downstream process steps. Falling-film evaporators that will be installed will have a higher juice distributor dome, making them easier to inspect and clean. Whenever necessary, the juice distributor and heating tubes can be cleaned with a high-pressure water jet from the top tube plate, without opening the dome flange.

2.6.6 CVP-Continuous vacuum pan

The new CVP design produces high massecuite exhaustion, consistent crystal size and improves energy efficiency. The Continuous Vacuum Pan designs are suitable for A, B and C massecuites and are configured to optimise upstream and downstream plant capabilities. Importantly, the pan's vapour demand is surge-free and consistent with steady-state boiler operation and evaporator performance for extended periods.

2.6.7 Grader

Grader to be installed will provide vital grading functions that help in maintaining sugar cane quality and are known to improve the efficiency in grading processes. The grader shall be highly durable, corrosion resistance and will require low maintenance, thereby improving services and bringing greater efficiency in production.

2.6.8 Spray pond

The warm water from the condensers needs to be cooled to the lowest practical temperature before being re-used. The cooling process is carried out in spray ponds after which the water is pumped back to the condensers.

2.6.9 Molasses tank

Molasses tanks shall be installed. These will be specially designed to suit the storage of molasses. The tanks will come complete with an inspection lid / manway access, and good ventilation (to reduce condensation and bacterial growth).

2.6.10 Centrifugal machine

The centrifugal machine will provide real and sustained process advantages to the user as they are more efficient and reduce processing costs through lower electrical power consumption and improved recovery of crystals from the massecuite.

2.7 *Decommissioning Phase*

At the end of the operational life of the plant (factory), all the equipment and waste materials from the construction/equipment installation will be removed from the site. The materials that can be reused will be separated and used for other construction work and others disposed of appropriately. The areas not intended for parking of vehicles will be landscaped and planted with beautiful vegetation to improve the aesthetics of the surrounding.

2.8 *Project Cost*

The total project budget is approximated to be Four billion Two Hundred and Twelve Million Shillings only (Kshs 4,212,000,000) as per the attached summary of the bill of quantities. The NEMA fees are payable at 0.1% of the project cost, with a minimum of 10,000.00, whichever is greater. Therefore, the total fee payable to NEMA is Four Million Two Hundred and Twelve Thousand Shillings (Ksh. 4,212,000.00).

3. BASELINE INFORMATION

3.1 Location

The proposed site is located on L.R. Nos. Nandi/Kamoiywo 26381, 179, 177 & 2599 off the Chemuswa-Saniak Road, within Saniak Village, Saniak Sub-location, Kamoiywa Location, Chesumei Constituency, Chesumei Sub-County, Nandi County. The site is bordered by three neighbouring locations, namely Kapsisiwa, Kabisaka, and Sang'alo-Keplonik.

The proposed project will occupy approximately 46.5 acres, comprising four (4) parcels of land with separate title deeds. Although registered under different titles, all the parcels were owned by a single landowner who has since been fully compensated for the land acquisition and associated resettlement. Consequently, no outstanding land acquisition or resettlement issues are anticipated for the proposed development.

The site is located on coordinates: **Latitude 0.346682° and longitude 35.066910**



Figure 2: Google map showing the location of the facility

(Source: Google Earth)

3.2 *Project's surrounding*

The surrounding land use pattern is predominantly small-scale crop cultivation (mainly maize and tea), livestock rearing, and localised community infrastructure and residential development. Notable existing infrastructure in the wider area includes the Sang'alo Tea Factory, located approximately 15 to 20 km from the site, and the KETRACO Lessons power transmission line, which passes less than 3 km away.



Figure 3: Satellite View of the Proposed Location Land Use Patterns

(Source: google earth)



Plate 1: Picture showing local land use patterns including small-scale tea farming, residential compounds and grazing livestock lands

3.3 *Topography, Physiography, and Geology*

3.3.1 Physiographic Zone

Located within the North Rift Highlands of western Kenya, Chesumei is dominated by rolling hills, undulating highlands, and broad river valleys.

3.3.2 Elevation Profile

Altitudes range between 1,800 meters and 2,020 meters above sea level (masl), with Kaptel/Kamoiywo ward averaging ~1,983 masl and Chemundu ward averaging ~1,946 masl.

3.3.3 Geological Formations

Underlain primarily by Precambrian granites and basement system rocks, overlain by Tertiary volcanic formations. The gently sloping landforms require moderate earthworks during industrial construction while remaining naturally prone to surface runoff during high-precipitation periods.

3.3.4 Soils & Fertility

Dominated by deep, well-drained, reddish-brown nitisols and ferralsols (developed from volcanic parent rock). These soils are highly fertile and acidic to moderately acidic (pH 4.5–5.8), making them suitable for tea (*Camellia sinensis*), maize, and sugarcane cultivation. However, the fine texture makes them vulnerable to water sheet erosion on cleared slopes.

Sub-Surface Soil Quality

All the four soil samples tested had all heavy metals detected except Nickel and Arsenic which were not detected in all the four samples. The levels were, however, within the target guidelines values stipulated in the DIV guidelines for Lead and Chromium. Cadmium on the other hand was detected in all the four samples and were noted to be above the DIV guidelines.

3.4 Climate, Meteorology, and Air Quality

Climatic is characterized by a warm, humid-to-subhumid tropical highland climate. Precipitation is characterized by bimodal rainfall patterns with long rains occurring from March to June and short rains from September to November. Annual rainfall averages between 1,200 mm and 2,000 mm, which supports rain-fed agriculture and natural catchment recharge. Mean annual temperatures range between 18°C and 26°C, with daily maximums reaching 28°C–30°C during dry months (January–February). Potential evapotranspiration rates remain lower than annual precipitation.

3.4.1 Baseline Air Quality & Ambient Noise:

Pristine rural air shed dominated by agricultural land cover. Background particulate levels ($PM_{2.5}$ / PM_{10}) are low, with seasonal spikes during land preparation, dry season dust, and domestic biomass burning. Ambient noise levels baseline at 35–45 dB(A), well below industrial thresholds.

Ambient Air Quality

The purpose of monitoring baseline air quality for proposed resource development projects is to characterize the current state of the substances in the atmosphere and to develop an understanding of potential incremental influences that a project can have on Air quality, climate, and the hydrological environment; and potential cumulative influences that a project and existing emission sources in the area can have on air quality, climate, and the hydrological environment. In pristine environments, where air emissions are unlikely to exceed EMCA (Air Quality) Regulations 2024, ambient air quality objectives, it is necessary for a proponent to demonstrate a clear understanding of the NEMA air quality objectives as well as policies developed by IFC/World Bank for continuous improvement.

Particulate Matter (TSP, PM10 & PM2.5) measurements was done using Oceanus Air Quality Monitor System (AQM-09) Environmental Monitor machine for both particulates and gaseous

concentrations. The gases, (SO₂, O₃, NO₂, H₂S & Total VOCs) were sampled using the AQM-09 Pollution Monitoring machine. The air pollution levels are reported instantaneously and in real-time into online monitoring platform. The air samples were collected from five points within the boundary of the project area. The points of air sampling were determined after site inspection in the company of West Kenya staff representatives.

The criteria used to evaluate the measured values are derived from NEMA EMCA (Air Quality) Regulations, 2024 and the WHO ambient air quality standards. Particulate Matter: From the results obtained, the points sampled for PM₁₀, PMs and TSP were all within the EMC Air Quality, Regulations, 2024, and the World Health Organization Air quality guidelines. Gases: The results for SO₂, NO₂, H₂S, O₃ and Total VOCs were all within the EMC (Air Quality) Regulations 2024 at the project area for all the locations sampled.

It is recommended that: The occupier to be carrying out monitoring of the ambient air quality on quarterly basis during the construction phase and at least on annual basis during the operational phase of the factory.

Noise and Vibration Quality

Construction and associated work will result to production of noise and excessive vibrations in the various project phases. It is thus important to understand and develop best practicable measures to control its impact on the surroundings. The noise results from all the points were within the EMC (Noise and

Excessive Vibration pollution Control) Regulations 2009 except at the left-hand side of the main access where the levels were above the EMC (Noise and Excessive Vibration pollution Control) Regulations 2009 but within the IFC/World Bank Environmental, Health and Safety Guidelines (April, 2007).

Based on the site observation and the measurement results, the following can be deduced regarding the baseline noise environment at each monitoring location: The noise environment within the site predominantly entailed typical rural residential activities. The ground vibration levels at all the monitoring locations recorded were below the set limits under The Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009.

3.5 Hydrology, Surface Water, and Wetlands

Hydrological Network	
Surface Streams & Rivers	Wetland Complexes
<ul style="list-style-type: none"> • Birei River system • Kingwal River drainage basin • Primary sources for domestic/farm use 	<ul style="list-style-type: none"> • Papyrus reed beds (*Cyperus papyrus*) • Seasonally inundated floodplains • Natural water filtration & storage

The rear boundary of the proposed site lies along the Birei River and associated riparian ecosystem. This watercourse is a sensitive receptor of particular concern, as it is also relied upon by the surrounding community for domestic use and livestock watering. Any deterioration in water quality arising from construction or operational activities could adversely affect downstream biodiversity and community water uses.

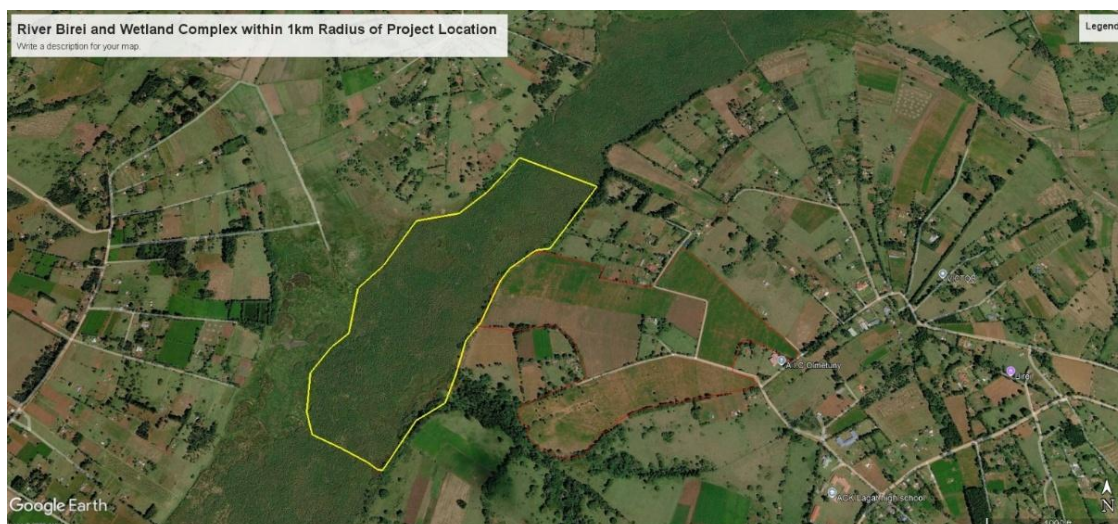


Figure 4: Satellite view of the River and Wetland within 1km radius of the proposed project location boundary (Highlighted in Yellow)

(Source: google earth)

N/B: The river flows from right to left of the above photo

3.5.1 Recommendations on Proposed Activity

The Birei River's hydrological water availability assessment revealed that the available measured water recharge was 99,351.36m³/day. The source being an expansive Wetland, it goes without saying that as a storage water body, it impounds much more volumes of water than the measured recharge flow. The wetland is also recharged from other tributaries around it whose discharges were not measured.

The proposed sugar factory in terms of water abstraction from Birei River recharged Birei Wetland is minimal given the vastness of the wetland and the river water recharge of measured 99,351.36m³/day. In terms of water quality, the proponent is advised to develop an Effluent Discharge Control Plan (EDCP) and also apply for a Permit for that in case they will discharge into the wetland.

It is therefore recommended that Water Resources Authority issues the proposed West Kenya Sugar Nandi County Factory with an Authorization to Construct Works to be thereafter converted into a Water Permit once the permit conditions are met and other regulatory requirements are adhered to.



Plate 2: Rear view of the project boundary and Birei River and associated riparian ecosystem covered by papyrus as seen in the background of this photo



Plate 3: Papyrus reeds covering the wetland and river along the proposed project boundary



Plate 4: Birei River and associated riparian ecosystem bank utilized by the local community for domestic purposes and livestock watering.

3.5.2 Drainage Basins

Formed within the Lake Victoria hydrology basin. Key surface drainage rivers include the Birei River and the Kingwal River system, fed by local micro-streams.

3.5.3 Wetland Systems

Feature extensive riverine and seasonal wetlands, dominated by papyrus vegetation (*Cyperus papyrus*) and indigenous sedges. These wetlands act as natural bio-filters, regulate streamflow, and mitigate downstream flooding.

3.5.4 Hydrogeology & Groundwater

Shallow aquifers (5–20 meters depth) feed springs and hand-dug wells across rural villages, while deep aquifers (60–150 meters depth) provide yield potential for institutional boreholes.

3.5.5 Hydrological Vulnerability

Riverbanks and wetlands face degradation due to smallholder agricultural encroachment, eucalyptus plantings in riparian zones, and unmitigated runoff.

3.6 Ecological Baseline: Flora, Fauna, and Biodiversity

Category	Primary Attributes & Species	Ecological Function / Status
Terrestrial Flora	Agro-ecosystems dominated by Tea (<i>Camellia sinensis</i>), Maize (<i>Zea mays</i>), and scattered <i>Eucalyptus</i> , <i>Cupressus lusitanica</i> , and <i>Grevillea robusta</i> . Indigenous trees (<i>Markhamia lutea</i> , <i>Croton macrostachyus</i>) line farm edges.	Highly modified agricultural landscape; remnant indigenous tree species are protected under county reforestation policies.
Riparian & Aquatic Flora	Papyrus reeds (<i>Cyperus papyrus</i>), indigenous sedges, bulrushes (<i>Typha spp.</i>), and riparian riverine grasses.	Critical bio-filtering buffer along Birei and Kingwal river systems.
Faunal Communities	Avifauna: Herons, egrets, weavers, kingfishers, and raptors in wetland margins. Mammals: Small rodents, vervet monkeys (<i>Chlorocebus pygerythrus</i>), and mongooses. Adjacent Kingwal catchment supports the rare Sitatunga antelope (<i>Tragelaphus spekii</i>).	High bird diversity along wetlands. Sitatunga presence in connected riverine corridors requires strict habitat protection.

Category	Primary Attributes & Species	Ecological Function / Status
Aquatic Fauna	Amphibians, aquatic reptiles, and freshwater fish (Tilapia spp., African catfish - <i>Clarias gariepinus</i>).	Sensitive to industrial effluent, sediment runoff, and chemical fertilizer leeching.

3.7 *Natural Resource Base & Utilization*

3.7.1 **Land & Soil Resources**

Fertile agricultural land is the primary economic asset, though average family farm holding size has declined to 1.0–2.5 acres due to sub-division driven by population growth.

3.7.2 **Forestry & Timber Resources**

High coverage of farm forestry (exotic tree stands like Eucalyptus, Cypress, and Pine) used for commercial timber, construction posts, and biomass fuel. Reforestation initiatives led by Nandi County focus on replacing water-intensive Eucalyptus in riparian corridors with bamboo and indigenous trees.

3.7.3 **Water Resources**

Surface rivers, seasonal wetlands, and protected springs supply community water needs. Increasing agricultural demand and industrial processing rely on sustainable abstraction permits issued by the Water Resources Authority (WRA).

3.7.4 **Sand and Quarry Minerals**

Small-scale river sand harvesting and murram/granite rock quarrying occur along riverbeds and rock outcrops to supply local construction material.

3.8 *Socio-Economic & Demographic Baseline of Chesumei Constituency*

3.8.1 **Demographic & Household Overview**

Based on the 2019 Population and Housing Census the total Population of the Sub County is 164,133 persons (80,949 males, 83,180 females, 4 intersex) in a total of 39,051 households. The land area comprises 474.6 km² with a density of 345.8 persons per km² (higher than the Nandi County average of 310 persons/km². Average Household Size is 4.2 persons per household.

Administrative Wards comprises 5 wards—Kaptel/Kamoiywa (project host ward), Chemundu/Kapngetuny, Kosirai, Kiptuya, and Lelmokwo/Ngechek.

3.8.2 **Education Profile**

The general adult literacy rate in Chesumei stands above 86%, supported by a well-distributed network of primary and secondary institutions. Primary school net enrolment exceeds 90%, while secondary school net enrolment sits at approximately 52%–58%. Chesumei hosts major tertiary

institutions including Moi University (Main Campus/Baraton area proximity) and Mosoriot Teachers Training College / Kenya Medical Training College (KMTC Mosoriot).

Table 2: Education Indicators Summary

Indicator	Sub-County Household Rate	Context / Source
Primary School Net Enrolment	> 90%	High transition to primary, supported by FPE.
Secondary School Net Enrolment	55%	Limited by Household Income constraints.
Tertiary / TVET Attainment	~12%–15%	Mosoriot TTC/KMTC & local VTCs.

3.8.3 Health & Healthcare Infrastructure

Health services are structured around Level 2 (Dispensaries) and Level 3 (Health Centres) facilities. Mosoriot Sub-County Hospital serves as the principal Level 4 referral hub for Chesumei. Hospital-based delivery rate stands at approximately 68%–72%, while full child immunization coverage reaches > 83%. Upper respiratory tract infections (URTI), skin diseases, malaria, and water-borne diseases (diarrhea/amoebiasis) form the top causes of outpatient visits. Doctor/Nurse to Population Ratio is higher than national targets, relying heavily on Community Health Promoters (CHPs) under CIDP preventive health programs.

3.8.4 Energy Use (Cooking & Lighting)

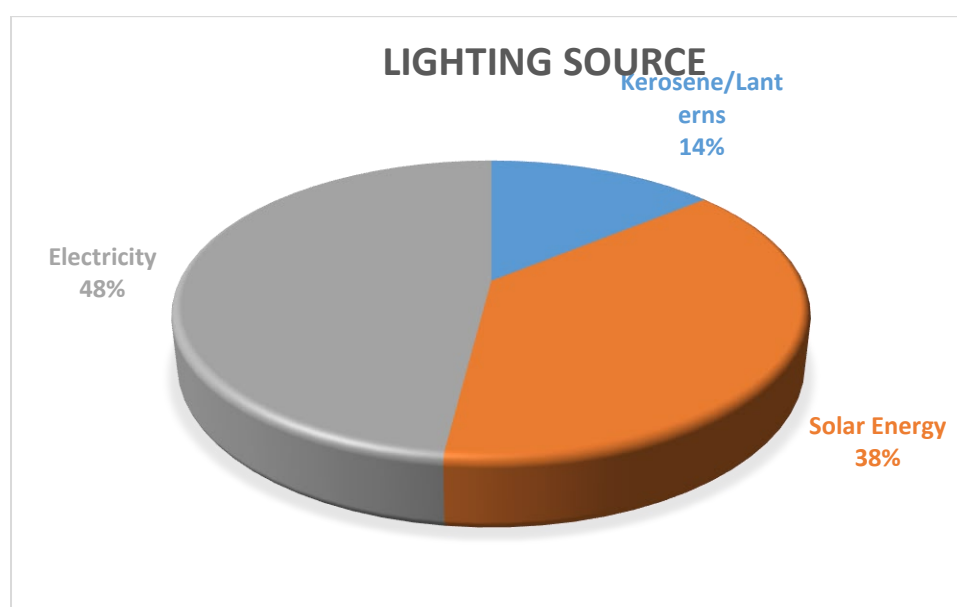


Figure 5: Energy for lighting in the Project Area

Approximately 48% of households are connected to the national grid via the Last Mile Connectivity Scheme. While 38% rely on stand-alone solar home systems/lanterns. Use of Kerosene/Paraffin reduced to < 14%.

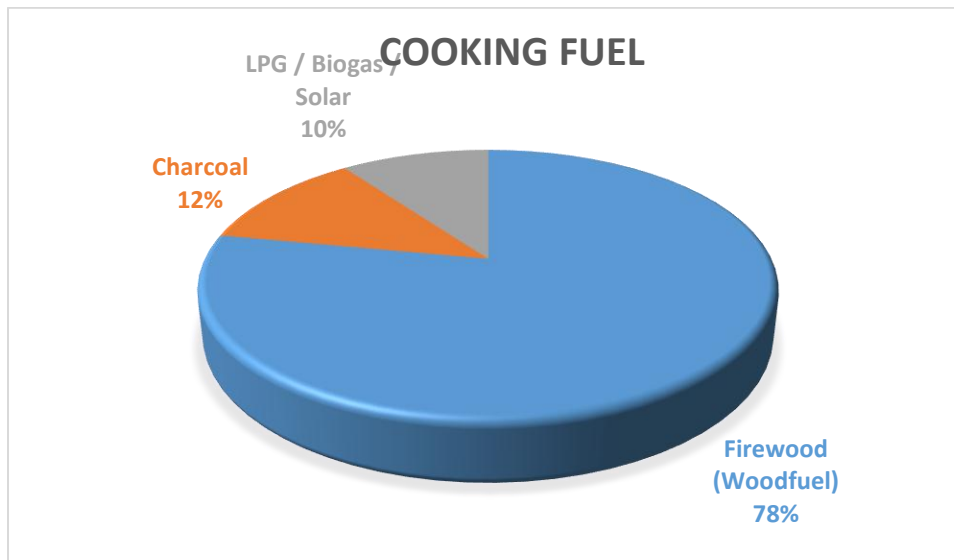


Figure 6: Energy for cooking in the Project Area

Firewood (Biomass) remains the dominant cooking fuel used by ~78% of households, particularly in rural wards like Kaptel/Kamoiywa. Charcoal is used by ~12% of peri-urban households (around Mosoriot and Chepterit) while LPG Gas & Clean Cookstoves are adopted by ~10% of total households.

3.8.5 Water, Sanitation & Hygiene (WASH)

Protected springs and wells is the primary source for over 52% of households while piped water (Borehole/Scheme) access sits at ~18%–22% across Chesumei. Over 20% of households still rely directly on untreated surface water sources (e.g., Birei River complex) for domestic tasks.

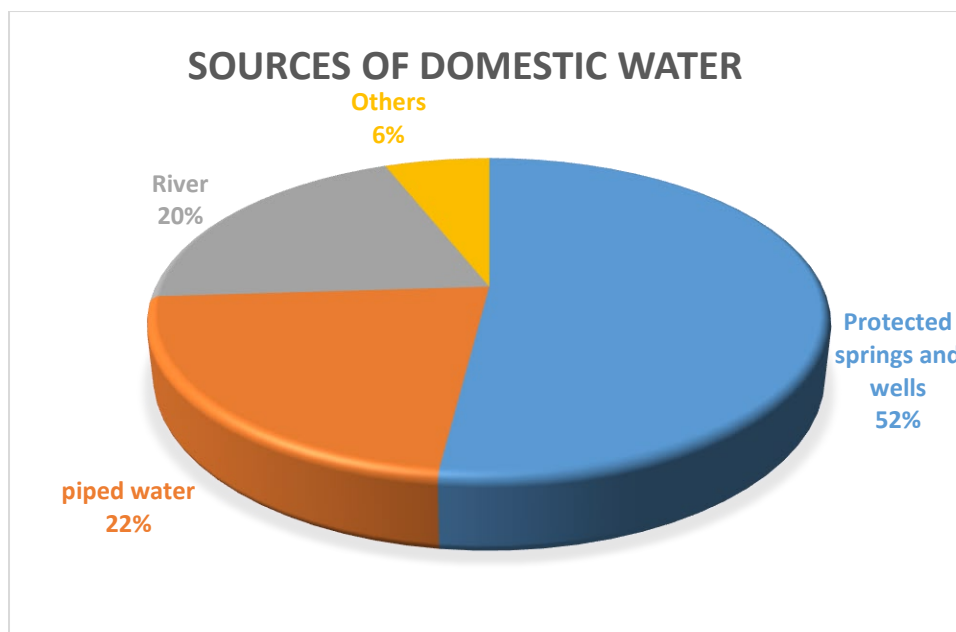


Figure 7: Domestic water source in the Project Area

Over 85% of households utilize pit latrines (covered and uncovered) as their primary sanitation facility while flush toilets is limited to approximately 5% of households (concentrated in urban centers like Mosoriot, Baraton, and Chepterit). Open Defecation Rate is low at 3%, but contamination of shallow wells from pit latrine runoff remains a seasonal hazard.

6. Employment, Economic Activity, and Income Profiles

Occupation in agriculture related activities such as smallholder tea accounts for over 65% of employment in the area while informal sector and trade such as Boda Boda Transport and agro-dealers and retail accounts for 20% of employment in the area. Formal jobs such as teachers, health workers, civil service and factory account for 15% of employment in the area.

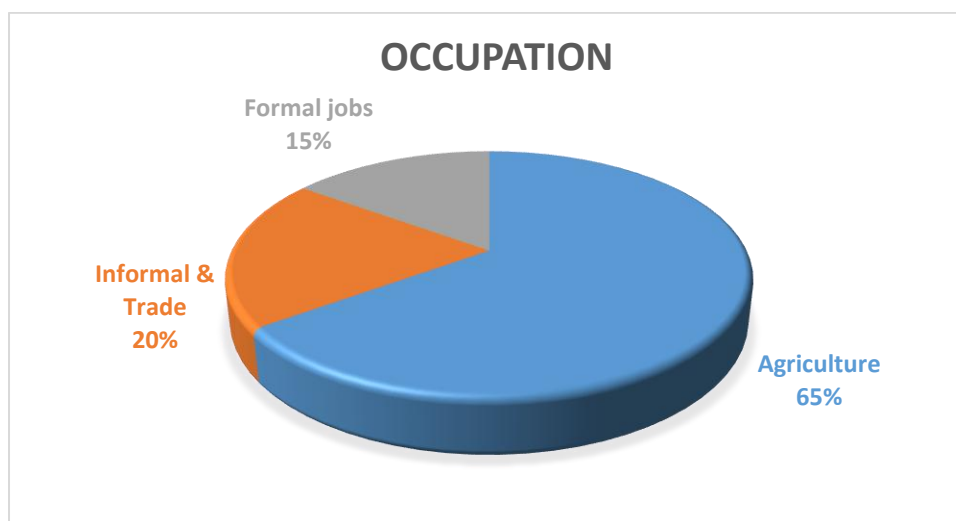


Figure 8: Occupation and employment in the Project Area

4. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

Environmental law is principally concerned with ensuring the sustainable utilization of natural resources according to a number of fundamental principles developed over the years. In an ideal setting, the utilization of land and land-based resources should adhere to these principles: sustainability, intergenerational equity, the principle of prevention, the precautionary principle, the polluter pays principle, and public participation.

The EMCA, 1999, was developed based on the principles highlighted in the preceding sections. Its basis was the fact that the public should be given effective access to judicial and administrative proceedings and that it should have access to the judicial review of environmental decision-making functions effectively.

4.1 *Background to environmental management policies and laws*

4.1.1 Sustainability

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

4.1.2 Principle of intergenerational equity

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

4.1.3 Principle of prevention

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

4.1.4 Precautionary principle

The precautionary principle recognizes the limitations of science, as it is not always able to accurately predict the likely environmental impacts of resource utilization. It calls for precaution in the making of environmental decisions where there is scientific uncertainty.

Accordingly, it is closely related to the principle of prevention and can be viewed as the application of the principle of prevention where the scientific understanding of a specific environmental threat is not complete. The precautionary principle thus requires that all reasonable measures must be taken to prevent the possible deleterious environmental consequences of development activities. Further, it demands that scientific uncertainty should not be used as a reason for not taking cost-effective measures to prevent environmental harm.

4.1.5 Polluter pays principle

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

4.1.6 Principle of public participation

The principle of public participation seeks to ensure environmental democracy and requires that the public, especially local communities, participate in environmental and development decisions that affect their lives. It requires that the public have appropriate access to information concerning the environment held by public authorities and be given an opportunity to participate in decision-making processes.

4.2 Policy framework

4.2.1 Environmental policy

The Kenya Government's environmental policy aims at integrating environmental aspects into national development plans. The broad objectives of the national environmental policy include:

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

4.2.2 National Environmental Action Plan Framework, 2009-2013

The National Environment Action Plan Framework is the second national environmental policy after the 1994 National Environment Action Plan (NEAP). The development of NEAP is provided for by EMCA, 1999 which requires preparation of Environmental Action Plan at different levels; district, provincial, and national levels. The framework recognizes the intertwined linkages between economic growth and environment in Kenya. It highlights priority themes and activities for the country towards achieving sustainable environment.

The policy framework, among others, proposes integration of environmental concerns into regional and local development plans, promotion of appropriate land uses, and enforcement of EMCA, 1999 and its subsidiary and other relevant legislations. The policy framework also advocates for efficient water harvesting, storage, and usage. On human settlements and infrastructure, this policy framework recognizes the associated environmental issues. These include waste management, sanitation, diseases, land use changes in conservation areas, demand for water, energy, construction materials, pollution, land degradation, biodiversity loss, land and housing tenure, urban planning and design and electronic wastes. In managing the proposed sugar factory operations, consideration of the highlighted issues is vital for contributing to the national sustainable development goals.

4.2.3 The Sugar Policy

The Sugar policy, as established, is in line with the national objectives of national food policy, which are self-sufficiency, food security, employment creation, and income generation, foreign exchange earnings, stemming rural-urban migration, poverty alleviation, and overall economic growth. Sugar is vital in providing livelihoods, earning national revenues and incomes, creating employment and foreign exchange savings. It is an industry valued at approximately Kshs. 15 billion, providing over 500,000 direct and indirect jobs and supporting the livelihoods of over 6 million people.

The Sugar sub-sector is a major enterprise in the Western and Nyanza and potential exists in the Eastern and Coastal belts. Further improvement of this vital industry will help alleviate unemployment through backward and forward linkages.

4.2.4 The Occupational safety and Health Policy

This Policy lays emphasis on continual development and implementation of the Occupational Safety and Health systems and programs to reduce incidences of work related accidents and diseases. In addition, it seeks to offer equitable compensation to those who suffer physical injuries and contract occupational diseases. The Policy addresses the current challenges, gaps and future development of safety and health systems and programs in the country. It promotes basic principles of assessing occupational risks or hazards; combating occupational risks or hazards at source; and developing a national preventative safety and health culture that includes information, consultation, research and training. The policy also promotes continuous improvement of occupational safety and health by integrating Kenyan national laws and regulations with Regional Protocols, ILO Conventions, ISO standards and the best practices in the world. It sets up mechanisms for resource mobilization for occupational safety and health programs and activities and provides guidance to all stakeholders in the development and implementation of occupational safety and health systems and programs. The proponent is committed to put in place occupational safety and health systems and programs to be in tandem with the national policy.

4.2.5 The Kenya Vision 2030 and the “Big Four” Blueprint

The Kenya Vision 2030 is the national long-term development policy that aims to transform Kenya into a newly industrialized, middle-income country, providing a high quality of life to all its citizens by 2030 in a clean and secure environment.

The Big Four is an economic blueprint that was developed by the government to foster economic development and provide a solution to the various socio-economic problems facing Kenyans. The four items intended for delivery include Food Security and Nutrition, Universal Health Care, Affordable Housing, and enhancing the Local Manufacturing industry. The proponent will explicitly play a big role in the realization of two of the pillars, namely food security and local manufacture, as soon as it starts its operations in Nandi County.

4.2.6 Sustainable Development Goals (SDGs)

MDGs are eight internationally agreed goals for socio-economic development that emphasize the following: elimination of extreme poverty and hunger; universal primary education; gender equality; reduction in child mortality; improvement in maternal health; lower HIV/AIDS and major disease incidence; environmental sustainability; and better partnerships with international development partners. The facility has an opportunity to contribute towards the local achievement of some of these goals via employment opportunities creation, corporate support to community initiatives, and contribution towards achieving environmental sustainability goals.

4.2.7 National Water Policy

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

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

4.3 Legal framework

4.3.1 NEMA

The National Environment Management Authority (NEMA) is the National body charged with coordinating matters of implementation of policy issues relating to the environment. This body was established under the Environmental Management and Coordination (amendment) Act (EMCA), 2015. Other departments that deal with environmental issues in the Sub County include Water Resources Authority (WRA), the Kenya Forestry Service, Kenya Wildlife Services (KWS), National Construction Authority (NCA), Kenya Sugar Board (KSB), County Government of Nandi, among others.

The proponent is committed to comply with all applicable legal provisions and regulations which have been reviewed in the table below.

Table 3: Relevant legal and regulatory requirements

Legislation/Regulation/Standard	Provisions	Compliance/Non-compliance
The Constitution of Kenya (2010)	<ul style="list-style-type: none"> • Provides for the protection of the right to private property • Provides for the sound conservation and protection of ecologically sensitive areas • Supports the settlement of land disputes through recognized local community initiatives • Gives powers to the state to regulate the use of land 	<ul style="list-style-type: none"> • The proponent will ensure sound protection of the environment and any other ecologically sensitive receptor by installing pollution prevention technologies such as effluent treatment and recycling plants. • The proponent involved members of the public in the proposed development during public participation and shall be involved during operation in ensuring the factory operates and, at the same time, safeguarding the environment
Environmental Management & Coordination Act, 1999 (Amended 2015) and Subsidiary Regulations	<p>Ensure environmental protection during project implementation.</p> <ul style="list-style-type: none"> • Environmental Impact Assessment EIA) • Environmental Audit and Monitoring, Environmental Quality standards, and issuance of environmental protection orders • Generation of sector related regulations • Environmental Management and Coordination (Environmental Impact Assessment and Audit) Regulations, 2003 <ul style="list-style-type: none"> - Waste Management Regulations - 2024 - Water Quality Regulations - 2024 - Air Quality Regulations - 2024 	<ul style="list-style-type: none"> • The proponent shall comply with EMCA and subsidiary regulations, including best international practices; • The proponent shall have an Environmental Policy in place and employ an environmental officer to oversee all environmental matters during the construction and operation of the sugar mill.
Environmental Management and Co-ordination (Waste Management) Regulations, 2024	<p>5. A waste generator shall collect, segregate and dispose the waste in the manner provided in regulation 6 of these Regulations.</p> <p>6. (1) In the discharge of their responsibility under regulation 5, a waste generator shall minimise the waste generated by adopting the following cleaner production methods—</p> <p>(a) improvement of production process through—</p> <p>(i) conserving raw materials and energy;</p> <p>(ii) reducing toxic emissions and wastes;</p>	<ul style="list-style-type: none"> • The proponent shall utilize sugar process waste known as bagasse to produce power for its own consumption. • The proponent shall contract a NEMA registered waste disposal agent to dispose of appropriately its solid waste, including hazardous wastes such as used oil and oil filters from the workshop;

Legislation/Regulation/ Standard	Provisions	Compliance/Non-compliance
	<p>(b) monitoring the product cycle from beginning to end by—</p> <p>(c) monitoring the product cycle from beginning to end by—</p> <p>(i) identifying and eliminating potential negative impacts of the product;</p> <p>(ii) enabling the recovery and re-use of the product where possible; and</p> <p>(iii) reclamation and recycling; and</p> <p>(d) incorporating environmental concerns in the design and disposal of a product</p>	<ul style="list-style-type: none"> The proponent shall pave and install oil water interceptor in active operation area such as the workshops and parking areas.
Environmental Management and Co-ordination (Managing and Control of Plastic Packaging Materials) Regulations, 2024	<p>To establish a framework for the management and control of the use of plastic packaging materials and promote the use of environmentally-friendly packaging material.</p> <p>The gazette notices banning use of plastics are now finally strengthened with the force of subsidiary legislation.</p> <p>To preserve and promote a clean and healthy environment for sustainable development and promote the recycling of plastic packaging material.</p>	<ul style="list-style-type: none"> The proponent shall promote a clean and healthy environment for sustainable development and promote the recycling of plastic packaging material
Environmental (Impact Assessment and Audit) Regulations, 2003	<ul style="list-style-type: none"> No proponent shall implement a project if it is likely to have a negative environmental impact; or for which an environmental impact assessment is required under the Act or these Regulations unless an environmental impact assessment has been concluded and approved in accordance with these regulations. No licensing authority under any law in force in Kenya shall issue a license for any project for which an environmental impact assessment is required under the Act unless the applicant produces to the licensing authority a license of environmental impact assessment issued by the Authority under these Regulations 	<ul style="list-style-type: none"> The proponent is carrying out the ESIA for NEMA review and licensing and shall carry successive Environmental Audits at the facility to identify new potential environmental impacts associated with the future operations of the factory.
EMCA (Water Quality) Regulations, 2024	<ul style="list-style-type: none"> To provide for the prevention of land and water pollution by establishing standards for waste water management to ensure 	<ul style="list-style-type: none"> The proponent shall install an Effluent Treatment and recycling Plant (ETP) for pre-

Legislation/Regulation/Standard	Provisions	Compliance/Non-compliance
	<p>clean and healthy water resources as well as provision of standards for water for different uses.</p> <ul style="list-style-type: none"> • The eleventh schedule on EDL fees for controlled facilities has been enhanced. 	<p>cleaning and recycling of effluent water from the factory.</p> <ul style="list-style-type: none"> • The facility shall apply for a valid Effluent Discharge License from NEMA for its Effluent Treatment Plant once it is operational.
EMCA (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009	<p>A person shall not engage in any activity that may-</p> <ul style="list-style-type: none"> • have an adverse impact on any ecosystem; • lead to the introduction of any exotic species; • lead to unsustainable use of natural resources, <p>Without an Environmental Impact Assessment License issued by the Authority under the Act.</p>	<ul style="list-style-type: none"> • The area lies on the boundary of the Mara River and Migori River catchments, and no effluent shall be released into the environment since the treated effluent water shall be re-used for other purposes within the factory.
Environmental Management and Coordination (Air Quality) Regulations, 2024	<ul style="list-style-type: none"> • To provide for the prevention, control and abatement of air pollution to ensure clean and healthy ambient air. • This is an improvement of the 2014 Regulations and introduces various improvements including emission testing from mobile sources. 	<ul style="list-style-type: none"> • The proponent shall install an appropriate Electrostatic precipitator (ESP) as an effective emissions control technology; • The proponent shall also sponsor tree planting exercises within and around the premises to counter air pollution as a result of the activities due to their operations.
Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009	<ul style="list-style-type: none"> • General prohibitions of the Act provide that no person shall make or cause to be made any loud, unreasonable, unnecessary, or unusual noise which annoys, disturbs, injures, or endangers the comfort, repose, health, or safety of others in the environment. Of importance in determining nuisance, the time of day, proximity to a residential area, recurrence or intermittence of the noise, level and intensity of the noise, and whether the noise can be controlled without much effort or expense to the person making the noise. • The regulations also provide that no person shall cause or cause to be made excessive vibrations that annoy, disturb, injure, or endanger the comfort, repose, health, or safety of others in the environment, or cause to be made excessive vibrations that 	<ul style="list-style-type: none"> • The proponent shall strictly adhere to these regulations during the construction and operation phases, respectively. • The proponent will ensure compliance with the site's set noise level limits during the construction and operation phases. • The contractor shall 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).

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	<p>exceed 0.5 centimetres per second beyond any source property or 30 meters from any moving source.</p> <ul style="list-style-type: none"> Vibrations that annoy, disturb, injure, or endanger the comfort, repose, health, or safety of others in the environment or cause to be made excessive vibrations that exceed 0.5 centimeters per second beyond any source property or 30 meters from any moving source. 	<ul style="list-style-type: none"> The proponent shall not engage in activities that will generate noise without a license from the relevant office. Annual environmental audit of the facility will also be carried out to monitor observation of these regulations.
The Sustainable Waste Management Act 2022	<ul style="list-style-type: none"> Became operational on 23 July 2023 to transition waste management to the circular model. Section 13 of the SWM Act 2022 directs all producers to implement mandatory extended producer responsibility (EPR) obligations to prevent pollution from their products or by waste arising therefrom. Every producer shall fulfill their extended producer responsibility obligations individually or collectively in a compliance scheme. The producer is defined in the Act as an entity that introduces goods, products and packaging into the country using authorized means by manufacturing, importing, converting, filling, refilling, repackaging or rebranding. 	<ul style="list-style-type: none"> The facility shall acquire relevant licenses required for waste management The proponent shall dispose of the waste through only licensed waste service providers The facility will install color coded segregation waste bins in strategic areas The proponent will enforce staff to segregate waste when disposing them in the properly labeled and colour coded receptacles and bins that will be located around the facility
The Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024	<ul style="list-style-type: none"> To extend the responsibility of a producer over a product and its packaging during the life cycle of the product or its packaging and provide a framework for the establishment and operation of mandatory extended producer responsibility schemes. To operationalize the polluter pays principle and give effect to section 13 of the SWMA. 	<ul style="list-style-type: none"> The Proponent shall implement the mandatory extended producer responsibility (EPR) obligations to prevent pollution from their products or by waste arising therefrom.
The Sugar Act, 2024	<p>An Act of Parliament to provide for the development, regulation and promotion of the sugar industry, to provide for the establishment, powers and functions of the Kenya Sugar Board, and for connected purposes.</p> <p>3. (1) There is established a board to be known as the Kenya Sugar Board.</p>	<ul style="list-style-type: none"> The proponent shall apply for a certificate of registration from the Kenya Sugar Board to operate the sugar mill The proponent shall enter into purchase agreement with growers from the Southern Catchment of Migori, Homa Bay, Kisii, and

Legislation/Regulation/ Standard	Provisions	Compliance/Non-compliance
	<p>4. (1) The Board shall—</p> <p>(a) Regulate, develop and promote the sugar industry;</p> <p>(b) Co-ordinate the activities of value chain actors within the industry; and</p> <p>(c) Facilitate equitable access to the benefits and resources of the industry by all interested parties.</p> <p>18. (1) A person shall not conduct the business of a miller unless he or she is registered by the Board and the premises in which the business is conducted is specified in the register in accordance with regulations made under this Act.</p> <p>(2) The Board shall issue to each miller registered under this section, a certificate of registration specifying the premises at which milling may be carried on by the miller.</p> <p>19. (1) A miller shall not purchase sugar crop from, or accept, sugar crop delivered by a grower and a grower shall not sell or deliver sugar crop to a miller, unless the —</p> <p>(a) grower is registered with, and has in force a valid supply agreement with the miller;</p> <p>(b) factory of the miller is situated within the grower's sugarcane catchment area; or</p> <p>(c) grower is exempted from the requirements by section 20.</p> <p>(2) No miller shall, refuse to accept or collect sugar crop for the manufacture of sugar delivered by a grower in accordance with a cane supply agreement.</p> <p>(3) A miller or a grower who contravenes the provisions of this section commits an offence and shall be liable, on conviction, to a fine not less than one million shillings or three times the market value of sugar in respect of which the offence is committed, whichever is greater, or to imprisonment for a term not less than one year, or to both such fine and imprisonment.</p> <p>20.(1) A grower may deliver cane outside a sugarcane catchment area provided that, the grower —</p>	<p>Nandi Counties to develop sugarcane for supply at the proposed sugar mill</p>

Legislation/Regulation/ Standard	Provisions	Compliance/Non-compliance
	<p>(a) has no supply agreement with a miller within the sugarcane catchment area that they are situated in;</p> <p>(b) is not indebted to a miller or an outgrower institution within the sugarcane catchment area; or</p> <p>(c) has a pre-existing agreement with a miller situated outside the sugarcane catchment area.</p> <p>- (2) The grower who intends to exercise the exemption under this section shall notify the Board of their intention to supply cane outside a sugarcane catchment area</p>	
Climate Change Act, 2023	This Act providing for the regulation of the carbon markets besides enhancing response to climate change. The Act provides guidance in the development and implementation of carbon markets; participation in carbon markets, as a result of a bilateral or multilateral trading agreement; promoting the mitigation of greenhouse gas emissions, while fostering sustainable development and environmental impact assessment. It provides for mainstreaming of climate change responses into development planning, decision making and implementation as well as resilience and adaptation in all governance sectors.	<ul style="list-style-type: none"> The proponent comply with mainstreaming of climate change responses into development planning, decision making and implementation as well as resilience and adaptation for the proposed development.
Land Act 2012	<p>Promote Land Conservation including and need to prepare EMP:</p> <ul style="list-style-type: none"> Conservation of ecologically sensitive public land Conservation of land based natural resources Submit an EMP pursuant to existing law on the environment 	<ul style="list-style-type: none"> The proponent is the registered title holder and shall ensure that he complies with the current environmental laws in order to protect the land from any form of pollution.
The Energy Act 2019	<ul style="list-style-type: none"> The Traffic Act, 2012 gives provisions and guidelines that govern the Kenya roads transport sector The Energy Act, amongst other issues, deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated with these purposes. 	<ul style="list-style-type: none"> The proponent shall follow this act to the latter and ensure Licensing and authorization to generate and/or transmit electrical power, supported by an Environmental Impact Assessment Report (EIA) approved by NEMA.

Legislation/Regulation/ Standard	Provisions	Compliance/Non-compliance
	<ul style="list-style-type: none"> • The Energy Act, 2024 established the Energy Regulatory Commission (ERC) now EPRA whose mandate is to regulate all functions and players in the Energy sector. One of the duties of the EPRA is to ensure compliance with Environmental, Health and Safety Standards in the Energy and Petroleum Sector, as empowered by the Energy Act. • Part IV (2) states that the Cabinet Secretary may in conjunction with relevant agencies perform such functions and exercise such powers as may be necessary under this Act to promote the development and use of renewable energy, including but not limited to— <ul style="list-style-type: none"> (i) promoting the utilization of renewable energy sources for either power generation or transportation; (ii) promoting co-generation of electric power by sugar millers and sale of such electric power through the National Grid directly to the consumers <p>In this respect, the following environmental issues will be considered before approval is granted:</p> <ol style="list-style-type: none"> 1. The need to protect and manage the environment, and conserve natural resources; 2. The ability to operate in a manner designated to protect the health and safety of the project employees; the local and other potentially affected communities. 	
Physical and Land Use Planning Act, 2019	This Act makes provision for the planning, use, regulation and development of land and for connected purposes. Article 5 of the Act under Principles and norms of physical and land use planning notes that ‘every person engaged in physical and land use planning development activities shall be in a manner that integrates economic, social and environmental needs of present and future generations.’ Article 4 notes that major developments should be subjected to environmental and social impact assessment.	<ul style="list-style-type: none"> • The proponent should comply with the provisions of this Act throughout the project cycle
The Traffic Act, 2012	<ul style="list-style-type: none"> • The Traffic Act, 2012 gives provisions and guidelines that govern the Kenya roads transport sector. 	<ul style="list-style-type: none"> • In ensuring compliance to this Act the contractor and developer shall ensure that all site drivers

Legislation/Regulation/Standard	Provisions	Compliance/Non-compliance
	<ul style="list-style-type: none"> • These guidelines are essential to private, public and commercial service vehicles in ensuring safety and sanity on the roads hence ensuring the environment; the human being a component is safeguarded. • In section 41 The Act demands for installation and certification of speed governors for the commercial vehicles ferrying goods adjusted to the loading condition of such vehicles to a limit of 80 KPH, registration and competence of drivers. Moreover, the owner of commercial vehicles or trailer shall ensure clear markings on their vehicles in English language on the right side of the vehicle showing ownership details, tare weight of vehicle and maximum authorized weight. • Section 26 and 27 of the same discourages engines that emit exhaust gases to the atmosphere without passing via a silencer or expansion chamber. In ensuring safety of all the persons in transit section 56 encourages that every public and commercial vehicle be fitted with inspected and first class first aid box and fire extinguisher 	<p>and all material suppliers to the site satisfy the provisions as stipulated in Act.</p> <ul style="list-style-type: none"> • The proponent shall enforce this act by ensuring all other vehicles of the company do not exceed speed limits and observe the rules at all times.
The Public Health Act (Cap 242)	<ul style="list-style-type: none"> • No person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health. • It shall be the duty of every health authority to take all lawful, necessary and reasonably practicable measures for preventing or causing to be prevented or remedied all conditions liable to be injurious or dangerous to health arising from the erection or occupation of unhealthy dwellings or premises 	<ul style="list-style-type: none"> • Housekeeping within the site shall be well maintained in all the operation areas including compliance with the Ministry of Health Covid-19 Protocols by providing hand washing stations and notices to both the employees and visitors to keep social distances and put on face masks at all times within the facility. • Sanitary conveniences shall be provided to the employees during construction and operation of the factory; • The proponent will sensitize the community on the importance of environmental management and carry out HIV/AIDS awareness programs within the community

Legislation/Regulation/Standard	Provisions	Compliance/Non-compliance
The Occupational Safety and Health Act, 2007	<ul style="list-style-type: none"> • Provides that every occupier shall ensure the safety, health and welfare at work of all persons working in his workplace • Provides that the architectural plans of the factory be approved by the Directorate of Occupational Safety and Health Services before construction activities commence. In approving the plans Directorate of Occupational Safety and Health Services will among other requirements ensure that: <ul style="list-style-type: none"> - Prescribed dimensions with regards to the distance of floor to ceiling of every workroom are upheld - Space defining machine layout for intended use by operators will be within statutory limits - Emergency exits are provided for and are designed to open in accordance to statutory requirements - Sanitary conveniences are provided for with adequacy as to the number of intended employees and are designed to have separate approaches - First aid facilities like first aid room(s) are provided for, - There is provision for accommodation for clothes not worn during working hours - There is provision for adequate ventilation - There is provision for storage of a firefighting water storage tank with a capacity of at least 10,000 litres • Provides that before any person occupies or uses any premises as a workplace, he shall apply for the registration of the premises • Provides that the workplace shall be of sufficient size for work to be carried out with ease and shall further have the necessary free space and, having regard to the nature of the work, an adequate amount of air for each employee, the minimum permissible being ten cubic meters per person • Provides that an occupier shall ensure that effective and suitable provision is made for securing and maintaining, by the 	<ul style="list-style-type: none"> • The facility will carry out an occupational health and safety audit, fire safety audit, risk assessment and is in the process of implementing the recommendations. • The proponent shall ensure that firefighting equipment is present and strategically placed within the facility including a standby fire engine; • First Aid kits shall be made available in every department and training on first aid done; • Fire assembly points shall be marked where the visitors and employees can gather for briefing in case of a fire; • There shall be provided clear and demarcated emergency exits within the facility; • An ambulance shall be on standby in the eventuality of an emergency; • Provision of PPEs shall be made mandatory within the facility. • Application for site registration will be done as soon as construction commences and registration of the facility shall follow when the facility starts operations. • Safety and health committee shall be formed when the facility is operational • Safety signs shall be erected and posted as appropriate when the facility is operational.

Legislation/Regulation/ Standard	Provisions	Compliance/Non-compliance
	<p>circulation of fresh air in each workroom, the adequate ventilation of the room</p> <ul style="list-style-type: none"> • Provides that an occupier shall ensure that effective provision is made for securing and maintaining sufficient and suitable lighting, whether natural or artificial, in every part of his workplace in which persons are working or passing • Provides that sufficient and suitable sanitary conveniences for the persons employed in the workplace shall be provided, maintained and kept clean, and effective provision shall be made for lighting the conveniences; and, where persons of both sexes are or are intended to be employed (except in the case of workplaces where the only persons employed are members of the same family dwelling there), such conveniences shall afford proper separate accommodation for persons of each sex • Provides that every steam boiler, lifting appliance, air receiver, refrigeration plant, steam receiver and all its fittings shall be thoroughly examined by an approved person, so far as the construction of the plant permits at prescribed intervals. • Provides that where work has to be done inside a confined space in which dangerous fumes are liable to be present, a permit to work has to be issued and the confined space shall be provided with adequate means of egress and ingress. • Provides that in every workplace or workroom, there shall be provided and maintained, and conspicuously displayed and free from any obstruction so as to be readily accessible, suitable means for extinguishing fire. • Provides every workplace there shall be provided and maintained safe plants and systems during its operational phase. • Provides for every workplace there shall be ensured absence/elimination of risks. • Provide for every workplace to ensure provision of information to employees to ensure safety and health. 	

Legislation/Regulation/ Standard	Provisions	Compliance/Non-compliance
	<ul style="list-style-type: none"> • Provides that every factory stops any hazardous activities and is maintained in a safe and healthy state. • Provides that every workplace carries out workplace risk assessment and send a copy of the risk assessment to the Directorate of Occupational Safety and Health Services (DOSHS). • Provides for preparation of a safety & health policy and submission of a copy to the Directorate of Occupational Safety and Health Services • Provides for prevention of environmental pollution • Provides for notification of accident occurrence, cases of occupational diseases and dangerous occurrence to DOSHS • Provides that no employee is discriminated against by virtue of:- <ul style="list-style-type: none"> - Lodging a complaint about an unsafe condition at the workplace - Being an active member of a health safety committee. • Provides for establishment of a health and safety committee whose composition should be in accordance to the Factories (Health and Safety Committees) Rules L.N. 31 of 2004. • Provides for carrying out workplace health and safety as well as fire safety audits on an annual basis. 	
Safety & Health Committee Rules, 2004 Legal Notice No. 31	<p>The Legal Notice provides for functions and duties of the health and safety committee, the purpose of meetings and recording minutes, and the roles of the office bearers. It further describes the duties of the occupier and those of the Health and Safety Adviser. Among other items, the rules provide that:</p> <ul style="list-style-type: none"> • The occupier of every workplace shall establish a health and safety committee; • The committee shall consist of safety representatives from the management and the workers; 	<ul style="list-style-type: none"> • Safety and health committee shall be formed and trained when the facility is operational

Legislation/Regulation/ Standard	Provisions	Compliance/Non-compliance
	<ul style="list-style-type: none"> • The factory occupiers shall appoint a competent person from the management staff to be responsible for safety, health and welfare in the factory or workplace; and the person appointed shall be the secretary to the committee. • Every member of the Health and Safety Committee shall undertake a prescribed basic training course in occupational health and safety within a period of six months from the date of appointment or election, and thereafter further training from time to time; • The occupier of every factory shall cause a health and safety audit of the workplace to be carried out at least once in every period of twelve months by a registered health and safety adviser. 	
Fire Risk Reduction Rules, 2007 Legal Notice No. 59	<p>The Rules provides that an employer/occupier having flammable substances must have fire resistant facility. The occupier to store highly flammable substances in fixed storage tanks, closed vessels, cupboards except for vehicles transporting the same. Flammable materials have to be kept in separate labelled stores. In go-downs, the employer has to maintain a distance of at least 80 cm wall gangway between the walls and stack of goods.</p> <p>Every employer is required to maintain good ventilation to allow exit of flammable fumes, maintain good housekeeping, maintain good electrical fittings, provide and maintain fire exits, form and train firefighting teams, conduct fire drills yearly, designate an assembly point, provide and maintain first aid facilities, post fire safety notices, install fire detectors, provide and maintain firefighting appliances, conduct an annual fire safety audit and formulate a fire safety policy.</p>	<ul style="list-style-type: none"> • Fire assembly points shall be marked where the visitors and employees can gather for briefing in case of a fire; • There shall be provided clear and demarcated emergency exits within the facility; • The facility shall carry out fire safety audit, risk assessment and implement the recommendations.

Legislation/Regulation/Standard	Provisions	Compliance/Non-compliance
Hazardous Substances Rules, 2007 Legal Notice No. 60	The rules provide that where hazardous substances are handled, washing facilities be provided, protective clothing be kept separate from personal clothing, separate clean and dirty changing rooms be maintained, proper maintenance and testing of engineering controls be done after every 2 years and a report submitted to DOSHS, protection against radioactive, carcinogenic, mutagenic or teratogenic be provided, Material Safety Data Sheets (MSDS) be availed in respect of chemicals handled, correct disposal of hazardous chemical substances be done, containers of hazardous substances be labelled, workers be trained on hazards associated to hazardous substances handled and air monitoring and measurements be done after every 12 months by an air quality monitor.	<ul style="list-style-type: none"> • The facility will carry out an occupational hygiene measurements and surveys which inform the process of implementing the recommended measures.
First Aid Rules, 1977 Legal Notice No. 160	These rules provide for first-aid box content with respect to size of a workplace and under whose charge the first-aid box should be placed.	<ul style="list-style-type: none"> • First Aid kits shall be made available in every department and training on first aid done; • An ambulance shall be on standby in the eventuality of an emergency;
Eye Protection Rules legal Notice No. 44 of 1978	The rules provide for eye safety in workplaces. Processes where eye protection is required include blasting, cleaning, chipping, metal cutting, arc welding, abrasive wheel use (grinding).	<ul style="list-style-type: none"> • Provision of PPEs shall be made mandatory within the facility. • Safe procedures and programmes will be provided to the workers
Electric Power(Special) Rules, 1979 Legal Notice No. 340	The rules provide for electrical safety with regards to electrical power installations, use and handling. These rules apply to generation, transformation, conversion, switching, controlling, regulating, distribution and use of electricity.	<ul style="list-style-type: none"> • Provision of PPEs shall be made mandatory within the facility. • Only qualified personnel will be allowed to handle activities that involve electric power.

Legislation/Regulation/Standard	Provisions	Compliance/Non-compliance
Building Operations and Works of Engineering Construction Rules, 1984 Legal Notice No. 40	These rules provide for the safety, health and welfare of workers in construction sites relating to building operations and works of engineering construction undertaken by way of trade or business, or for the purpose of any industrial or commercial undertaking, and any line or siding which is used in connection therewith and for the purposes thereof. The rules apply whether the building operations and works of engineering construction undertaken by or on behalf of the Government or a public body or private developer.	During the construction phase, the contractor will be expected to ensure safety, health and welfare of workers and all persons lawfully present at the construction site
Medical Examination Rules, 2007 Legal Notice No. 24	The rules apply to workplaces of classified hazards. Every employer has to ensure medical examination of workers in the workplaces of classified hazards.	<ul style="list-style-type: none"> • During the construction phase, there will be noise emission, exposure to dusts and fumes (cement, soil, welding fumes etc) and exposure to musculoskeletal hazards. • During the operational phase, there will be noise emission, exposure to bagasse, dust and fumes, and exposure to musculoskeletal hazards. • Statutory medical examination of the workers exposed will be mandatory.
Noise Prevention and Control Rules, 2005. Legal Notice No. 25	The rules provide that 'No worker shall be exposed to noise level excess of the continuous equivalent of 90 dB(A) for more than 8 hours within any 24 hours duration'. They further protect from exposure to high noise levels.	<ul style="list-style-type: none"> • Provision of PPEs shall be made mandatory within the facility. • Medical examinations and surveillance will be implemented at the facility • Noise measurement and survey will be done at the facility
Work Injury Benefits Act, No. 17 of 2007	This law provides for compensation to employees for work-related injuries and diseases contracted in the course of employment and for connected purposes.	<ul style="list-style-type: none"> • The employer will have an insurance cover for the facility to cater for compensation for injuries sustained by employees while at work
The Water Act, 2016 and The Water Resources Management Rules, 2007	<ul style="list-style-type: none"> • Protection of surface and groundwater resources; • Protection of water catchments; 	<ul style="list-style-type: none"> • The mill shall install a water treatment plant that abstracts water from the borehole

Legislation/Regulation/Standard	Provisions	Compliance/Non-compliance
	<ul style="list-style-type: none"> • Empower the Water Resources Authority (WRA) to impose management controls on land use falling under riparian land; • Provides that a permit shall be required for any use of water from a water resource, especially where there is abstraction and use of water with the employment of works. 	<ul style="list-style-type: none"> • The proponent shall obtain a water abstraction permit from WRA to abstract water from a borehole. Other water sources include the proposed borehole, which will have a permit from WRA.
The County Governments Act 2012	<ul style="list-style-type: none"> • Enforcing the protection of trees and other vegetation in urban centers • Approval of development designs before construction can begin • Enforce orderly development in an urban setting 	<ul style="list-style-type: none"> • The sugar mill shall liaise with the County Government to ensure compliance with land use requirements within the county and obtain the necessary licenses and permits.
Employment Act 2007	<ul style="list-style-type: none"> • The act stipulates that no person shall use or assist any other person in using forced labour. • No employer shall discriminate, directly or indirectly, against an employee or prospective employee or harass an employee or prospective employee on the following grounds: race, color, sex, language, religion, political or another opinion, nationality, ethnic or social origin, disability, pregnancy, mental status or HIV status. • An employer shall pay his employees equal remuneration for work of equal value. 	<ul style="list-style-type: none"> • The sugar mill shall be a source of employment for many workers of both gender and diverse cultural backgrounds.
Standards Act Chapter 496	<ul style="list-style-type: none"> • Section 9 (2), states that where a Kenya Standard has been declared under subsection (1), the Cabinet Secretary, on the advice of the Council, shall, by order in the Gazette, prescribe a date after which no person shall manufacture or sell any commodity, method or procedure to which the relevant specification or code of practice relates unless it complies with that specification or code of practice. (3) Where, after the publication of an order under section 9. Section 10 (2), states that, any person intends to manufacture any commodity to which that order refers after the date specified therein he shall notify the Bureau in the prescribed form of his intention and the 	<ul style="list-style-type: none"> • The proponent shall acquire a permit from KEBS to use the standardization mark as per this act to sell its sugar in the market

Legislation/Regulation/Standard	Provisions	Compliance/Non-compliance
	Bureau, if it is satisfied that he is capable of manufacturing the commodity in accordance with the relevant Kenya Standard, shall issue him with a permit to use the standardization mark referred to in paragraph (a) of subsection (1).	
Food Drugs And Chemical Substances Act (Cap 254)	<ul style="list-style-type: none"> The Food, Drugs and Chemical Substances Act (CAP 254) whose purpose is to make provisions for the prevention of adulteration of food, drugs and chemical substances. This Act (which has been invoked for the consumption of genetically modified food), requires that food, drugs, cosmetics, devices and chemical substances should not be sold if they are unwholesome, poisonous, or adulterated. It further prohibits deceptive labelling. The statute also gives powers to authorized officers to inspect and examine any premises for evidence of contravention of the provisions of the law. 	<ul style="list-style-type: none"> The sugar mill shall be inspected by the public health officers from Nandi County and issued with a Food Drugs and Chemicals Substances License for its sugar production
Sustainable Development Goals (SDGs)	<ul style="list-style-type: none"> Sustainable Development goals which were initiated by world leaders in 2015 as an advancement of the Millennium Development Goals (MDGs) provide concrete, numerical benchmarks for tackling extreme poverty in its many dimensions. The SDGs also provide a framework for the entire international community to work together towards a common end making sure that human development reaches everyone, everywhere. If these goals are achieved, world poverty will reduce by half, tens of millions of lives will be saved, and billions more people will have the opportunity to benefit from the global economy. Goals 6, 7, 13 and 15 of the SDGs revolve around ensuring Environmental Sustainability. The goals highlight on; <ul style="list-style-type: none"> ✓ Ensuring availability of sustainable management of water and sanitation for all ; ✓ Ensuring a clean and more sustainable supply of water within related watersheds; 	<ul style="list-style-type: none"> The proposed project will contribute towards alleviating rural poverty by increasing means of livelihood and enhancing food security. The ESIA study will ensure that the proposed project reflects Environmental Sustainability especially during the time of construction and implementation.

Legislation/Regulation/Standard	Provisions	Compliance/Non-compliance
	<ul style="list-style-type: none"> ✓ Ensuring access to affordable, reliable, sustainable and modern energy for all; ✓ Combating climate change through the reforestation of degraded and degrading landscapes where by reforestation helps in strengthening community resilience to climate change ; ✓ Protecting, restoring and promoting sustainable use of terrestrial ecosystem, sustainably manage forests, and ✓ Combat desertification and halt and reverse land degradation, and halt biodiversity loss. 	
Penal Code, Cap. 63	<ul style="list-style-type: none"> • Section 191–Fouling Water • Section 192–Dwellings and Neighbourhood 	<ul style="list-style-type: none"> • The management shall ensure that no foul water of any public spring or reservoir is rendered unfit for the purpose for which it was ordinarily used for by the community. • The operation phases of the project shall ensure that health of persons in general dwellings or carrying on business in the neighbourhood or passing along a public facility are protected.
The Pest Control Products Act (Cap 346)	<ul style="list-style-type: none"> • This is an Act of Parliament that regulates the importation, exportation, manufacture, distribution and use of products used for the control of pests and of the organic functions of plants and animals and for connected purposes. It also regulates against use of pest control products without due analysis from a certified analyst and inspection from an appointed inspector, in addition to granting due guidance on the licensing of use and storage of the said products. • Section 2 of the Act refers to “pest control product” as “ a product, device, organism, substance or thing that is manufactured, represented, sold or used as a means for directly or indirectly controlling, preventing, destroying, attracting or repelling any pest and includes- 	<ul style="list-style-type: none"> • The proponent shall observe the relevant provisions in the Act in regulating the use of pest control products during operational phase of the project when implementing sugarcane crop enhancement and protection activities by the facility’s agriculture department and farmers through use of pesticides and other soil-enriching chemicals

Legislation/Regulation/Standard	Provisions	Compliance/Non-compliance
	<ul style="list-style-type: none"> • a) any compound or substance that enhances or modifies or is intended to enhance or modify the physical or chemical characteristics of a pest control product to which it is added; and b) any active ingredient used for the manufacture of a pest control product;” 	
The Wildlife Conservation and Management Act, 2013	<ul style="list-style-type: none"> • This Act guiding principles is the devolution of conservation and management of wildlife to landowners and managers in areas where wildlife occurs, through in particular the recognition of wildlife conservation as a form of landuse, better access to benefits from wildlife conservation, and adherence to the principles of sustainable utilization. • The act in its sixth schedule list various animal and tree species that are nationally considered as critically endangered, vulnerable, nearly threatened and protected. It also lists in its seventh schedule, national invasive species for which control is required. • Section 48 restricts activities involving the above listed species without a permit from KWS. KWS can make recommendations to the responsible cabinet secretary, to prohibit carrying out of any activity which: is of a nature that may negatively impact on the survival of species listed in sixth schedule; or is specified in the notice or prohibit the carrying out of such activity without a permit issued by KWS. • Part IX of the act deals with the management of human-wildlife conflicts. It provides for handling of problem animals by land owners/occupiers or their agents 	<ul style="list-style-type: none"> • Any critically endangered, vulnerable, nearly threatened or protected species found within the project area will have to be managed in line with this Act. Further, management of any human-wildlife conflicts arising from the project implementation will also be guided by this act
Work Injury Benefits Act (WIBA), 2007	<ul style="list-style-type: none"> • It is an act of Parliament (No. 13 of 2007) to provide for compensation to workers for injuries suffered in the course of their employment. It outlines the following: • Employer’s liability for compensation for death or incapacity resulting from accident; • Compensation in fatal cases; 	<ul style="list-style-type: none"> • During construction period, the contractor will need to abide by all the provisions of WIBA. Similarly, the same will be required of the proponent during operation phase of the Sugar factory.

Legislation/Regulation/ Standard	Provisions	Compliance/Non-compliance
	<ul style="list-style-type: none"> • Compensation in case of permanent partial incapacity; • Compensation in case of temporary incapacity; • Persons entitled to compensation and methods of calculating the earnings; • No compensation shall be payable under this Act in respect of any incapacity or death resulting from a deliberate self-injury; and • Notice of an accident, causing injury to a workman, of such a nature as would entitle him for compensation shall be given in the prescribed form to the director. 	
Public Roads and Road of Access Act (Cap 399)	<ul style="list-style-type: none"> • The Act provides for the following with regard to public roads: • Dedication of line of public travel; • Application to construct roads of access; • Notice to be served on land owners affected; • Granting of leave to construct road of access; • Notification of order to be registered; • Right of way over road of Access; • Power to cancel or alter road of access; and • Prohibition of classes of traffic 	<ul style="list-style-type: none"> • The proponent will rehabilitate existing local roads and laying out of access roads.
The Kenya Roads Act of 2007	<ul style="list-style-type: none"> • The act stipulates the legal and institutional aspects of the road sub-sector policy. The Act provides for the establishment of three independent Road Authorities, namely: <ol style="list-style-type: none"> 1) Kenya National Highways Authority (KeNHA), responsible for the administration, control, development and maintenance of all class A, B and C roads in Kenya, 2) Kenya Rural Roads Authority (KeRRA), responsible for rural and small town roads including class D, E roads and Special Purpose Roads; and 3) Kenya Urban Roads Authority (KURA) responsible for all City and Municipal Roads. 	<ul style="list-style-type: none"> • The proponent will liaise with these institutions in the improvements existing and development of any new roads within the project area.

Legislation/Regulation/ Standard	Provisions	Compliance/Non-compliance
	The Authorities fall under the Ministry responsible for infrastructure and retains the role policy formulation and general oversight of public roads including regulatory aspects such as technical standards.	
Sexual Offences Act (No. 3 of 2024)	<ul style="list-style-type: none"> This Act aims to make provision about sexual offences, their definition, prevention and the protection of all persons from harm from unlawful sexual acts, and for connected purposes. 	<ul style="list-style-type: none"> The proponent shall put in place all mechanism to discourage unlawful sexual acts in the entire project life, these includes massive awareness

5. CLIMATE CHANGE AND COMMUNITY VULNERABILITY

5.1 *Drought and reduced water availability*

Birei River and Birei Wetland support the local water environment and are situated within an agricultural and settlement landscape. Prolonged dry spells could reduce catchment runoff and wetland recharge, potentially affecting:

- Factory water availability.
- Community access to water.
- Agricultural production.
- Riparian vegetation and wetland ecological functions.
- Water availability for livestock and other local uses.

The risk is particularly relevant because the WRA assessment's measured discharge represents conditions at the time of measurement, rather than a continuous record of seasonal and interannual flow variability.

Recommended response: Establish continuous or regular flow monitoring and develop a drought-response plan incorporating factory demand restrictions, water recycling and protection of environmental flows.

5.2 *Heavy rainfall, runoff and flooding*

The catchment contains cultivated land, settlements, gentle slopes and a wetland receiving flows from multiple tributaries. Intense rainfall could increase surface runoff, sediment transport and drainage loading. Potential consequences include:

- Erosion of cultivated land and access roads.
- Sedimentation of the wetland and river channels.
- Flooding of low-lying factory areas.
- Damage to water-intake infrastructure.
- Increased sediment loading in water used by the factory.

Recommended response: Undertake site-specific stormwater and flood-risk modelling, maintain riparian buffers and provide appropriately designed drainage infrastructure.

5.3 *Soil erosion and catchment degradation*

The area is characterized by cultivated agricultural land, settlements and partially forested upstream areas. These land uses may influence runoff, infiltration and sediment movement depending on vegetation cover and land-management practices.

Potential climate-related impacts include increased soil erosion during intense rainfall and reduced soil moisture during prolonged dry spells.

Recommended response: Promote contour farming, vegetative buffer strips, cover crops, riparian restoration and sustainable agricultural land management.

5.4 *Community livelihood vulnerability*

The surrounding area supports tea cultivation, subsistence maize farming, livestock keeping and settlement activities. These activities are potentially sensitive to rainfall variability, water availability and soil conditions. Climate-related agricultural disruption could affect household food production, income and employment.

The project should therefore incorporate community consultation and assess:

- Dependence on Birei River and wetland resources.
- Seasonal availability of domestic and agricultural water.
- Household reliance on climate-sensitive livelihoods.
- Existing adaptation practices.
- Vulnerability of women, older persons, persons with disabilities and low-income households.

5.5 *Climate Risk Assessment*

Climate hazard	Potential impact on project and communities	Risk management priority
Prolonged dry spells	Reduced river recharge, wetland storage and water availability	High
Extreme rainfall	Runoff, flooding and infrastructure damage	High
Catchment degradation	Reduced infiltration and increased sedimentation	High
Soil erosion	Loss of agricultural topsoil and sediment loading	High
Higher temperatures	Increased crop water demand and worker heat exposure	Medium
Water-resource competition	Potential pressure on community and environmental water requirements	High
Road disruption	Delayed sugarcane transportation	Medium–High
Wetland degradation	Reduced ecosystem resilience and water-storage functions	High

5.6 Climate Change Adaptation and Mitigation Measures

5.6.1 Water-resource management

The factory should:

- Establish a water balance for the 1,500 TCD initial capacity and 3,000 TCD expansion.
- Confirm abstraction requirements against WRA-approved allocations.
- Install flow-monitoring equipment at the abstraction point.
- Maintain environmental-flow requirements.
- Implement water recycling and process-water efficiency measures.
- Develop drought-response and water-shortage contingency procedures.
- Protect the Birei Wetland and its tributaries from pollution and physical disturbance.

5.6.2 Catchment and wetland conservation

The project should implement a catchment conservation programme involving surrounding farmers and relevant government agencies.

Priority interventions include:

- Restoration of degraded riparian vegetation.
- Protection of wetland buffer areas.
- Erosion-control measures on cultivated slopes.
- Community tree-growing initiatives.
- Prevention of uncontrolled sediment discharge.
- Regular monitoring of wetland condition and water quality.

5.6.3 Climate-resilient factory infrastructure

Factory infrastructure should incorporate:

- Adequately sized stormwater drains.
- Flood protection for critical equipment.
- Secure water-intake structures.
- Erosion-resistant access roads.
- Adequate wastewater and stormwater containment.
- Emergency arrangements for extreme weather events.

5.6.4 Community adaptation

The proponent should collaborate with local agricultural extension services to promote climate-smart farming, soil conservation, efficient water use and access to weather information.

Community engagement should also establish a grievance mechanism for concerns relating to water availability, abstraction, pollution and climate-related impacts.

5.6.5 Greenhouse-gas mitigation

The factory should assess opportunities for energy efficiency, bagasse-based cogeneration, efficient boiler operation, transport optimisation and wastewater-management improvements.

5.7 *Climate Risk Monitoring and Management Plan*

Parameter	Monitoring indicator	Frequency	Responsibility
Birei River flow	Discharge at abstraction point	Continuous or monthly measurements	Factory Environment Officer
Water abstraction	Volume abstracted against permitted allocation	Daily/monthly reporting	Water Manager
Environmental flow	Compliance with applicable flow requirements	Continuous or agreed monitoring schedule	Water Manager
Water quality	Relevant physical, chemical and microbiological parameters	Quarterly and after significant incidents	Environment Officer
Wetland condition	Riparian vegetation, erosion and sedimentation	Quarterly	Environment Officer
Factory water efficiency	Water use per tonne of cane processed	Monthly	Production Manager
Stormwater management	Drainage condition and evidence of erosion	Quarterly and after major rainfall	Engineering Department
Community water access	Reported shortages and grievances	Quarterly	Community Liaison Officer
Agricultural resilience	Cane production and weather-related disruptions	Seasonal	Agricultural Manager
Climate adaptation	Implementation of planned measures	Quarterly	Project Manager

6. PUBLIC CONSULTATION AND PARTICIPATION

6.1 Overview

The proposed project facilities will mainly serve the public and the local people. Therefore it is imperative that the beneficiaries are involved in the project feasibility, planning, implementation and operation stages. In view of these, the ESIA team adopted a participatory approach during the study noting that stakeholders' participation in Kenya is entrenched in the constitution, several legal instruments and international instruments to where Kenya is a party.

6.2 Legal Requirement for Public Participation

6.2.1 The Constitution of Kenya

Public participation is entrenched in several articles across the Kenya Constitution 2010. Article 6 provided for devolution and access to services. Responsibilities in major decision-making processes have been bestowed to the public (in the Bill of Rights, articles 118, 174, 196, and 201). The constitution further in Article 21 Section 3 requires safeguarding the rights and interests of marginalized groups for equity in public service provision. This can be effectively achieved through the active involvement of such groups in the decision-making process at all levels. Hence, there is a need to involve the local people in the project area in studies, design, and implementation of the proposed project facilities.

6.2.2 Environmental Management and Coordination Act, 1999

Section 17 of the Environmental (Impact Assessment and Audit) Regulations of 2003 requires that all ESIA studies incorporate public consultation throughout the study process. The aim of public consultation was to ensure that all stakeholders' issues and concerns about the proposed facilities were identified and their opinions considered during the project planning, design, implementation, operation, and decommissioning phases.

6.2.3 County Government Act 2012

Public participation is integral in Kenya's development process as set out in the decentralized system of governance. The County Government Act, which sets out the service delivery procedure of county governments, has recognized local people's involvement in decision-making as key to governance. The Act in part VIII stipulates the principles of citizen participation, and in part IX, it guarantees the citizen's" right to public communication as well as access to information. To ensure that there is optimal participation, the Act provides for civic education in part X to build the capacity of local people. Therefore, meaningful public consultation is significant during the planning, implementing, and operation of development projects, hence the need for such consultations for the proposed development of the sugar project in Nandi County.

6.2.4 International Convention (Aarhus Convention 1998)

The Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters entered into force on October 2001. The Convention grants the public rights regarding access to information, public participation and access to justice, in public decision-making processes on matters concerning the local, national and trans-boundary environment. It focuses on interactions between the public and public authorities.

6.3 Objectives of Public Consultations

Public participation is not a one off event but a process throughout the project cycle that requires regular consultations. In regard to the preceding observation, the proposed project involved stakeholders' participation with the following objectives;

- Disseminate and inform the project stakeholders about the proposed project, its key components and activities, location and expected impacts with particular attention to potentially affected persons;
- Create awareness among the public and stakeholders on the need for the ESIA for the proposed project and its due process;
- To obtain information about the needs, concerns, comments, suggestions, and priorities of the local people as well as their general reactions to proposed project activities;
- To obtain the cooperation and participation of the key stakeholders, affected persons, and local communities in activities that were required to be undertaken for designing, implementing, and operating the proposed project or development of the project facilities;
- Create a sense of ownership, capacity build, and ensure transparency in all activities related to the project, including but not limited to designing, planning, implementing, environmental management, operation, monitoring, and evaluation of the project by all key stakeholders; and
- To establish a clear communication channel, easily accessible and effective grievance procedure between the public, consultant team, the project proponent and the County government of Nandi.

6.4 Public and stakeholder engagement and Mapping

Public and stakeholder participation in the ESIA process is a legislative requirement under Article 69 of the Kenya Constitution 2010 and Regulation 17 of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. Hence the consultant identified, analyzed and profiled all the key stakeholders in the ESIA process and engaged them by organizing and holding 3 (three) consultative meetings. The ESIA report has documented and incorporate their views, comments, concerns, and possible complaints on the proposed project.

6.4.1 Introduction

This summary presents the stakeholder mapping and engagement plan for the proposed West Kenya Sugar Company Ltd Nandi Unit Mill-Stakeholder Engagement Report, a sugar milling facility located in Saniak Village, Kamoiywa Location, Chesumei Sub-County, Nandi County. It builds on the findings of the ESIA reconnaissance survey conducted in July 2026, and identifies the key government, institutional, and community stakeholders whose engagement will be central to the project's Environmental and Social Impact Assessment (ESIA) and ongoing operations.

6.4.2 Methodology

Stakeholders were identified and categorized through:

- Review of the administrative and jurisdictional boundaries surrounding the project site, established during the reconnaissance survey;
- Mapping of relevant national and county government offices, regulatory agencies, and elected representatives with jurisdiction over the site;
- Identification of local administrative units and institutions within the project's immediate zone of influence (1–3 km radius); and
- Application of a Power/Interest matrix to classify each stakeholder group and determine an appropriate engagement strategy, consistent with approaches used in comparable West Kenya Sugar Company ESIA processes.

Formal stakeholder consultation meetings (public barazas and targeted institutional/agency meetings) are recommended as the next step of the engagement process and should be scheduled as part of the full ESIA study.

6.4.3 Stakeholder Engagement & Communication Matrix

The matrix below classifies stakeholders by their power (influence over project approval, regulation, or local opinion) and interest (level of concern in, or exposure to, project outcomes), guiding the corresponding engagement approach.

Table 4: Stakeholder Engagement & Communication Matrix

Stakeholder Group	Power / Influence	Interest / Impact	Engagement Strategy
Nandi County Government (Governor's Office; Chief Officers – Agriculture, Livestock & Fisheries; Lands, Physical Planning, Housing, Environment, Water, Natural Resources & Climate Change; Trade, Tourism, Industrialization & Enterprise Development; Transport, Public Works and Infrastructure Development)	High – statutory approvals, physical planning, environmental and trade licensing	High – economic development, land use, and environmental compliance within the county	Manage Closely – formal briefings, joint site visits, and coordination on approvals and licensing
Regulatory Agencies (NEMA, Water Resources Authority – WRA, Directorate of Occupational Safety & Health Services – DOSHS, Water Resources Authority's local Water Resource Users Association- WRUA)	Very High – statutory licensing, compliance enforcement, and audit authority	High – direct oversight of environmental, water resource, and occupational safety compliance	Keep Satisfied / Manage Closely – statutory reporting, license applications, and compliance inspections
National Government Administration (Ministry of Interior; County	High – security oversight and	Moderate – concerned with public order,	Keep Satisfied – official correspondence

Stakeholder Group	Power / Influence	Interest / Impact	Engagement Strategy
Commissioner; Deputy County Commissioner – Chesumei)	administrative authority	security, and administrative coordination	and periodic administrative briefings
Area Member of County Assembly (MCA)	High – elected representative with local political influence	High – directly accountable to affected constituents	Manage Closely – regular briefings and inclusion in community forums
Local Administrators (Chiefs / Assistant Chiefs of Kamoiywa, Kapsisiwa, Kabisaka, and Sang'alo-Keplonik Locations)	Medium – locally trusted representatives who can mediate and mobilize community opinion	High – directly responsible for community welfare and order in the affected locations	Consult & collaborate – continuous liaison on operations, grievances, and community relations
Local Institutions (ACK Lagat High School, Saniak Senior School, clergy of local AIC and ACK churches, among others)	Low–Medium – moral and social influence within the community	High – proximity to site exposes them to noise, air quality, and access-related impacts	Keep Informed & Consult – direct briefings and inclusion in grievance redress awareness
Local Community / Project Affected Persons (residents within 1–3 km radius of the proposed facility)	Low – limited formal decision-making power, but able to influence through community action if concerns are unmet	High – directly exposed to construction and operational impacts (noise, air quality, traffic, water quality); also, primary beneficiaries of employment and market opportunities	Keep Informed & Consult Closely – public barazas and a formal grievance redress mechanism

6.5 Consultation Process

Legal Notice 101 of June 2003 requires that all environmental and social assessment processes in Kenya incorporate public consultation. This a requirement informed by an awareness that the development and implementation of projects can occasion diverse impacts on stakeholders, who should consequently be informed appropriately, following which they can make informed decisions on the proposed development. It is also important to ensure that all stakeholder interests are identified and incorporated in project development, implementation, and operation and, against such background, consultation was undertaken far and wide both within the project area and outside with the following objectives; -

- i. To disclose the Study to both primary, secondary, and other stakeholders;

- ii. To obtain the reaction/comments/concerns of all stakeholders so as to understand their perceived view of the proposed project and assess the extent to which their views need to be taken into account. This is important as it helps to ensure that important social issues are not overlooked and there is ownership from the communities in all the project areas;
- iii. Improve project design by incorporating their views, thereby minimizing conflicts and delays in implementation;
- iv. Increase long-term project sustainability and ownership of the project;
- v. Identify local leaders with whom further dialogue can be continued in subsequent stages of the project.

Key stakeholder consultation was undertaken in the project area. The team identified stakeholders who are key to implementing the proposed project and those who rely on such services. The stakeholders included County Government officials, National Government officials, and Non-governmental organizations, among others.

6.6 Tools used in stakeholder and public consultations

6.6.1 Reconnaissance Visit

The ESIA study process commenced with a reconnaissance visit to the project area in July 2026, the consultants, along with the proponent's representatives, visited the proposed project site for a reconnaissance survey. The goal of the visit was to familiarize the team with the project site and assess the status of the construction site and the farms. The proponent explained the origin and justification of the project as well as the planning activities that had so far taken place in relation to the proposed project.

6.6.2 Feasibility study

A feasibility study of the project had already been done. The proposed milling plant will have a capacity of 1,500 tonnes of cane per day (TCD) expandable to 3,000 TCD. It was also confirmed that enough cane supply would support this capacity. The proponent had a full financial feasibility study for the project, which showed a positive Net Present Value (NPV) in terms of financial performance.

License

The consultant explained that a NEMA license, in addition to a sugar cane production and milling license from the Kenya Sugar Board, was required for such a venture. A comprehensive Environmental and Social Impact Assessment is necessary before a decision to issue a NEMA license can be made. The proponent authorized the consultant to prepare a Terms of Reference (TOR) for the consultancy assignment.

6.6.3 Key Stakeholder Meeting

- Key Stakeholders' meeting. –This meeting was held with technical representatives of the County's Environmental Committee to gather information and interrogate the technical and implementation schedule of the project with a view of identifying and tightening the gaps that might be a hindrance to the project.

6.6.4 Public Consultation Meetings

- PCMs – The Consultant, in collaboration with the national government led by the local chiefs and assistant chiefs, carried out public participation in the proposed Sugar factory

project in Nandi. Two meetings were held in the proposed project location. The third meeting involving the county and national government officials was held in Kapsabet Town. In their consultations, the community sensitization meetings generally targeted all community members within and neighbouring the project area.

- During the meetings, the proponent representative and the consultants explained the salient features of the project, including geographical scope, infrastructure, expected benefits that were cross-checked with the communities, and environmental aspects. The community members were given an opportunity to air their views and bring out the issues that were of concern to them. The meetings addressed the following topics: Overview of the project; cane development; the sugar milling factory, possibility of domestic water supply; socio-economic aspects including anticipated project benefits; community participation in the project; natural resources including water, land, and environmental and social issues including likely negative impacts and the proposed mitigation measures.

Table 5: Stakeholders engagement schedule

#	Date and Time	Area/Location	Venue
1.	22 nd September 2026	Institutional Stakeholders	Eden Springs Grand Hotel, Kapsabet
2.	23 rd September 2026	Kimngeru Location	Chemuswo Farmers' Cooperative Society Limited Warehouse
3.	25 th September 2026	Kamoiywo Location	Kamoiywo Location Chief's Office



Figure 9: Stakeholders consultation meetings

7. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This chapter presents an assessment of environmental impacts from the planned project design and activities, and proposes mitigation and management measures to prevent and control these impacts.

The environmental impact assessment and analysis was done using a number of methods and tools. While identifying impacts, a checklist was used. This indicated all possible impacts that would accrue from implementation of this project.

7.1 Legal and regulatory compliance

The national laws and regulations relevant to the development and their relevance to the process project have been discussed.

7.2 Construction and Equipment installation

Key aspects to be considered during construction are:

- Procurement of construction materials;
- Installation of services and interiors of the buildings;
- Use of heavy and light machinery;
- Energy utilisation, major energy consuming activities include:
 - ✓ Lighting;
 - ✓ Excavation;
 - ✓ Transportation;
 - ✓ Hauling and hoisting of materials;
- Mixing raw materials;
- Waste handling trucking and disposal;
- Testing and commissioning of the development.
- Energy sources for these activities include grid electricity and diesel or petrol fuel for machinery/vehicles.
- Water utilisation, including use for the following activities:
 - ✓ Washing of machinery and equipment;
 - ✓ Preparing of mixtures, including water based emulsion paints;
 - ✓ Concrete works, including curing;
 - ✓ General cleaning;
 - ✓ Landscaping;
 - ✓ Controlling dust on site;
 - ✓ Domestic utilisation (sanitary facilities).
- Construction waste will include the following:
 - ✓ Timber from used formwork;
 - ✓ Paints, lubricants and petroleum wastes;
 - ✓ Containers, cement paper bags and other packaging materials;
 - ✓ Metal, glass, plastic containers and other unwanted materials.
- Socio-economic effects;
 - ✓ Labour;
 - ✓ Security;

- ✓ Transport.
- ✓ Archaeological findings and aesthetics.

Table 6: Summary of impacts and mitigation during construction and installation

Activity	Anticipated Impact	Recommended Mitigation Measures
Procurement of construction materials:	<ul style="list-style-type: none"> • Natural resource depletion if not rationally done through activities such as quarrying, mining, timber logging. 	<ul style="list-style-type: none"> • The tender documents should specify required standards and certification for procurement of all materials and appliances; • All construction materials should be from approved sources; for example, hardstone for building should be obtained from bona fide commercial quarries; • As far as possible, environmentally friendly and sustainable materials should be used. • Materials not to be used for construction of the buildings include: <ul style="list-style-type: none"> ✓ High alumina cement; ✓ Wood wool slab in permanent formwork to concrete; ✓ Calcium silicate bricks or tiles; ✓ Asbestos in any form; ✓ Asbestos substitutes or any naturally occurring or man-made mineral fibers; ✓ Lead, lead paint or any other materials containing lead which may be inhaled, ingested or absorbed; Vermiculite, unless it is established as being fiber-free; ✓ Any products containing cadmium that are regarded as being injurious substances; ✓ Any other substances regarded as being deleterious building materials which are not in accordance with statutory requirements or with current accepted good building practice at the time of specification or construction. • The Project Manager should ensure that the Contractors are instructed in the use of all • materials that may have negative environmental (including health) effects; • If any material or substance is used that is at any point in the future deemed to be deleterious to health, then it must be replaced with an acceptable alternative.
Building works:	<ul style="list-style-type: none"> • Health and safety risk from accidents and incidents; Noise, vibrations and dust. 	<ul style="list-style-type: none"> • Adhere to safety regulations outlined in the County Government Adoptive by-laws, Building Code and the Building Operations and Works of Engineering Construction • The Project Manager should ensure strict safety management through close attention to design, work procedures, materials and equipment; • Schedule noisy construction • Develop a site safety action plan detailing safety equipment to be used, emergency procedures, restrictions on site, frequency and personnel responsible for safety inspections and controls; • All workmen should be provided with personal protective equipment (e.g. dust masks, ear muffs, helmets, overalls, industrial boots, harnesses, etc);

Activity	Anticipated Impact	Recommended Mitigation Measures
		<ul style="list-style-type: none"> • There should be regular site reporting on health, safety and environment (HSE) issues by an appointed HSE representative, daily site inspections should be done to ensure safe work practices are adhered to; • All injuries that occur on site must be reported recorded in the accident registers and corrective actions for their prevention be instigated as appropriate; • Statistical records on accidents and incidents should be collated and analyzed on a monthly basis and forwarded to the Project Manager and / or displayed on the notice boards; • Site personnel should be encouraged to report “near-miss incidents” in order to avoid potential problems and increase safety awareness. • Safety signage should be erected and adhered to at the site
Energy utilization:	• Energy consumption.	<ul style="list-style-type: none"> • Develop an energy management plan; • Construction machinery and vehicles should be maintained and used in accordance with manufacturer’s specifications, to maximize efficiency and lower use of energy, e.g. drivers of construction vehicles should be instructed not to leave them idling for extended periods; • Construction workers should be sensitized on the importance of energy management.
Water Utilization	• Water consumption; Hygiene and sanitation challenges.	<ul style="list-style-type: none"> • Monitor water consumption and utilization; • Sensitize construction workers on the importance of proper water management; • All wastewater should be drained into approved drainage facilities.
Waste production:	• Littering, soil and surface water pollution potential.	<ul style="list-style-type: none"> • The tender documents should specify the proper disposal of waste during construction and should also ensure that the Contractor leaves the site in a clean and safe condition on completion of the Works; • The Contractor should be required to restore and landscape all areas to the satisfaction of the Project Manager; • All solid waste generated during construction should be collected, stored, and taken away for disposal; • There should be controlled use of raw materials; • Procedures for handling of special wastes, such as waste fuel oil, should be specified; • Comply with guidelines on solid waste disposal and Waste Management Regulations 2024.

Activity	Anticipated Impact	Recommended Mitigation Measures
Influx of construction workers into the area:	<ul style="list-style-type: none"> • Proliferation of informal kiosks in the area; • Increase in transport demand. 	<ul style="list-style-type: none"> • Develop a catering program on site for construction staff; • Provide transportation for the workforce to and from the site.
Construction traffic:	<ul style="list-style-type: none"> • Disruption of local traffic; • Potential for accidents. 	<ul style="list-style-type: none"> • The Contractor should plan itineraries for site traffic.
Archaeological findings:	<ul style="list-style-type: none"> • Destruction of natural heritage /loss of archaeological findings. 	<ul style="list-style-type: none"> • In the event of an archaeological finding, the Contractor should secure the location 'as is' and immediately call the National Museums of Kenya's Archaeology Section.

7.3 Operation Stage

The key environmental issues during commissioning and operation are as follows:

- Water supply and consumption;
- Energy consumption and management;
- Effluent Management
- Solid waste, bagasse, filter cake and boiler ash management;
- Stack emissions
- Property management;
- Transport & security;
- Health and safety;
 - Noise.
 - Contamination of soil and water by agrochemicals
- Oil and fuel spillage on soils or highways

7.3.1 Operational Phase Negative Impacts

1. Increased pressure on infrastructure – Stressed up service provision

The additional facility will lead to increased pressure on existing infrastructure such as roads, water abstracted from the borehole, etc. due to the increased number of users. In turn, this may directly translate into increased use of facilities and services.

Recommended Mitigation Measures

- a. Relevant authorities such as the Kenya Power and Lighting, WRA should be informed of the capacity of the facility;
- b. The proponent will install water-conserving automatic taps and toilets, as well as energy saving electrical fittings to optimize use of public resources;
- c. Water leaks through damaged pipes and faulty taps will be fixed promptly by qualified staff.
- d. Occupants of the facility should be sensitized to use water efficiently.

2. Pollution – Environmental Degradation

Possible pollution may impact on alteration of soil structure by contaminations from introduced materials, bagasse, molasses, boiler ash, filter mud, waste water contamination, air pollution as well as noise levels from various sources within the premise.

a. Solid waste generation/by-products (bagasse, filter cake, boiler ash)

Once the proposed project is completed and operational, they are expected to generate a large amount of solid waste on a daily basis whose composition will be dominated by organic waste. These solid waste, if not disposed properly can cause the following impact on environment:

- Ground water contamination by bagasse leachate generated by non-scientific dumping;
- Surface water contamination by the run off from the bagasse dumping site;
- Bad odour, Pests, rodents and windblown litter in and around the collection site;
- Generation of inflammable gases (e.g. Methane).
- Risks of bagasse avalanche

- b. Impacts may also result from improper sitting, inadequate design and poor operation of waste disposal facilities.**

Recommended Mitigation Measures

- a. Clearly designate and construct an appropriate waste collection facility or provide covered refuse skips;
- b. Designate filter cake and boiler ash dumping and composting sites;
- c. Use only NEMA licensed waste transport vehicles to transport waste materials;
- d. Maintain a proper waste tracking document;
- e. Utilise bagasse as a source of fuel in the boilers or mixing with boiler ash and filter mud for use by farmers as fertilizer and other reuse options such as cogeneration for electricity and quarry rehabilitation;
- f. Construct bagasse holding shades to ensure remaining bagasse on site does not come in contact with rain to produce leachate; and
- g. Ensure adequate fire warning, response and management systems are installed.

c. Wastewater management

There will be effluent release due to the cane crushing. The EMCA Water Quality Regulations of 2024 requires all facilities that discharge any effluent to the environment to obtain an Effluent Discharge license and to continuously monitor the discharge. The fourth schedule of the Water quality regulations gives a guide on the quality parameters which should be monitored for different types of effluents. The parameters which should be monitored for Sugar Industry effluent include the following: Biochemical Oxygen Demand (BOD), Total suspended solids (TSS), pH, Faecal Coliforms /Ecoli, Chemical Oxygen Demand (COD), Colour/Dye/Pigment, Organic Nitrogen as N, Flow, Copper, Zinc and Surfactants.

Recommendations

- Incorporate Effluent Treatment Plant (ETP) within the facility;
- Apply for effluent discharge license from NEMA on time;
- Install a water meter to measure the amount of water waste water released from the factory on daily basis;
- Carry out an analysis of the composition of the effluent through a NEMA registered laboratory;
- Continuously monitor the discharge as per the regulations.

d. Air pollution levels

Vehicular emissions from vehicles, stack emissions and fugitive emissions will be the major air pollution sources from the Project.

Recommended Mitigation Measures

- Regularly monitor stack emission and obtain Emission licence from NEMA;
- Invest in bagasse drying mechanism along the delivery line;
- Exhaust gas recirculation
- Selective non-catalytic/catalytic reduction
- Installation of Electrostatic Precipitators (ESP), wet scrubbers and thermal oxidizers
- Avoid overloading the bagasse for efficient burning

- Formulate the fugitive emissions Control Plan
- Use the correct fuel to air ratio by proper adjustment of air and fuel ratios
- Avoid carbon build-up in the boiler and furnace tubes and maintain the boiler and furnace settings in good condition

3. Increased traffic flow – Unnecessary congestion

An increase in the number of vehicles within the area is anticipated which may lead to congestion and pose a threat to accidental occurrences.

Recommended Mitigation Measures

- In case of heavy traffic, an attendant should be employed to direct vehicles during peak periods.

4. Drain blockages – Back flooding

Poor surface drain management or large amounts of effluents may lead to blockage of drains which in turn could result to flooding and unsanitary conditions within the neighbourhood. Blocked drains produce bad odour and are a threat to general health, hence are environmentally unfriendly.

Recommended Mitigation Measures

- The proponent should ensure that there are adequate means of handling the large quantities of sewage generated at the facility;
- It will also be important to ensure that septic pipes are not blocked or damaged since such occurrences can lead to release of the effluent, resulting in land and water contamination.
- Such blockages or damages will be fixed expeditiously

5. Vector and rodents breeding grounds – Vulnerability to diseases

If the project does not have well designed storm water drains, the rain water may end up stagnating or intruding neighbouring facilities and hence creating conducive breeding areas for mosquitoes and other water based vectors leading to human diseases like malaria. Poor solid waste management practices may also lead to breeding grounds for pests such as rats and other scavenging animals.

Recommended Mitigation Measures

- The design of the construction should ensure that no space for stagnant water will be retained;
- A well maintained trash collection point should be set aside;
- The proponent should put in place efficient storm water and waste management systems that will prevent the accumulation of rain water and uncontrolled waste, as well as an efficient collection system and recycling;
- Proper monitoring of the premise should be effected for maintenance of health and hygiene.

6. Electricity consumption – pressure on supply

The project shall consume large amount of electricity due to activities that will take place once the project is complete. The Sugar Mill will however generate its own electricity for internal use.

Recommended mitigation measures:

- Maximize the contribution of daylight to reduce use of artificial lighting in the buildings;
- Select the most efficient lighting system design and minimum lighting level appropriate for the required application;
- Install energy saving appliances;
- Select the most effective lighting controls for optimal operating efficiency and minimum energy wastage.
- Develop an energy management plan.

7. Water supply and consumption

Water for the project shall be extracted from a proposed borehole to be drilled on site after obtaining abstraction permits from WRA.

Recommended mitigation measures:

- Monitor water consumption;
- Install internal water meters;
- Manage consumption rigorously.
- Installing plumbing fittings, appliances and devices to optimise water use efficiency;
- Recycling of wastewater to reduce water consumption.

8. Contamination from Agrochemicals

Agrochemicals such as pesticides, fertilizers and herbicides may be used on the farms and if not properly handled end up in water sources or the soil. There is also a danger that agrochemicals could be consumed by human beings deliberately or inadvertently. Contamination of soil or water by agrochemicals can be minimized by;

- Training of farmers on Good Agricultural Practices for sugarcane production
- Storing the chemicals in properly designed stores
- Ensuring that farm workers are well-trained on handling and application of agro-chemicals
- Ensuring that human beings are warned about the danger of agro-chemical poisoning.

9. Oil and fuel Spillage

Oil and fuel spillage not only contribute to accidents but can also damage the soil or water bodies. People handling machinery like tractors must be trained on safe workshop practices and proper repair and maintenance to avoid such mishaps.

10. Safety and Health hazards

During operation, the use of machinery poses mechanical hazards such as accidental cuts and bruises. There will be storage of flammable liquids such as fuels and lubricants, and bagasse, which at some point will be stored at the workplace for use in vehicles, machines and firing of the boilers, respectively. Leakage, spillage or poor handling of such substances may result in fires that may cause considerable losses in terms of injury to persons and damage to property. Persons

exposed to bagasse will likely suffer from bagassosis. Noise levels from the occasioned by use of machinery may pose health hazards also. There are many other potential safety and health hazards commonly inherent in sugar factory.

Recommended mitigation measures:

- Regular maintenance and use of machinery safeguards i.e. machine fencing and guarding
- Statutory examination of plant and machinery
- Statutory medical examination and surveillance of workers exposed to classified hazards
- Statutory industrial hygiene surveys
- Statutory safety and health audits
- Use of appropriate Personal Protective Equipment (PPE)
- Safety and Health training for workers
- Provision of first aid facilities and personnel
- Execution of fire safety training and drills

7.4 Decommissioning

Decommissioning is the process of shutting down an operational facility in a manner that leaves the area in a safe and stable condition that is consistent with the surrounding physical and social environment. The Contractor will ensure that:

- The process of closure occurs in an orderly, cost effective and timely manner with the allocation of adequate resources;
- The anticipated cost of decommissioning is adequately provided for in the project costs.

The Contractor will be expected to:

- Carry out consultations with stakeholders;
- Develop the action plan for demolition including the assigning of roles for the demolition crew;
- Isolate power at the main switch and remove cables up to that point;
- Dismantle, remove and dispose of construction camp equipment and structures in an appropriate environmentally friendly manner;
- Request utility service providers to disconnect the power, water and telephones as may be appropriate;
- Reinststate the land to its natural condition by filling excavations and planting suitable saplings.

The Contractor must obtain a Certificate of Satisfactory Decommissioning from the relevant Authorities. In the unlikely event that the facilities is closed down decommissioning would comprise the reduction of all buildings and facilities to a safe condition and the restoration of the land to its original condition. The following will be done:

- Notification of intent to all relevant regulatory agencies;
- Liaise with project Consultants, including architects, engineers, and environmentalists, to ascertain guidelines, anticipated decommissioning impacts, and mitigation measures.

7.4.1 Decommissioning phase Negative Impacts

During the decommissioning phase, another comprehensive ESIA study based on the site's intended new use will be conducted. Decommissioning may involve one of the options: facing out operations and evacuating the premises without carrying out any other plans, changing the facility's use, or demolishing the property to restore it to its current or better status.

1. Solid Waste Generation

Demolition of the facilities and related infrastructure will result in large quantities of solid waste. The waste will contain the materials used in construction, including concrete, metal, drywall, wood, glass, paints, adhesives, sealants, and fasteners. Although demolition waste is generally considered less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to the release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, sulphate, and ammonia, which may be released as a result of the leaching of demolition waste, are known to lead to the degradation of groundwater quality.

2. Dust

Large quantities of dust will be generated during demolition works. This will affect demolition staff as well as the neighbouring residents.

3. Noise and Vibration

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas. This will be as a result of the noise and vibration that will be experienced as a result of demolishing the proposed project.

Table 7: Summary of major impacts and their proposed mitigation measures

Project stage	Potential Impact	Proposed Mitigation
Pre-construction/ equipment installation stage	▪ Introduction of improper seeds to the sugar farmers	▪ Use of short maturing sugar varieties, which will enable the farmers to be able to meet their financial needs through a short maturity period. The Proponent currently has FR and N14 sugar varieties, which take approximately 15 months to mature.
	▪ Improper land preparation	▪ The proponent, through their designated office, will sensitize the farmers on the standards of land preparation and methods of soil conservation to sustain the productivity of the soil over the long term.
	▪ Use of improper inputs	▪ The proponent, through their designated office, will sensitize farmers on the need to apply all the inputs they are given to get higher yields instead of diverting the farm inputs to other uses.
	▪ Conflicts with other sugar millers	▪ The proponent will carefully identify and contract their sugar farmers in collaboration with the local administration to avoid conflicts with other millers in the catchment area.
Construction/equipment installation stage	▪ Noise and vibration pollution	<ul style="list-style-type: none"> ▪ Switching off machines while not in use ▪ Proper servicing of machines
	▪ Material and equipment Transport	<ul style="list-style-type: none"> ▪ Restrict working hours to periods which are not associated to human disturbances, especially the recommended working hours 8.00 am – 5.00 pm ▪ Provide workers with ear masks. ▪ Regular servicing of working machines ▪ As far as possible, transport of construction materials should be scheduled for off-peak traffic hours. ▪ Appropriate traffic warning signs, informing road users of a construction site entrance ahead and instructing them to reduce speed, should be placed along the main road in the vicinity of the entrance to the site during the construction period. ▪ Flagmen should be employed to control traffic and assist construction vehicles as they enter and exit the project site. ▪ Issue notices/advisories of pending traffic inconveniences and solicit tolerance by local residents before the commencement of construction works. ▪ Assign traffic regulators to places during periods of chronic or potential traffic congestions. ▪ Set relatively low speed limit within the site. ▪ Encourage transport vehicle owner to insure their vehicles on regular basis.

Project stage	Potential Impact	Proposed Mitigation
		<ul style="list-style-type: none"> Discourage parking near the entrance or exit routes.
	<ul style="list-style-type: none"> Material and equipment stockpiling & storage 	<ul style="list-style-type: none"> The stockpiling of construction materials should be properly controlled and managed. Fine-grained materials (sand, marl, etc.) should be stockpiled away from any surface drainage channels and features. Low berms should be placed around the piles of sand and marl and/or tarpaulin used to cover open piles of these materials to prevent them from being washed away during rainfall. Safe storage areas should be identified and retaining structures put in place prior to the arrival and placement of material and equipment Materials and equipment to be delivered on site in installments.
	<ul style="list-style-type: none"> Soil Erosion 	<ul style="list-style-type: none"> Stage site clearance works so as to minimize the area of exposed soil at any given time. Re-cover exposed soils with grass and other ground cover as soon as possible. Temporarily bund exposed soil and redirect flows from heavy runoff areas that threaten to erode or result in substantial turbid surface runoff to adjacent drainage waters. Monitor areas of exposed soil during periods of heavy rainfall throughout the construction phase of the project to ensure that any incidents of erosion are quickly controlled. Leveling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil, therefore avoid compaction where possible.
	<ul style="list-style-type: none"> Workers safety and health 	<ul style="list-style-type: none"> Provide workers with reflective garments. Regular maintenance and safeguarding of working machines. Train workers on manual handling techniques. Deploy an expert to lead first aid administration. Provision of adequate safety equipment and enforce on their usage. Discourage trespass. Erect signage on the ongoing activities Provide workers with personal protective equipment Provide implement safe systems and programs
	<ul style="list-style-type: none"> Construction debris and other rejected construction materials. 	<ul style="list-style-type: none"> Reduce wastes from the point of generation by purchasing high standard and recommended materials. Instruct workers to avoid damage of working materials.

Project stage	Potential Impact	Proposed Mitigation
		<ul style="list-style-type: none"> Contract NEMA registered garbage collector to collect waste on regular basis. Embrace the 3R's concept (Reduce, Reuse and Recycle).
	<ul style="list-style-type: none"> Dust generation and aerosol emission 	<ul style="list-style-type: none"> Sprinkle water to harness dust level. Provide workers with dust masks.
	<ul style="list-style-type: none"> Landscape and ecosystem change 	<ul style="list-style-type: none"> Once the project is completed, any bare land will be re-vegetated with indigenous grass, shrubs and trees Landscaping will be done to reduce any negative impacts Only specified areas of construction will have vegetation cleared protecting the existing individual trees as much as possible
	<ul style="list-style-type: none"> Water supply 	<ul style="list-style-type: none"> Provide adequate water storage reservoirs on the construction site to meet project needs externally during periods of high demand and refill the tanks during periods of low demand (e.g. late at night). Engaging water supply tankers in case of total supply failure.
Operation Stage	<ul style="list-style-type: none"> Cane fires 	<ul style="list-style-type: none"> The proponent will encourage green cane harvesting to avoid the negative Environmental impacts associated with can harvesting through burning
	<ul style="list-style-type: none"> Land and succession conflicts 	<ul style="list-style-type: none"> The proponent should proactively approach this issue by considering appropriate lease agreements and using qualified lawyers to advise farmers about their land ownership status. It should also adhere to the Ministry of Agriculture, Land and Fisheries guidelines on sustainable sugarcane farming, including supporting complementary agricultural activities for food security and discouraging monoculture.
	<ul style="list-style-type: none"> Cane spillage 	<ul style="list-style-type: none"> The proponent in partnership with Kenya Sugar Board, Kenya Roads Board, KENHA, KURA, KERRA and the County Government of Nandi will ensure the improvement of the road infrastructure within the cane growing area in order to reduce the level of cane spillage along the roads Sensitization of sugarcane loaders so as to allow for proper sugarcane loading avoiding protruding cane which inconvenience other road users The company should also institute measures of collecting all the spilled cane on the feeder roads

Project stage	Potential Impact	Proposed Mitigation
	Late Payment for Cane	<ul style="list-style-type: none"> ▪ The proponent should ensure that their cane purchase agreements with farmers contain provisions for timely payment for cane delivered and penalties for late payment.
	<ul style="list-style-type: none"> ▪ Water use 	<ul style="list-style-type: none"> ▪ A Sustainable Water Management System Plan should be developed in collaboration with WRA to minimize impact to natural systems by managing water use, avoiding over-abstraction from the groundwater aquifers, and minimizing impacts to other water users. ▪ Factory water use should be carefully monitored through the use of flow meters and timely identification and control of any leakages ▪ The factory will be operated at optimum capacity and with minimum stoppages because raw water consumption per ton of cane crushed increases when crushing lower than the optimum capacity and when hot water production is suspended during halts in operations (cleaning, restocking, and breakdowns).
	<ul style="list-style-type: none"> ▪ Waste water 	<ul style="list-style-type: none"> ▪ Wherever possible, containment of water collected from areas with potential contaminants will be ensured. Such waste water should be reused; ▪ Oil interceptors and sediment traps should be installed and maintained to ensure any discharge to the environment carries a low sediment load. ▪ Storm water management canals and dams should be maintained and kept clean in order to ensure that the capacity of such systems is not compromised during the life of the operations ▪ Sensitization of the clients who buy molasses of the environmental effects of the product so as to prevent spillage of the same; ▪ Apply for effluent discharge license from NEMA on time; ▪ Install a water meter to measure the amount of water waste water released from the factory on daily basis; ▪ Carry out an analysis of the composition of the effluent through a NEMA registered laboratory; ▪ Continuously monitor the discharge as per the regulations; ▪ The company to construct drainages throughout the factory to direct storm waters to the river after lab testing and treatment if necessary.
	<ul style="list-style-type: none"> ▪ Solid waste generation/by-products 	<ul style="list-style-type: none"> ▪ Clearly designate and construct an appropriate waste collection facility or provide covered refuse skips; (Designate Filter cake and boiler ash dumping and composting sites)

Project stage	Potential Impact	Proposed Mitigation
	(bagasse, filter cake, boiler ash)	<ul style="list-style-type: none"> ▪ Provide NEMA licensed waste transport vehicles; ▪ Maintain a proper waste tracking document; ▪ Bagasse to be used as a source of fuel in the boilers in addition to being used to future plans of cogeneration; ▪ Ensure adequate fire warning, response and management systems are installed. ▪ Ensure prescribed regular medical examination of workers exposed to bagasse
	▪ Air pollution levels	<ul style="list-style-type: none"> ▪ Monitor stack emissions regularly ▪ Have Fugitive Emissions Control Plan ▪ Install appropriate Electrostatic precipitator (ESP) as an effective emissions control technology. ▪ Ensure the emissions are within permissible limits in line with Air Quality Regulations 2014 ▪ Apply for Emission license and undertake quarterly analysis to ensure compliance with the emission standards. ▪ Do regular air quality monitoring (AQM) in the prescribed intervals
	▪ Drain blockages	<ul style="list-style-type: none"> ▪ The proponent should ensure that there is adequate means of handling large quantities of sewage blockages as well as related emergency situations. ▪ Proper monitoring at waste generation points should be established. A site management plan should be put in place.
	▪ Increased pressure on infrastructure	<ul style="list-style-type: none"> ▪ The proponent should maintain close operations with service providers such as the Kenya Power and Lighting Company, WRA etc. ▪ Principles of Cleaner Production should be applied to ensure optimal system performance.
	▪ Fire outbreak	<ul style="list-style-type: none"> ▪ Install and regularly maintain firefighting equipment ▪ Clearly labeling fire exit routes. ▪ Constitute a firefighting team ▪ Staff to be made clearly aware of fire hazards
	▪ Vector breeding grounds	<ul style="list-style-type: none"> ▪ Include an efficient storm water and waste management systems that will prevent the accumulation of rain water

Project stage	Potential Impact	Proposed Mitigation
		<ul style="list-style-type: none"> ▪ All trenches and drains should be kept clear of all debris
	<ul style="list-style-type: none"> ▪ Climate change 	<ul style="list-style-type: none"> ▪ Establish continuous or regular flow monitoring and develop a drought-response plan incorporating factory demand restrictions, water recycling and protection of environmental flows ▪ Undertake site-specific stormwater and flood-risk modelling, maintain riparian buffers and provide appropriately designed drainage infrastructure ▪ Promote contour farming, vegetative buffer strips, cover crops, riparian restoration and sustainable agricultural land management.
Decommissioning stage	<ul style="list-style-type: none"> ▪ Loss and damage of properties during demolition activities 	<ul style="list-style-type: none"> ▪ Removal of properties that are not intended to be destroyed before the actual demolition process. ▪ Proper supervision during demolition activities.
	<ul style="list-style-type: none"> ▪ Loss of employment opportunities 	<ul style="list-style-type: none"> ▪ A good phase out programme for employees should be put in place from the onset of the project.
	<ul style="list-style-type: none"> ▪ Accidents to the demolishing team. 	<ul style="list-style-type: none"> ▪ Issue the workers with reflective garments. ▪ Supervisors to ensure measures in place for the worker and ensure that no one is at risk by falling objects.
	<ul style="list-style-type: none"> ▪ Loss of environmental aesthetics beauty. 	<ul style="list-style-type: none"> ▪ Ensure complete collection and disposal of wastes after demolition ▪ Landscaping the affected areas. ▪ Conduct a decommissioning audit.

8. PROJECT ALTERNATIVES

8.1 *Site alternative*

Alternatives for the siting of the project may be limited to land ownership and appropriateness of the area. The current location provides the most suitable place. The relocation option to a different site is an option available subject to negotiating a fresh lease on other lands within the project area. More time shall be needed, and delays towards project implementation may be realized. Alternatives for siting of the project may be limited to land ownership and appropriateness of the area.

The proposed site is located on L.R. Nos. Nandi/Kamoiywo 26381, 179, 177 & 2599 off the Chemuswa-Saniak Road, within Saniak Village, Saniak Sub-location, Kamoiywa Location, Chesumei Constituency, Chesumei Sub-County, Nandi County. The site is bordered by three neighbouring locations, namely Kapsisiwa, Kabisaka, and Sang'alo-Keplonik.

The proposed project will occupy approximately 46.5 acres, comprising four (4) parcels of land with separate title deeds. Although registered under different titles, all the parcels were owned by a single landowner who has since been fully compensated for the land acquisition and associated resettlement. Consequently, no outstanding land acquisition or resettlement issues are anticipated for the proposed development. This alternative will have minimal impact on the physical environment and has considered the necessary measures to almost eliminate the identified issues.

Advantages:

- The property value appreciates.
- Investment made in the property will be productive. The proponent will have a potential source of income on a term basis.
- Government earns revenue from fees, taxes, rent, rates and licenses.
- Employment opportunities for the workforce at the facility.
- Optimal economic and spatial land use
- Visual amenities will be improved.

8.2 *Alternative Technologies*

The design of the ETP has taken into account measures that can be implemented to minimise wastewater production through recycling, treatment and reuse. No effluent discharge shall be made to the environment before satisfactory treatment. Sewage arising from the workforce at the plant will also be discharged into septic tanks. Equipment for the development were preferred with reference to available capital, and function. The facility's design was undertaken to provide the most suitable, modern and practical facilities for the expected users.

8.3 *Alternative Bagasse management*

Bagasse is the residual material after extraction of juice from sugarcane. This bagasse through the conveyor is sent to steam generation unit. However, the bagasse generated is so voluminous that managing it requires serious interventions. The proponent shall have a robust bagasse waste management infrastructure that comprises of using bagasse as soil conditioner to ensure excess

bagasse that is not undergone complete combustion during boiler firing is turned into fertilizer for the consumption by the local community in order to reduce chances of forming leachate especially during wet weather.

Bagasse Leachate is a low pH liquid which normally forms when rain water percolates through bagasse and washes some of the bagasse organic components.

The proponent has considered each of several methods in the management of bagasse.

8.3.1 Transfer the bagasse heap to another location

The proponent explored the possibilities of shifting the bagasse from the factory grounds to another site to reduce the quantities of bagasse at the yard. However this will only worsen the situation since the large quantities of bagasse will form leachate in the near future.

8.3.2 Use of bagasse in co-generation of power and steam

The proponent will use fresh bagasse to produce about 3 MW of power at its station. However, the power station will only be able to utilise a fraction of the fresh bagasse daily out of the quantities produced from crushing of cane per day.

8.3.3 Reuse of bagasse as soil conditioner

Bagasse could be a suitable soil conditioner if applied in thin layers and with pH adjustment, for example, using lime. The proponent shall work with farmers on application of the bagasse on land.

8.4 *Alternative Equipment*

Equipment for the development were preferred with reference to available capital, and function. The design of the facility was undertaken with a view to providing the most suitable, modern and practical facilities for the expected users.

8.5 *“No Project” Alternatives*

The No Project alternative would be a loss to the expected gap that would be filled by with the increase in sugar production at the sugar factory. The no project expansion alternative in respect to the proposed Project implies that the status quo is maintained. Under the no project expansion alternative, the proponent's proposal would not receive the necessary approval from NEMA. The proposed sugar factory complex Project would not be constructed and the expectations attached to the Project would not be met. The no project construction alternative is the least preferred from the socio-economic perspective.

8.6 *Preferred option*

For this project, there are limited alternatives for the project site because the proponent already acquired the land and has been carrying out cane development in the area for over two years. Therefore, emphasis is now placed on the technological approaches that the proponent will adopt in constructing and managing the proposed development.

9. ENVIRONMENTAL MANAGEMENT PLAN

9.1 Introduction

The Environmental Management Plan involves the protection, conservation and sustainable use of the various elements of the environment. The EMP for the proposed project provides all the details of its activities, impacts, mitigation measures and expected costs during implementation and decommissioning phases of the project. This project bears the potential of a number of negative impacts on the environment. With proper environmental management procedures in place and adhered to then there should be minimal negative impact of concern emanating from it. Key areas that require mitigation measures include wastewater, solid wastes, maintaining good air quality, safety, and storm water management.

The table below indicates measure for Environmental Management Plan

Table 8: Environmental Management Plan (EMP)

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
Construction/equipment installation phase				
Extraction of raw material	<ul style="list-style-type: none"> Land-use and Landscape change Poor visual quality Water abstraction 	<ul style="list-style-type: none"> Obtain a change of User (Agricultural to industrial) as required. Source material from supplies that use environmentally friendly processes in their operation. Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered. Ensure that damage or loss of material at the construction site is minimal through proper storage. Use at least 5%-10% recycled, refurbished, or salvaged materials to reduce the use of raw materials and divert material from landfills. Hydrological study to inform abstraction of water from the borehole and WRA permit to be obtained prior to abstraction. The tender documents should specify the required standards and certification for procurement of all materials and appliances; Steel scaffolding should be used in preference to timber and the Contractor should ensure that sufficient quantities of scaffolding are available for hire at the time of construction. All construction materials should be from approved sources; for example, hard stones for buildings should be obtained from NEMA-licensed sites and bona fide commercial quarries. 	<ul style="list-style-type: none"> Proponent and Contractor WRA, NEMA 	<ul style="list-style-type: none"> As per BQ and agreement with the Contractor
Removal/clearing of vegetation	<ul style="list-style-type: none"> Exposing ground to agents of soil erosion Loss of terrestrial habitat & biodiversity 	<ul style="list-style-type: none"> Proper demarcation and delineation of the project site to be affected by construction work Specify location for trucks and equipment, and areas of the site which should be kept free from traffic, equipment and storage. Designate access route within the site 	<ul style="list-style-type: none"> Proponent and contractor KFS 	<ul style="list-style-type: none"> 100,000 for landscaping

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
	<ul style="list-style-type: none"> ▪ Permanent loss of vegetation ▪ Habitat fragmentation ▪ Interruption of ecological corridors and migration paths ▪ Erosion and stream sedimentation ▪ Draining of wetlands 	<ul style="list-style-type: none"> ▪ Design and implement an appropriate landscaping program to help in re-vegetation of part of the project site after construction ▪ Mapping out the conservation zones and ensure Protection of wetlands, rivers, springs and the existing vegetation as much as possible and in line with applicable rules, regulations and standards. ▪ Set a replanting and landscaping programme that focuses on increasing “green area” 		
Sewage and effluent	<ul style="list-style-type: none"> ▪ Pollution 	<ul style="list-style-type: none"> ▪ Provide adequate sanitary facilities for workers, ▪ Provide solid waste receptacles and storage containers, particularly for the disposal of plastic bags boxes, so as not to block drainage system and to prevent littering of the site. 	<ul style="list-style-type: none"> ▪ Proponent and contractor 	<ul style="list-style-type: none"> ▪ As per BQ and agreement with Contractor
Movement of vehicle at the site	<ul style="list-style-type: none"> ▪ Compaction of soil ▪ Interference with soil structure leading to low water infiltration 	<ul style="list-style-type: none"> ▪ Apply soil erosion control measures such as levelling of the project site to reduce run-off velocity and Increase infiltration of storm water into the soil. ▪ Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the project site, ▪ Ensure that any compacted areas are ripped to reduce run-off. ▪ Storm water drainage lines be well constructed to reduce incidence of pounding and flooding 	<ul style="list-style-type: none"> ▪ Proponent and contractor 	<ul style="list-style-type: none"> ▪ As per BQ and agreement with Contractor
Utilization of construction materials	Generation of wastes leading to: <ul style="list-style-type: none"> ▪ Wastage of resources/ materials 	<ul style="list-style-type: none"> ▪ Through accurate estimation of 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. 	<ul style="list-style-type: none"> ▪ Constructor and his workers 	<ul style="list-style-type: none"> ▪ As per BQ and agreement with Contractor

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
	<ul style="list-style-type: none"> Health risk to the worker and environment Reduced aesthetic value of the site Blockage of drainage systems Chocking water bodies 	<ul style="list-style-type: none"> Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed off. Ensure that damaged or waste materials including cabinet, doors, plumbing, and lighting fixtures, marble and glasses will be recovered for refurbishing and use in other projects Reducing the amount of construction waste generated over time Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements Purchase of perishable construction materials such as paints should be done incrementally to ensure reduced spoilage of unused materials Use building materials that have minimal or no packaging to avoid the generation of excessive packaging waste Maintain a proper waste tracking document Ensure adequate fire warning, response and management systems are installed. Hazardous wastes, such as waste oils and grease to be collected in secure storage facilities on-site to prevent accidental release that may result in contaminated run-off and leaching. Storage areas for hazardous material to be cemented to provide an impervious surface and to prevent uncontrolled discharges to groundwater. Contract a NEMA licensed waste handler to collect waste oil, waste tyres and general office and domestic wastes. Practice the 6Rs (Reuse, Recover, Refill, Return, Recycle) of waste Management. 		

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
		<ul style="list-style-type: none"> Training of workforce on matters health, safety and environment with regards to waste and its effects. 		
Dust emission from movement of transportation vehicles at the site and on the road	<ul style="list-style-type: none"> Air pollution Causing breathing problems to the workers and the neighbourhood Blockage of fauna stomata 	<ul style="list-style-type: none"> Sprinkle water on graded access routes each day to reduce dust generation by construction vehicles Controlling the speed of vehicles on the site Watering open soil or storage sites Selecting transportation routes Provide worker with dust masks Spiro metric examination on exposed workers at prescribed interval of time 	<ul style="list-style-type: none"> Constructor and his workers 	<ul style="list-style-type: none"> As per BQ and agreement with Contractor
Utilization of fossil fuel by fuel consuming machineries.	<ul style="list-style-type: none"> Emission of carbon gas into the atmosphere leading to global warming Exhaustion of fossil fuel resource Air pollution Can Lead to breathing problems 	<ul style="list-style-type: none"> Ensure proper planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done per vehicle or the number of vehicles on the road. Sensitize truck drivers to avoid unnecessary racing of vehicle engines at adding/offloading points and parking areas, and to switch off or keep vehicle engines when not in use Prompt servicing of vehicles engines Use of unleaded and low sulphur fuel Monitor energy use during construction and set target for reduction of energy use. 	<ul style="list-style-type: none"> Contractor and Drivers 	<ul style="list-style-type: none"> As per need
Noise and vibration	<ul style="list-style-type: none"> Noise generation Hearing problem 	<ul style="list-style-type: none"> Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, schools, residential areas and hospitals Sensitize construction vehicle drivers and machinery operators to switch of vehicle or machinery not being used. 	<ul style="list-style-type: none"> Constructor and Workers 	<ul style="list-style-type: none"> 50,000

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
		<ul style="list-style-type: none"> ▪ Ensure that all heavy duty equipment are insulated or placed in enclosures to minimize ambient noise levels. ▪ Measure to ensure that noise levels does not exceed 75dB(A) ▪ Attenuation of any sound that may affect the inner ear by use of earplugs and earmuffs. ▪ Audio metrical examination of workers at prescribed intervals 		
Water consumption	<ul style="list-style-type: none"> ▪ Excessive use / misuse of water ▪ Generation of excess waste water ▪ Water pollution 	<ul style="list-style-type: none"> ▪ Prompt reuse and recycling of water as much as possible where necessary ▪ Install a discharge meter at water outlet to monitor and determine total water usage. ▪ Monitor water consumption and utilization; ▪ Sensitize construction workers on the importance of proper water management; ▪ All wastewater should be drained into approved drainage facilities. 	<ul style="list-style-type: none"> ▪ Contractor and his workers 	<ul style="list-style-type: none"> ▪ 150,000
Approval of building plan	<ul style="list-style-type: none"> ▪ The development being in alignment with the County Integrated Development Plan (CIDP) 	<ul style="list-style-type: none"> ▪ Ensure that the Change of Use is effected and plans are approved by the County Government, Physical Planner and the local Occupational Health and Safety Office 	<ul style="list-style-type: none"> ▪ The proponent 	<ul style="list-style-type: none"> ▪ Gazetted fee
Incident, accidents, and dangerous occurrences	<ul style="list-style-type: none"> ▪ To enable relevant authorities to monitor incidence occurrences and take necessary measure to minimize them. 	<ul style="list-style-type: none"> ▪ Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the local Occupational Health and Safety Office (OHSO) are in place. 	<ul style="list-style-type: none"> ▪ Contractor and his workers 	<ul style="list-style-type: none"> ▪ Gazetted fee

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
Safety, health and environment (SHE) policy	<ul style="list-style-type: none"> To give guidelines on how one is to protect himself within a given premises against any incident. 	<ul style="list-style-type: none"> Develop, document and display prominently an appropriate SHE policy for construction works 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> 5,000
Personal protective gears	<ul style="list-style-type: none"> To protect against any infection or injuries while at work. 	<ul style="list-style-type: none"> Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc. should be made available and construction personnel must be trained on their use. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> 100,000
Supply of clean water	<ul style="list-style-type: none"> Ensure good health as dirty/untreated water leads to water borne diseases. 	<ul style="list-style-type: none"> Ensure that construction workers are provided with an adequate supply of wholesome drinking water which should be maintained at suitable and accessible points. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> 100,000
Storage of materials	<ul style="list-style-type: none"> Can cause accident, material wastage and spoilage, and reduced aesthetic value. 	<ul style="list-style-type: none"> Ensure that materials are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> 5000
First aid	<ul style="list-style-type: none"> To ensure that when any injury occur it can be taken care of before main treatment at a hospital or a dispensary. 	<ul style="list-style-type: none"> Well stocked first aid box which is easily available and Accessible should be provided within the premises Provision must be made for persons to be trained in first aid, with a certificate issued by a recognized body. 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> 40,000

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
Safety and security	<ul style="list-style-type: none"> ▪ Destruction and stealing of materials on site. 	<ul style="list-style-type: none"> ▪ Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the construction site. ▪ The Contractor should ensure strict safety management through close attention to design, work procedures, materials and equipment; ▪ Develop a site safety action plan detailing safety equipment to be used, emergency procedures, restrictions on site, frequency and personnel responsible for safety inspections and controls; ▪ All workmen should be provided with personal protective equipment (e.g. nose masks, ear muffs, helmets, overalls, industrial boots, etc.); ▪ There should be regular site reporting on health, safety and environment (HSE) issues by an appointed HSE representative, daily site inspections should be done to ensure safe work practices are adhered to; ▪ All injuries that occur on site must be recorded in the accident registers and corrective actions for their prevention be instigated as appropriate (Section 62 of the Factories and Other Places of Work Act); ▪ Statistical records on accidents and incidents should be collated and analysed on a monthly basis and forwarded to the contractor and / or displayed on the notice boards; ▪ Site personnel should be encouraged to report “near-miss incidents” in order to avoid potential problems and increase safety awareness. 	<ul style="list-style-type: none"> ▪ Contractor 	<ul style="list-style-type: none"> ▪ 100,000
Fire Hazards	<ul style="list-style-type: none"> ▪ Destruction of property and lives 	<ul style="list-style-type: none"> ▪ Provide adequate number of appropriate firefighting equipment as well as fire exit options. ▪ Ensure inspection and maintenance of fire equipment 	<ul style="list-style-type: none"> ▪ Contractor and proponent 	<ul style="list-style-type: none"> ▪ 200,000

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
		<ul style="list-style-type: none"> ▪ A fire escape route and an emergency assembly point should be clearly indicated ▪ Form and train firefighting team ▪ Conduct regular fire drills 		
Construction traffic:	<ul style="list-style-type: none"> ▪ Disruption of local traffic; ▪ Potential for accidents. 	<ul style="list-style-type: none"> ▪ The Contractor should plan itineraries for site traffic. ▪ Issue notices/advisories of pending traffic inconveniences and solicit tolerance by commuters before the commencement of construction works. ▪ Assign traffic regulators to places during periods of chronic or potential traffic congestions. ▪ Prepare & provide appropriate signage & trained flag persons where the movement of heavy machinery and construction equipment may cross the main roads. 	<ul style="list-style-type: none"> ▪ Contractor 	<ul style="list-style-type: none"> ▪ 50,000
Influx of construction workers into the area:	<ul style="list-style-type: none"> ▪ Proliferation of informal kiosks in the area; Increase in transport demand. ▪ Road side vending 	<ul style="list-style-type: none"> ▪ Develop a catering program on site for construction staff; ▪ Provide transportation for the workforce to and from the site; ▪ The contractor should identify, demarcate and fence a specific area within which specific number vendors will be allowed to operate. ▪ The vendors should be instructed to maintain the area in a tidy fashion and litter bins should be provided with arrangements in place to have the contents of these emptied on a regular basis and disposed of appropriately. 	<ul style="list-style-type: none"> ▪ Contractor 	<ul style="list-style-type: none"> ▪ 100,000
Energy utilization	<ul style="list-style-type: none"> ▪ Energy consumption 	<ul style="list-style-type: none"> ▪ Develop an energy management plan; ▪ Construction machinery and vehicles should be maintained and used in accordance with manufacturer's specifications, to maximize efficiency and lower use of energy, e.g. drivers of construction vehicles should be instructed not to leave them idling for extended periods; ▪ Construction workers should be sensitized on the importance of energy management. 	<ul style="list-style-type: none"> ▪ Contractor 	<ul style="list-style-type: none"> ▪ 20,000

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
Ergonomic	<ul style="list-style-type: none"> Bad posture may lead to body structural disorder. 	<ul style="list-style-type: none"> Provision for repairing and maintaining of hand tools must be in place Hand tools must be of appropriate size and shape for easy and safe use Height of equipment, controls or work surfaces should be positioned to reduce bending posture for standing workers 	<ul style="list-style-type: none"> Contractor 	<ul style="list-style-type: none"> 20,000
Operation phase				
Solid waste generation	<ul style="list-style-type: none"> Generation of general Solid wastes leading to pollution of water bodies, air impairment when decomposing hence odours, and reduction in aesthetic value of the compound. 	<ul style="list-style-type: none"> Provision of dirt bins/skips at strategic points of the compound Disposal at the designated site, Awareness creation among workers Practice reuse and recycling methods as much as possible where applicable. Display portraits like “Don’t Litter”, “Keep Environment Clean” 	<ul style="list-style-type: none"> Proponent 	<ul style="list-style-type: none"> Waste collection as per rates
	<ul style="list-style-type: none"> The Bagasse Menace 	<ul style="list-style-type: none"> Installation of a bagasse house as part of the project design. Use as a source of fuel in the boilers. Installation of a Co-generation unit Installation of a pelleting unit. Practicing of bagasse bailing to enhance transportation. Reuse together with the filter cake as soil enrichment to increase organic matter in the farm lands. Consider use of bagasse as a raw material in paper and chip-board manufacturing. 	<ul style="list-style-type: none"> Proponent 	<ul style="list-style-type: none"> As per need

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
Hazardous waste generation	<ul style="list-style-type: none"> ▪ Pollution of surface or ground water due to oil spillage 	<ul style="list-style-type: none"> ▪ Hazardous wastes, such as waste oils and grease to be collected in secure storage facilities on-site to prevent accidental release that may result in contaminated run-off and leaching. ▪ Storage areas for hazardous material to be cemented to provide an impervious surface and to prevent uncontrolled discharges to groundwater 	<ul style="list-style-type: none"> ▪ Proponent 	<ul style="list-style-type: none"> ▪ Waste collection as per rates
Air pollution	<ul style="list-style-type: none"> ▪ Unmonitored stack emissions 	<ul style="list-style-type: none"> ▪ Monitor stack emissions regularly ▪ Have Fugitive Emissions Control Plan ▪ Install appropriate Electrostatic precipitator (ESP) as an effective emissions control technology. ▪ Ensure the emissions are within permissible limits in line with Air Quality Regulations 2014 ▪ Apply for Emission license and undertake quarterly analysis to ensure compliance with the emission standards. 	<ul style="list-style-type: none"> ▪ Proponent 	<ul style="list-style-type: none"> ▪ 400,000
Accidents and injuries	<ul style="list-style-type: none"> ▪ Machine safety (improper use and maintenance of machines) 	<ul style="list-style-type: none"> ▪ All plant, machinery and equipment should only be used for work which they are designed for and be operated by a competent person. ▪ Insist on regular servicing of electrical fittings and appliances by qualified personnel. ▪ Every machine intended to be driven by mechanical or any other type of power should be provided with safeguards and an efficient starting and stopping appliance, the control of which should be in such a position as to be readily and conveniently operated by the person operating the machine. 	<ul style="list-style-type: none"> ▪ Proponent 	-
Occupational health and Safety	<ul style="list-style-type: none"> ▪ Accidents and injuries 	<ul style="list-style-type: none"> ▪ The premise must be kept clean, daily removal of accumulated dust from floors, free from effluvia arising from any drain, sanitary convenience or nuisance 	<ul style="list-style-type: none"> ▪ Proponent 	<ul style="list-style-type: none"> ▪ 100,000

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
		<ul style="list-style-type: none"> ▪ The premise must not be overcrowded, there must be in each room 10 metres of space for each employee, not counting space 14 feet from the floor and a 9 feet floor-roof height. ▪ The circulation of fresh air must secure adequate ventilation of workrooms. ▪ There must be sufficient and suitable lighting in every part of the premise in which persons are working or passing. ▪ There should also be sufficient and suitable sanitary conveniences separate for each sex, ▪ Management should ensure provision of suitable protective clothing and appliances including where necessary, suitable gloves, footwear, goggles, gas masks, and head covering, and maintained for the use of workers in any process involving expose to wet or to any injurious or offensive substances ▪ Management should ensure training and supervision of inexperienced workers ▪ An adequate supply of both quantity and quality of wholesome drinking water must be provided. ▪ Maintenance of suitable washing facilities, accommodation for clothing not worn during working hours must be provided. ▪ Provision of well-equipped First Aid kits and /or ready transport facilities to hospital. 		
Use of sanitary room (toilets and urinal)	<ul style="list-style-type: none"> ▪ Generation of sewage(liquid waste), Water pollution, Air pollution (odour) ▪ Reduced aesthetic value 	<ul style="list-style-type: none"> ▪ Incorporate grease traps ▪ Conduct regular inspections for sewerage pipe blockages or damages and fix appropriately ▪ Ensure regular monitoring of the sewage discharged ▪ Reuse, recycle waste water where necessary ▪ Ensure adequate water supply for flushing and to ensure the waste is carried to the sewerage system without causing blockage. 	<ul style="list-style-type: none"> ▪ Proponent ▪ NEMA 	<ul style="list-style-type: none"> ▪ 150,000

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
		<ul style="list-style-type: none"> ▪ Ensure flushing toilet after use though Avoid unnecessary flushing ▪ Apply for effluent discharge license 		
Water Consumption	<ul style="list-style-type: none"> ▪ Overutilization of water 	<ul style="list-style-type: none"> ▪ Monitor water consumption ▪ Apply for water abstraction permits from WRA ▪ Install internal water meters. ▪ Installing plumbing fittings, appliances and devices to optimize water use efficiency; ▪ Recycling of wastewater to reduce water consumption. 	<ul style="list-style-type: none"> ▪ Proponent/ Contractor ▪ WRA 	<ul style="list-style-type: none"> ▪ As per BQ
Waste management	<ul style="list-style-type: none"> ▪ Drain blockages 	<ul style="list-style-type: none"> ▪ The proponent should ensure that there is adequate means of handling large quantities of sewage blockages as well as related emergency situations. ▪ Proper monitoring at waste generation points should be established. 	<ul style="list-style-type: none"> ▪ Proponent/ Contractor 	<ul style="list-style-type: none"> ▪ As per BQ
Use of energy	<ul style="list-style-type: none"> ▪ Overutilization of hydropower ▪ Overloading hydropower grid 	<ul style="list-style-type: none"> ▪ Switch off electrical equipment, appliances and lights when not being used ▪ Install energy saving fluorescent tubes at all lighting points within the facility instead of bulbs which consume higher electric energy ▪ Sensitize occupants of the facility to use energy efficiently ▪ Plant trees within the compound and along the fence. 	<ul style="list-style-type: none"> ▪ Proponent 	<ul style="list-style-type: none"> ▪ -
Electricity use	<ul style="list-style-type: none"> ▪ Explosions/Fire outbreaks causing injuries and destruction of properties 	<ul style="list-style-type: none"> ▪ Regular maintenance of fire extinguishers ▪ Proper electric connections. ▪ Circuit must not be overloaded ▪ Distribution boards switches must be clearly marked to indicate respective circuits ▪ No live exposure connection 	<ul style="list-style-type: none"> ▪ Proponent/Contractor 	<ul style="list-style-type: none"> ▪ As per BQ and need

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
		<ul style="list-style-type: none"> Electrical fittings near all potential sources of ignition should be flame proof 		
Ventilation	<ul style="list-style-type: none"> Suffocation and lack of clean air may lead to discomfort of the occupants in the facility. 	<ul style="list-style-type: none"> Enough space must be provided within the premises to allow for adequate natural ventilation through circulation of fresh air 	<ul style="list-style-type: none"> Proponent Contractor 	<ul style="list-style-type: none"> As per BQ
Vector/rodents breeding grounds	<ul style="list-style-type: none"> Diseases and infections 	<ul style="list-style-type: none"> Ensure that there is no space for unplanned stagnant water retained in the fields. Recommended measures should be applied when dealing with rodents and food storage. A monitoring programme should be put in place for controlling relative cases observed. 	<ul style="list-style-type: none"> Proponent 	<ul style="list-style-type: none"> As per need
Lighting	<ul style="list-style-type: none"> Lack of enough light in the facility may lead to eye straining hence eye problems 	<ul style="list-style-type: none"> There must be adequate provision for artificial and natural lighting in the facility. 	<ul style="list-style-type: none"> Proponent 	<ul style="list-style-type: none"> As per BQ
Decommissioning Phase				
Demolition activity	<ul style="list-style-type: none"> Lead to accident from falling, and flying objects. Generation of construction waste Reduced aesthetic value of that place Destruction of soil structure 	<ul style="list-style-type: none"> Develop a decommissioning EIA 	<ul style="list-style-type: none"> Proponent and the contractor 	<ul style="list-style-type: none"> Develop BQ and project budget

Environmental parameter	Impact	Mitigation measure	Responsible party	Costs (KES)
	<ul style="list-style-type: none"> Lead to soil erosion hence water pollution 			

10. CONCLUSION AND RECOMMENDATIONS

This Study Report has been prepared to provide sufficient and relevant information on the proposed project to enable NEMA to establish whether activities of the project are likely to have significant adverse environmental impacts. Mitigation measures have been proposed for identified impacts in this report and an Environmental Management Plan (EMP) for the implementation of the proposed measures has been presented. The EMP presented in this report is a tool to be used by the Project Team during the construction, hand-over and operation periods.

To ensure implementation, mitigation measures should be reflected in the Conditions of Contract and Bills of Quantities. It is the responsibility of the Proponent to ensure these measures are incorporated into these two documents.

It is recommended that the available waste management systems must be monitored and upgraded (where necessary) to ensure that they adequately handle the anticipated increase in waste and by-products.

In this respect the project can proceed on condition that the concerns are addressed the proposed mitigation measures are implemented and an EIA license issued with the above conditions taken fully into account amongst any others.

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ANNEXURE

Annex 1: NEMA Approved TOR

Annex2: Proponent Documents

Annex 3: Land ownership document

Annex 4: Expert practicing licenses

Annex 5: PCMs (Notices, Minutes and Questionnaires)

Annex 6: Baseline Environmental Studies

Annex 7: Project Design Layout