ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT STUDY REPORT

FOR THE PROPOSED WEST VALLEY SUGAR FACTORY LOCATED ON PLOT L.R NO. KERICHO/POIYWEK/462 AT KAPKORMOM SUB-LOCATION, KOITABUROT LOCATION IN SOIN/SIGOWET SUB COUNTY, KERICHO COUNTY




GPs Location: Latitude: 0º 14‘35.25’’S, Longitude: 35º15’ 0.0” E

<u>PROJECT PROPONENT</u>

WEST VALLEY SUGAR COMPANY LIMITED

P.O BOX 1314-20200

KERICHO

CERTIFICATION

This Environmental and Social Impact Assessment Study Report (ESIA) for the proposed West Valley Sugar Factory Project to be located on plot L.R No. Kericho/Poiywek/462 at Kapkormom sublocation, Koitaburot location, Soin/Sigowet Sub County, Kericho County has been prepared in accordance with NEMA regulations under the guidance and supervision of a registered NEMA Lead Expert. It meets statutory provisions stipulated in EMCA 2015, the Legal Notice No. 32 and the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019. We hereby certify that the details herein are correct and true to the best of our knowledge.

ESIA CONSULTANTS

Name: Mr. Jacob Okal Ohalo

Signature  **Date: 23/9/2021**

Designation: EIA/EA Lead Expert

NEMA Reg. No. 11362

Mr. Paul K. Muhia

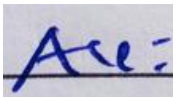
Signature  **Date: 23/9/2021**

Designation: EIA/EA Associate Expert

NEMA Reg No. 10286

PROPONENT

Name: Benard Kiprotich Soi

Signature  **Date: 23/9/2021**

Designation: Director

On Behalf of: West Valley Sugar Company Limited

P.O Box 1314 – 20200

Kericho

ACKNOWLEDGEMENT

The Lead Expert wishes to thank the members of public and proponents of the proposed West Valley Sugar Factory. In particular Mr. Benard Soi (One of the Directors) who commissioned this ESIA. MK Changwony and Associates Consultants who participated in conducting of this ESIA Report by providing necessary assistance, information and relevant documentation including feasibility studies. We also wish to thank all the other local leaders consulted led by the area MCA Mr, Kimutai Rutto and the area Chief whose support for their immense assistance and input. Finally, we express our gratitude to the Key stakeholders consulted, the general public and members of Kapkormom community for their input in Public Participation and Stakeholders Exercise.

LIST OF ACRONYMS.

CBD Convention on Biodiversity
CBO Community Based Organizations
CDM Cleaner Development Mechanism
CITES Convention on International Trade on Endangered Species
EA Environmental Audit
EHS Environmental Health and Safety
EIA Environmental Impact Assessment
EMCA Environmental Management and Coordination Act 1999
EMP Environmental Management Plan
EMS Environmental Management Systems
ESA Ecologically Sensitive Areas
ETP Effluent Treatment Plant
EU European Union
FAO Food and Agriculture Organization
HIV Human Immune Virus
IRPTC International Register for Potentially Toxic Chemicals
KP Kenya Power
KWS Kenya Wildlife Service
MOH Medical Officer of Health
MW Mega Watt
NEAP National Environmental Action Plan
NEC National Environmental Council
NEMA National Environmental Management Authority
NET National Environment Tribunal
NETF National Environment Trust Fund
NGO Non-Governmental Organizations
PCC Public Complaints Committee
R.O Reverse Osmosis
SEA Sexual Exploitation and Abuse
SERC Standards and Enforcement Review Committee
SOP Standard Operating Procedures
SPM Suspended Particulate Matter
TCD Tonnes Crushed per Day
TCH Tonnes Crushed per Hour
TOR Terms of Reference
UNEP United National Environment Program
WEVAS West Valley Sugar Company
WRA Water Resources Authority
MT Metric Tones
VMGs Vulnerable and Marginalized Groups

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EXECUTIVE SUMMARY

Background

West Valley Sugar Company Limited, here in referred to as the proponent has proposed to construct a Sugar Factory located on plot L.R No. Kericho/Poiywek/462 at Kapkormom Sublocation, Koitaburot Location in Soin/Sigowet Sub County, Kericho County. The Proponent is expected to engage in the activities of sugarcane procurement, milling of sugarcane, production of mill white sugar and power and marketing of the finished products. The Environment Management and Coordination Act of 1999 require that an environmental impact assessment should precede all development activities. In compliance, the proponent has commissioned consultants to carry out the Environmental Impact Assessment Study for the proposed project.

Purpose of study

The purpose of this study is to ensure adequate identification of potentially positive and negative environmental and social impacts associated with the establishment of WEVAS sugar factory in the area. Secondly, to propose workable mitigation measures, and thirdly to formulate an Environmental and Social Management and Monitoring Plan articulating envisaged impacts and mitigations, and to obtain an Environmental Impact Assessment license prior to commencement of the project.

Methodology

The Environmental Impact Assessment (EIA) was carried out based on field assessments, stakeholders and public consultations with the community neighboring the proposed project site, relevant stakeholders and the proponent with a total of three meetings (2 Public participation Barazas held on **29th May 2021** and **19th June 2021 a**nd 1 Key stakeholders' consultation meeting that was held on **21st September 2021).** Both Public Participation exercise were chaired by the area chief and the Area MCA on the two respective dates. The key stakeholders meeting was also moderated by the area Chief. Relevant document reviews also took place. The Project proponent provided the proposed project design details including feasibility study. The data collection was carried out through structured questionnaires where 25 questionnaires were administered on 29th June meeting. Out of these, 19 were filled and returned. Another set of questionnaires was administered on 19th June 2021 with 30 questionnaires filled and returned.

Involvement of Key stakeholders

Interviews were conducted to key informants including the area MCA, the area chief, village elders and lead sugarcane farmers in the area. A meeting for the Key stakeholder's engagement was also organized at the proposed project site. Key stakeholder and departments engaged is the County Government of Kericho represented by the department of Trade, Industrialization, Co-operative Management, Tourism and Wildlife and is in full support of the project (See Letter of No Objection attached from the CEC,-Trade, Industrialization, Co-operative Management, Tourism and Wildlife), WRA, DOSHs, Ministry of Agriculture (MOA), Kenya National Chamber of Commerce (Business Community), Ministry of Labor and Social Protection, Sugarcane Farmers Association, NEMA and Public Health.

Potential negative impacts and mitigation measures during construction, operation and decommissioning of the proposed West Valley Sugar factory were taken into consideration during the study and public/stakeholders' engagement.

Current site status and land use

The site is currently an open inhabited expansive field with a portion of the land being under dairy farming activities by the director of the proposed project who is also the land owner. There are homesteads scattered in the neighborhood. A barbed wire fence had been erected around the project site. The entire plot is covered by grasses, forbs, herbs and few trees that will be cleared to allow for the construction.

ESIA Process, Approach and Methodology

A comprehensive project Report was first undertaken and submitted to NEMA **(NEMA/PR/5/2/23908).** The project was reviewed and upgraded to this study due to the magnitude and complexity of the issues associated with the proposed sugar factory project that needed a wider consultation with the PAPs and in-depth analysis of project impacts. During the study, the general steps followed during the assessment included: -

- Environment screening, during which the proposed sugar factory project was identified as among those listed and requiring to be subjected to the ESIA process as stipulated in EMCA 1999 (Revised 2015) and the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019 as stipulated in the Legal Notice No. 31 and 32.
- Submission of TOR to NEMA Headquarters for Approval
- Environmental scoping that provided the key environmental issues to be considered,

- Desktop studies and documentary review of relevant reports, legal, institutional and policy frameworks,
- Physical inspection and assessment of the proposed factory site,
- Analysis of project alternative options,
- In-house consultative meetings with the proponent (Directors of West Valley Sugar Company Limited),
- Comprehensive baseline field environmental assessment,
- Intensive stakeholder engagement and public consultations,
- Comprehensive project impact analysis,
- Impact mitigation planning,
- Environmental management planning and preparation of an ESMP,
- ESIA report writing.

Project Site Description

The sugar factory, to be located on Plot Kericho/Poiyek/462 at Kapkormom Sublocation, Koitaburot Location in Soin/Sigowet Sub County, Kericho County. The land to be developed is under the registration of the Company director Mr. Bernard Kiprotich Soi (See title deed appended). The factory is proposed on land registered on Registry Map Sheet No. 3 & 4 measuring 11.2 ha. However, the proponent has enough land and has in total acquired land area of 50 acres and another 100-acre adjacent to the site is still available for future expansion.

Project Objectives

The project objectives include the installation of a 1250 TCD sugar milling factory (Expandable to 2500 TCD) and Captive Power. Sugar production from the 1250TCD plant will be about 138 MT/day equivalent to 3250 MT/month. The raw materials generated from the sugar plant, such as bagasse and molasses, will be utilized in the mill and co-gen power plants. It is planned that excess bagasse will be used in the manufacture of chip boards and also briquetted and transported for use in firing boilers in the nearby tea factories.

The Out growers targeted by the proposed sugar factory will be expected to fall mainly within 30-50 km radius of the factory area and will cover mainly Sigowet/Soin Constituency and parts of Ainamoi, Belgut, Kipkelion West and Nyando constituencies. Water is available from River Kipkwes and a borehole is to be drilled by the company inside factory premises.

Both the proponent and farmers in the target area have been sensitized on the objectives of the factory and are able to foresee the potential.

Capital Cost Estimate

The capital cost estimate for the project is approximately Eight hundred million (KShs. 800,000,000). The final cost estimates will be provided and approved by a certified QS once harmonized with the machine suppliers.

Baseline Environmental Status

The proposed project is situated within Kericho County in Soin/Sigowet Sub-County. However, the environmental details were collected from a radius of 10Km of the project site. A feasibility study has been carried out. The proponent has contracted an agronomist who will carry out a crop study and soil type information is available along with varieties of seed and husbandry for the use of farmers and agricultural workers in the catchment area.

The source of water will be the nearby River Kipkwes which has sufficient flow for the factory to draw from. The water is gravity-led. Hence, proponent expect the availability of required water to process the projected 288,000 tonnes of cane annually. The proponent has proposed to abstract a total of $30M^3$ from the river. Additionally, there is potential for investment in the future on water pans to store rainwater or drilling a borehole.

Water sample collected from River Kipkwes and analyzed as part of feasibility study indicated that the parameters of water are within the normal range for use *(source: feasibility study)*.

Legislative and Environmental Setting

Various Laws and regulatory policies have been established by the relevant authorities for the control and regulations of sugar processing factories. These are considered and elaborated on the ESIA Study Report.

The proponent is advised to acquaint himself with the various Acts and regulations and adhere to them in the construction and operations phase of this project.

Prediction of Impacts

The potential impacts on the environment due to the proposed activity are identified based on the nature and extent of the various activities associated with the project implementation and operation as well as the current status of the environmental quality at the project site. Both

beneficial and adverse impacts are considered. The sources of air pollution, water pollution and solid waste generation are identified and the impacts due to the above are superimposed on the existing baseline environment. Impacts such as fire hazards, increase in population and traffic, ambient noise, drainages and storm water management, air emissions, security, environmental health and safety and occupational health and considered and measures to reduce and mitigate them are provided for in the Study Report.

Positive impacts

- ✓ There will be Direct and indirect employment opportunities,
- ✓ Gains in the County and national economy,
- ✓ Increased Industrial development in Kericho County,
- ✓ Attraction of premises in the factory area,
- ✓ Improved area road network,
- ✓ Improved security in the neighborhoods,
- ✓ Improved living standards,
- ✓ Corporate social responsibility (CSR) benefits to be derived from establishment of the Sugar factory in the area.

Key potential negative impacts and recommended mitigation strategies

From the project assessment, the anticipated adverse negative impacts and recommended mitigation measures are summarized as follows:

Table 1: Summary of Impacts and Mitigation Measures

Anticipated negative impact	***Recommended mitigation measures***
Increased demand of raw materials	• Construction materials will be sourced from licensed quarries and local suppliers who use environmentally friendly processes in their operations; • Accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered and to ensure that the amount of construction materials left on site after construction is kept minimal; • Ensuring that damage or loss of materials at the construction site is kept minimal through proper handling;

Generation of construction and domestic wastes	• Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time; • Construction waste will be recycled or reused to ensure that materials that would otherwise be disposed of as waste are diverted for productive uses; • Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements; • Consider the use of recycled or refurbished construction materials where feasible; • On operation, the developer shall provide adequate domestic waste receptacles on site and ensure safe transportation to designated disposal sites by licensed waste handlers; • An Effluent Treatment Plant has been proposed to manage all liquid wastes from the premises, and • Contract registered waste disposal expert to transport and dispose waste from site.
Dust and air pollution	• Watering all active construction areas as and when necessary to lay dust; • A speed limit of 10km/hr shall apply to all construction vehicles to limit dust • Rehabilitation of disturbed areas once completed; • Materials transport equipment will be cleaned on a regular basis; and Planting appropriate trees, shrubs and flowers to compensate for emissions.
Noise and vibrations	• Restriction of the work hours during the construction phase from 7 am to 6 pm Monday to Saturday; • All machinery used during construction shall be maintained in a sound mechanical condition with regular servicing; • Limit pick-up trucks and other small equipment to a minimum idling time and observe a common-sense approach to machine use, and encourage workers to shut them off whenever possible;
Increased Traffic	• Construction vehicles to enter and leave the site through designated paths only; • Posting traffic warning signs on both approaches to the construction site to warn other road users of traffic risks; • Strict adherence to speed limits near the construction area of 10 km/hr; and • Clearly marking parking spaces, installation and maintenance of traffic guide signage.

Increased energy demand	• Sensitization of staff to conserve non-renewable fossil energy by switching off machinery and equipment when they are not being used; • Proper planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts unnecessarily; • Monitoring energy use during construction/welding and operation and setting targets for reduction of energy use; and • Installation and use of energy efficient welding and lighting equipment during construction and operation respectively.
Occupational and public hazards and accidents	• Provision of appropriate Personal Protective Equipment (PPE) to construction workers; • Safety education and training for workers; • Barricading the construction area appropriately and posting public warnings; • Provision of appropriate onsite sanitary convenience for workers; • Establishing emergency procedures against hazards and ensuring the workers stay aware/educated on following them and commensurate to the magnitude and type of emergency, by conducting regular drills and involving the neighboring people. • Having a safety officer on site to ensure adherence to the Occupational Health and Safety rules and regulations stipulated in the Occupational Safety and Health Act, 2007. • Providing firefighting equipment and in easily accessible areas as well as ensuring site personnel are well trained to use them as well as maintaining them regularly
Increased Water demand	• Employing water conservation techniques and only using the required amounts of water to prevent wastage. • Implementing water conservation techniques such as having faucets with dead man tap openers • Reusing water where possible to minimize on unnecessary wastage • Installing water meter to measure the water being abstracted for use
Soil disturbance and erosion	• Levelling the disturbed site areas to reduce run-off velocity and increase infiltration of rain water into the soil; • Construction vehicles will be restricted to designated paths to avoid soil compaction within the proposed Project site; • stockpiling materials shall not be done along the road.
Food insecurity	The proponent will ensure that sugarcane farming does not replace maize farming which is the main food crop in the area. This will be done in collaboration with relevant county government departments.
Use of improper cane seeds	The proponent will provide short maturing and high yield sugar varieties to enable farmers get their financial benefits in a short time

Improper land preparation	The proponent will sensitize the farmers on the most appropriate methods of good land preparation including soil conservation
Cane spillage	Sensitization of sugarcane loaders on proper sugarcane loading to avoid loss and inconveniencing other road users. The proponent will also institute measures of collecting all the spilled cane on the feeder roads.
Influx of factory workers	Employment priority will be given to the local people within the factory area.
HIV/AIDS	The proponent in partnership with the Ministry of health and county government will undertake sensitization campaigns against the spread of HIV/AIDS among the factory works and with local community members
VMGs involvement	VMGs and less fortunate in the society should be considered in this project. The proponent during public consultation promised to integrate all workers to benefit including the VMGs.

Environmental and Social Management Plan (ESMP)

Environmental and Social Management Plan includes the protection, mitigation and enhancement measures to be implemented to reduce the adverse impact on the environment as well as social impacts. The ESMP will be a baseline document that will be utilized in the management of the environment during the construction phase, the operational phase and the decommissioning phase. Its purpose is to ensure the sustainable use of the environment and it takes into consideration mitigation measures indicated in the above chapter and provides responsibilities and approximate costs. It is important that the proponent include this within his operating budgets from the outset in order to comply with the requirements of the Law.

Conclusion

The project will play an important role in the local, county and national economy. Constant monitoring of the said aspects (impacts and mitigation) through close follow-up and implementation of the recommended Environmental Management and Monitoring Plans will also ensure its longevity and avoid conflicts between the project and stakeholders or between it and the natural world. In relation to the proposed mitigation and environmental management and planning measures that will be incorporated during construction and operation phases; and the developments' input to the proponent and the general society, the proposed project is considered beneficial and important and the experts recommend it for approval. Major concerns

should nevertheless be focused towards minimizing the occurrence of impacts that would degrade the general environment through follow up Environmental Audit which should be done annually just to cross check conformity and adherence to the regulations and recommendations made in this report.

CHAPTER ONE
INTRODUCTION

1.0 Project Overview

West Valley Sugar Company Limited (WEVAS) is owned by Kenyan investors with interests in sugar farming, construction, retail, commodity trading and tea processing factories. These Investors have taken this investment decision to make a contribution to Kenya's Sugar Sector through: reduction of Kenya's dependence on imported sugar, creation of market for excess cane in Kericho Sugar belt (a region with a significant potential for expansion of cane development and currently underserved by existing sugar mills).

The company has identified a gap in the crushing capacities of nearby sugar factories, the consequence of which has caused suffering among cane farmers in the region. The Directors intends to install a 1250 TCD plant to produce sugar with sufficient captive power.

1.1 Background and Rational of the ESIA Study Report

The proponent wishes to establish a sugar mill at the project site which hitherto has been agricultural. He will encourage the community to invest in sugar cane farming and will assist them with farming requirements. The area will become an industrial growth center. This is an activity out of character with its surroundings at the proposed location and the land will have to go through change of user from agricultural land to industrial use. The project is included in the projects in Schedule 2 of the EMCA (Amendment 2015) that require an Environmental Impact Assessment. The proponent has contracted EIA Experts to carry out this study report.

1.2 The Need for ESIA

The proposed project falls under the EIA mandatory activities and is among those listed and requiring to be subjected to the EIA process as stipulated in EMCA 1999 (Revised 2015) and the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019 as stipulated in the Legal Notice No. 31 and 32. The project factory constitutes a major change in land use, and will establish an industrial estate, the project will also emit raw effluent that requires careful handling through proper ETP. Also anticipated is bagasse, a solid waste that is difficult to dispose off. The project will also result in air pollution which must be mitigated properly.

1.3 Objectives of the ESIA

The main objective in respect to the proposed project is to guide environmentally sound decision-making. Such a decision will be on the basis of significant environmental impacts related to the project. Mitigation measures proposed will determine whether the decision to implement the project will be deferred or approved.

Specific broad objectives shall include:

i. Identification; examination and analysis of all the significant environmental and socio-economic impacts related to the proposed Sugar Factory project.
ii. Carrying out baseline surveys of the existing environmental, social and economic parameters in the project area upon which the ESIA Study is based.
iii. Identifying, examining and analyzing existing policies and institutional arrangements for effective implementation of the proposed project.
iv. Analyzing specific project alternatives in terms of site, technology, design, scale, size and extent.
v. Formulating workable, acceptable and viable environmental mitigation measures to minimize identified negative impacts.
vi. Developing an ESMP specifying specific actions, responsibilities, time schedule and costs.
vii. Making appropriate conclusions and recommendations.
viii. Ensuring adequate consultation and public participation throughout the ESIA process.

1.4 ESIA Process and Approach

The ESIA process identifies significant negative and positive environmental impacts and proposes mitigation measures to ameliorate negative impacts. The process also provides a mechanism for auditing and monitoring and implementation of mitigation measures contained in the Environmental and Social Management Plan (EMSP).

The key steps on EIA process include:

1.4.1 Screening

This project was initially screened by the NEMA County Director of Environment (CDE). A decision was made in reference to the NEMA Public Notice on ESIA and Legal Notice No 31 and 32 of April 2019 that the report is high risk and should be handled by the Headquarters.

During the environmental and social screening exercise, issues which were identified and considered pertinent and important for coverage also determined the decision made by the CDE, Kericho.

A project report Ref No. NEMA/PR/5/2/23908 (PSR 22863) was first prepared and submitted to NEMA Headquarters on 28th June 2021. The authority reviewed the project report and recommended it to be upgraded to this study on 30th June 2021 upon approval of TOR.

1.4.2 Scoping

Site visits were made by the experts together with the representatives of WEVAS and members of the public. This was done to ensure that critical issues pertaining to the ESIA were identified to enable the experts understand the area and collect baseline information in preparation for undertaking the task.

1.4.3 Desk Review

A desk top review was done to collect secondary data especially from the Feasibility study for the proposed West Valley Sugar Factory conducted by MK Changwony and Associates and reference to other ESIA Study Reports on similar subject submitted to NEMA.

1.4.4 Field Data Collection

The study employed various tools and instruments for data collection. These included pre-determined checklists; camera for taking pictures of the site, questionnaires with both open-ended and closed format used to gather primary data and information from neighbors, notebooks for recording notable observations and site layout which included environmental screening and Physical environment that encompasses flora and fauna, geology and soil types, safety issues as well as noise pollution. Interview guide was used to get information from the Key informants who included the area MCA, the area chief, village elders and lead sugarcane farmers in the area. Other Key stakeholder and departments were engaged among them the County Government of Kericho and is in full support of the project (See Letter of No Objection attached from the CEC,-Trade, Industrialization, Co-operative Management, Tourism and Wildlife).

Data from the general public was obtained using a closed and open-ended questionnaire circulated among the sampled respondents in the community. During assessment and public participation, all the laid down containment measures against the spread of COVID-19 were

followed. Sampling included the Vulnerable and Marginalized Groups in the community and their views were taken.

The data gathered was evaluated, analyzed to determine the required level of environmental performance. Recommendation action plans were made with a view to ensure compliance with the National Environmental Management Authority requirements and/or guidelines relating to issues listed in Environmental Management and Coordination Act. Sampled questionnaires have been attached to the appendices of this report.

1.4.5 Reporting and documentation

The reporting and documentation followed the format provided by NEMA (through both EMCA, 1999 and the Environmental Social Impact Assessment and Audit Regulations-Legal Notice No.32 of 2019) The proponent was continually informed throughout the period of report preparation to ensure that they were aware of the issues raised and the recommendations that were likely to be made regarding the best practices to mitigate environmental and social impacts.

1.5 Scope and Terms of Reference of the Study

1.5.1 Scope

A project proponent is required to undertake an Environmental Impact Assessment study before undertaking any project highlighted in Schedule 2 of the Environmental Management and Coordination (Amendment) Act, 2015. This study undertakes to fulfill this requirement. This report 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 scope of the ESIA was to undertake the following key tasks:

- **Detailed desk-top review**: This involves review of all existing documentation especially the ESIA Study Report and then providing a concise description of the proposed sugar mill including its geographic, ecological, general layout of facilities including maps at appropriate scale where necessary information on size, capacity, facilities and services should also be provided.

- **Description of the baseline environment:** This involves collecting and documenting the baseline information on the environmental characteristics of the existing situation in the proposed factory site and neighborhood. This description will consider:
  - ✓ Physical environment which includes topography, soils, land cover, land use, climate, hydrology and drainage, and sound levels.
  - ✓ Biological environment comprising of flora and fauna types and diversity, endangered species, sensitive habitats.
  - ✓ Social and cultural environment present and projected population, land use, planned development activities, community social structure, social services, road networks, employment and labour market, sources and distribution of income, cultural/religious sites and properties, vulnerable groups and indigenous populations.
- **Occupational health and safety concerns:** The Consultant will analyze and describe all occupational health and safety concerns brought about by activities during all the phases of the project. The Consultant was also expected to make recommendations on corrective and remedial measures to be implemented under the environmental management plan.
- **Determination of impacts of project facilities and activities:** From the detailed baseline environmental assessment, the Consultants will analyze and describe all significant changes brought about by each project activity. These would encompass environmental, ecological and social impacts, both positive and negative, as a result of each facility/activity intervention that are likely to bring about changes in the baseline environmental and social conditions. The Consultant will make a prioritization of all concerns identified and differentiate between short, medium, long-term and cumulative impacts during construction, operation and decommissioning. The Consultant will identify both temporary and permanent impacts.
- **Legislative and regulatory framework:** to identify and describe the pertinent and relevant regulations and standards for the proposed sugar factory - both local and international, governing the environmental quality, health and safety, protection of sensitive areas, land use control at the national and local levels and ecological and socio-economic issues. The project activities that comply with the identified regulations will also be detailed.

- **Development of management plan to mitigate negative impacts:** The Consultant was expected to develop a comprehensive environmental and social management plan. The plan would recommend a set of mitigation, monitoring and institutional measures to eliminate, minimize or reduce to acceptable levels of adverse environmental impacts and/or maximize socio-economic benefits. The Consultant will provide details on the institutional, time frame and responsibility for long term environmental management of the proposed sugar mill.
- **Development of an environmental monitoring plan:** The Consultants has given a specific description, and technical details of environmental monitoring measures, including the parameters to be measured, methods to be used, monitoring locations, and frequency of monitoring.
- Preparation of Environmental and Social Impact Assessment Study Report in accordance with the regulatory provisions.
- **The Consultant shall submit the Study Report for approval by NEMA.** The Consultant shall be responsible for making any modifications that the authorities may demand before approval of the report and issuance of an EIA License.

1.5.2 Terms of Reference

The following were the terms of reference:

i) Prepare the TOR for submission to NEMA for consideration and approval.

ii) Hold meetings with the project proponent, and other stakeholders to establish the procedures, define requirements, responsibilities and a time frame.

iii) Carry out a detailed systematic environmental assessment at the proposed project site and the surrounding area in line with established standards and laws.

iv) Provide a description of the proposed activities throughout the entire implementation process of the project with a special focus on potential impacts to the surrounding environment and facilities.

v)To provide a description of the location of the proposed development project

vi) To provide a concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.

vii) To provide objectives of the proposed project.

viii) To provide a description of the potentially affected environment.

viii)To identify environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.

ix)To recommend a specific environmentally sound and affordable wastewater and solid waste management system.

x)To provide alternative technologies and processes available and reasons for preferring the chosen technology and processes.

xi)To analyze of alternatives including project site, design and technologies.

xii)To prepare an Environmental Management/Monitoring Plan proposing the measures for eliminating, minimizing/mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.

xiii)To provide an action plan for the prevention and management of the foreseeable accidents and hazardous activities in the cause of carrying out development activities.

xv) To propose measures to prevent health hazards and to ensure security in the working environment for the employees, residents and for the management in case of emergencies.

xiv)Produce an Environmental & Social Impact Assessment study report that contain among other issues potential negative and positive impacts and recommendation of appropriate mitigation measures to minimize or prevent adverse impacts.

xv)Such other matter as NEMA may require.

1.5.3 Details of Project Proponents

The project comprises of seven directors and shareholders. The project is majorly comprising of one family led by Mr. Benard Soi who is the land owner. These are: Benard Soi, Alfred Soi, Brian Kipngeno Soi, Brenda Cherotich Soi, Justice Kipsang Kemei, Samwel Kipterer Ngetich, Lenah Chesang Kiprop and Kipkirui Stanley.

1.5.4 Participating Experts/Professionals

The following Experts and specialists participated in data collection, analysis, interpretation of results and ESIA Report writing:

	Name	SPECIALIZATION	QUALIFICATIONS
1.	Jacob Okal Ohalo	NEMA EIA/EA Lead Expert and Team Leader (Agricultural Specialist and a Sociologist)	Phd. Cont. Agricultural Economics & Resource Management MSc. In Agricultural Economics & Resource Management, Agricultural Marketing BSc. Agribusiness Management (NEMA licensed EIA/EA Lead Expert)
2.	Raphael K. Ngetich	NEMA Lead Expert, Agronomist and Agricultural Engineer	BSc. Agricultural Production Mechanization Engineering - Cuba. Diploma In Mechanical Engineering (JKUAT). Certificate In EIA/EA (UNES). Lead Auditor-Rainforest Alliance San Standards and CoC. Lead Auditor Iso 9001:2008 (QMS) Lead Auditor, Ethical Trading SA8000 East Africa Organic Products Standard Inspector.
3.	Charles Apudo Owelle	Sugarcane Agronomist	Msc. Business Administration (Strategic Management), Bsc. Agriculture.
4.	Paul K. Muhia	Associate Expert (Expert in Environment and Social Impacts)	BSc. Disaster Preparedness and Environmental Technology NEMA EIA/EA Associate Expert
5.	Florence Tuukuo	GIS Expert and NEMA EIA Associate Expert	Msc.in Geographic Information Systems (GIS) Bsc. In Environmental Science (Majoring in Hydrology)

CHAPTER TWO
PROJECT LOCATION AND DESCRIPTION

2.1 Overview

The chapter focuses on how the project has been designed to fit into the existing site, it describes in detail what the project entails and how it has been projected to operate through the project life, i.e design, operation and decommissioning. It is from this that the environmental impacts have been drawn with appropriate suggested mitigation measures given.

The proposed West Valley Sugar Factory Complex project was conceived by the investors in 2020 and Sugar Consultant Agencies tasked to carry out studies, recommend suitable factory outlay and source bidders for the project. The ESIA experts have been brought on board to ensure the project meets the requirements of EMCA 1999 (Revised 2015) and the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019 as stipulated in the Legal Notice No. 31 and 32.

2.1 Project Location

The project is located on Plot Kericho/Poiyek/462 at Kapkormom Sublocation, Koitaburot Location in Soin/Sigowet Sub County, Kericho County. The GPS Coordinates for the site are Latitude: **0º 14‘35.25’’S,** Longitude**: 35º15’ 0.0” E**. The site is located 30 Km from the Soin Sugar Factory (currently not operational) and is within the Soin sugar belt. The site is located about 200 metres off Kericho Ainamoi-Muhoroni road.

Figure 2.1.1: View of the Proposed project site in relation to the immediate neighborhood

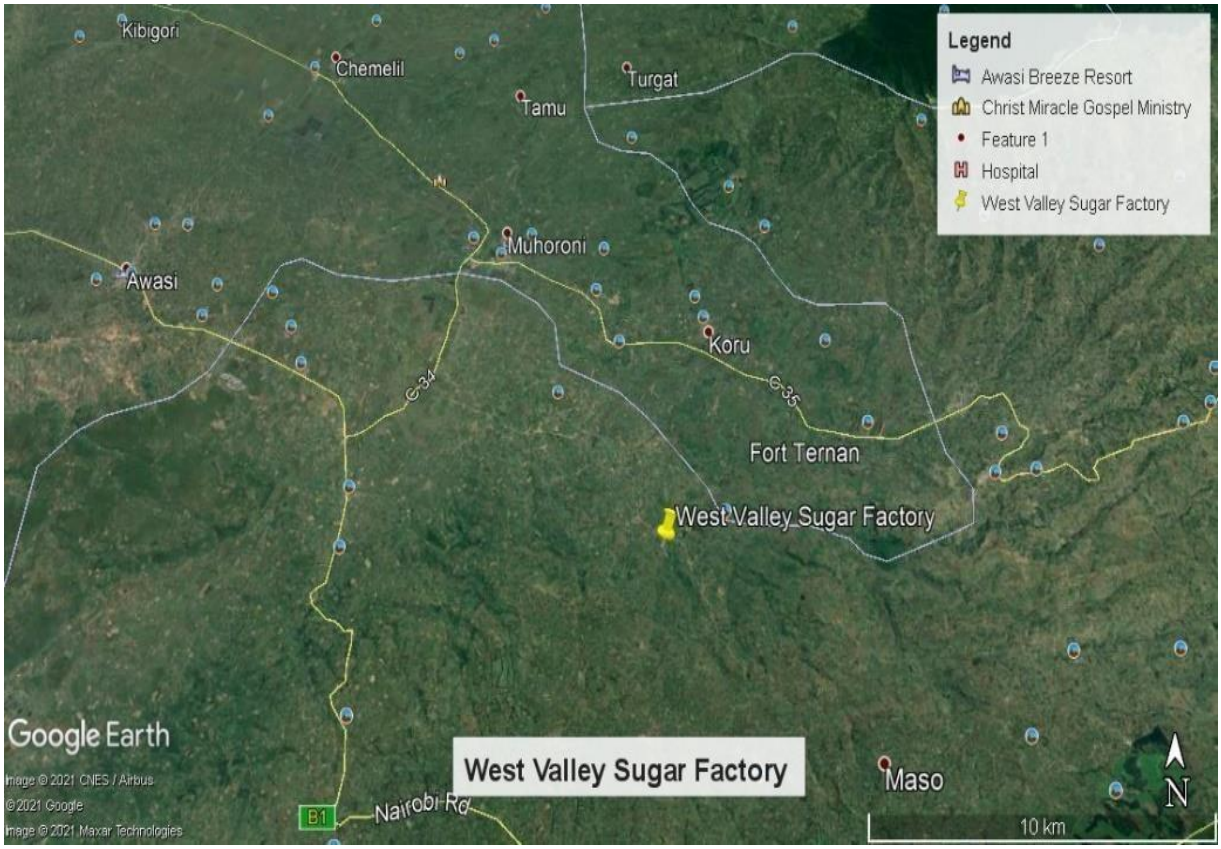

Figure 2.1.2: View of the Proposed project site in relation to the nearest town centres

2.1 Goals of the Project

The goal of the project is to establish a 1250 TCD sugar factory expandable to 2500TCD. The project is expected to

- Assist Kenya to meet the existing sugar deficit of 250,000 tonnes per year.
- Reverse the current trend of continuous importation of sugar into the country thereby draining the country's foreign exchange and job exportation.

Thus, the purpose of the project is to increase sugar production in the country in order to meet domestic sugar demand.

2.2 Project Objectives

In order to achieve these goals, the objectives of the project are as follows: -

- Expand production of sugar cane in the nucleus farms and out growers field
- Construct and establish a sugar processing mill;

- Create employment to the residents of Kapkormom, Soin/Sigowet, Kericho County and Kenya at large as well as other staff for operating the sugar processing mill by engaging professionally qualified individuals;

2.3 Justification for the Project

Soin/Sigowet sub county produces a lot of sugarcane alongside other agricultural activities. Currently, farmers have suffered big losses due to the distance travelled to take sugar cane to the Sugar Milling Factories which are located very far lowering their output. In case of technical breakdown in the nearest sugar factory, the farmers in the area have been incurring big losses with the sugarcane stranded at Kipsitet with nowhere to take them. WEVAS has identified this gap and as a remedy, the directors have proposed to build a 1250 TCD Factory (Expendable to 2500 TCD) in Kapkormom Sublocation, Koitaburot Location in Soin/Sigowet Sub County, Kericho County. The proponents have extensively and diligently analyzed the present and future scenario of sugar industries. They have carefully reviewed surplus cane availability in the target project area, as well as future potential of irrigation and additional cane availability.

The Out growers targeted by the proposed sugar factory will be expected to fall mainly within 30-50 km radius of the factory area and will cover mainly Sigowet/Soin Constituency and parts of Ainamoi, Belgut, Kipkelion West and Nyando constituencies.

The current policies in Kenya's Sugar Industry are supportive to such projects. The sugar market in Kenya is growing each year with demand growing faster than production.

The promoters' cognizance of the support it receives from the community in their current businesses makes this project valuable in the sense that it will contribute to socio-economic development of the region. The design of this project responds positively to the aspiration of the sugar sub sector and environmental health. Overall, the entire integrated project is proposed to be set up based on a clear business agenda whose primary interest will be to improve shareholder value. This will be done by ensuring that each component of this project will justify its costs and can stand independently, ensuring that the integration effort or synergy will enhance individual commercial viabilities of these stand-alone projects.

2.4 Project Description

The company's operations will include the following: -

i) Production of sugar cane in its nucleus estate and out-growers' fields;

ii) Processing white sugar from harvested sugar cane at the proposed West Valley Sugar Factory at Kapkormom in Koitaburot Location;

iii) Generating 6MW captive power

2.4.1 Nature of the Project

The proposed project will involve a new vacuum pan plant consisting of a 1250 TCD (Expendable to 2500 TCD). The project also considers to have a cogeneration power plant of 6 MW.

2.4.2 Project Components

i) Land Acquisition

The Director of West valley Sugar Company Mr. Benard Soi is the owner of the plot No. Kericho /Kapkormom/462 (See title deed attached). The factory is proposed on land registered on Registry Map Sheet No. 3 & 4 measuring 11.2 ha. However, the proponent has enough land and has in total acquired land area of 50 acres and another 100-acre adjacent to the site is still available for future expansion. Additional land parcels will be acquired at appropriate time for further expansion and for nucleus estates.

ii) Buildings

The factory will be constructed using locally available materials including blocks, cement, ballast and timber, all obtained from nearby suppliers or from Kericho Town. According to the preliminary design provided by the supplier in India, the buildings to be constructed will mainly consist of the factory structures and the following: -

a. Workshops,
b. Administrative offices,
c. Weighbridge house,
d. Cane yard,
e. Mill House,
f. Bagasse Handling area for Boiler
g. Boiler
h. Power house,
i. Control Panel Room
j. Chemist office and Laboratory
k. Sugar house,

l. Effluent treatment plant,
m. Agriculture offices
n. Staff Houses, and
o. Stores.

The factory buildings will be constructed in accordance with the machinery supplier's specifications and the architectural plans layout will be contracted locally by the proponent. All the constructions will be done under the guidance of the Project Engineer.

iii) Utilities and consumables

Electricity and water are crucial for the operation of this plant. Water will be easily available from the nearby Kipkwes River bordering the lower area of the land nearly 300m away from where the factory is to be sited. The river has enough flow to serve the factory all year round but the proponent has proposed to abstract a volume of $30M^3$. Additionally, a bore hole within the project area will be sunk, either to supplement supply or for emergency purposes.

The factory will be connected to the KPLC National grid to ensure that during construction, power will be available on site. A three-phase power line is connected to the site. During operation, the factory will supplement this by producing 6MW at the Co-gen plant using bagasse.

iv)Sugar Plant

The proposed sugar plant of 1250 TCD will require about 240,000 of sugarcane for 190 days in the first year crushing season, 256,000 tonnes for the next two years and then thereafter 288,000 tonnes, excluding sugarcane required for seeding purposes. There is more than required cane in the catchment area. The climatic conditions are quite favorable for sugarcane cultivation. What the factory will do is reorganizing cropping and matching maturity seasons with daily crushing capacity of the factory. Thus, by implementing this strategy it is envisaged that the mill will receive optimal cane supply by year two of its operation.

v) Cogen Power Plant

In the steam / power cycle design, the total bagasse available from the sugar mill, from cane crushing of 288,000 MT, as fuel, will be 86,400 MT. Out of this, 63,250 MT (12.5 TPH x 22 x 256) will be utilized by the Cogen plant boiler during season, leaving saved bagasse of about 23,150 for the off-season operation of 30 days. The plant is expected to produce 6MW.

Field staff working closely with the procurement manager will monitor very closely bagasse availability for the planned operation and should there be some projected shortfalls, procurement of biomass from registered farmers in the form of maize cobs, bean waste and any other biomass approved by the company.

The detailed biomass assessment survey will be conducted during the farmers registration drive and recorded. Farmers in the target area grow maize and beans while most factories in the locality still have surplus bagasse. Availability of biomass for off season operation is considered secure.

The land available within the factory will also be utilized to plant trees and crops that can provide this biomass wasteland in the command area, and this will also be evaluated and utilized for long-term fuel linkage for the proposed co-gen power plant.

vi) Effluent Treatment Plant

- ***From the Sugar Plant***

The sugar plant effluents will be treated in a separate Effluent Treatment Plant with final Reverse Osmosis. The discharges will be maintained as per the latest norms of NEMA as spelt out in Water Quality Regulations 2006 (Legal Notice No. 121). The liquid effluents from the sugar process will be mainly waste water from various process equipment in the milling and boiling house sections and the treated water will be used for gardening purposes. The air emissions in the sugar bagging sections will be limited to the acceptable limits due to deployment of dust catchers.

- ***From the Cogen Power Plant***

The Cogen power plant effluents will also be treated in a separate effluent treatment plant and the discharges will be maintained as per the latest norms of NEMA. The liquid effluents generated from the Cogen power plant will be mainly from boiler blow down, cooling tower and water treatment plant blow downs, wash water and other sewage effluents.

- ***Water treatment plant for the boilers***

Reverse Osmosis (R.O) plant of suitable capacity shall be installed to treat the raw water before feeding it in the boiler. Effluent treated water will be used for gardening purposes. The air emissions will be maintained well within the norms due to deployment of the latest design

electrostatic precipitator and the ash generated will be either sold to brick manufacturer or used in the composting process as a filler material.

2.5 Project Cost

The minimum capital cost estimate for setting up the factory premises is approximately **KSh. 800,000,000**

The Final BoQ will be approved after the machine supplier is identified and every cost of machines included).

CHAPTER 3
BASELINE ENVIRONMENTAL CONDITIONS

3.1 Background Information

This Chapter introduces Kericho County, its location in the County, its total area, the main physical features and its administrative units. The chapter also highlights the county's socio-economic characteristics in addition to its profile. The information here provides a general overview of Soin/Sigowet Sub- County.

The project is located on Plot Kericho/Poiywek/462 at Kapkormom Sublocation, Koitaburot Location in Soin/Sigowet Sub County, Kericho County. The GPS Coordinates for the site are **Latitude: 0º 14'35.25''S, Longitude: 35º15' 0.0" E**

The environmental resources examined in baseline analysis include:

(a) Physical resources (climate, soils geology, ground water and surface water)

(b) Ecological resources (aquatic biology e.g. fisheries, wildlife, forests and endangered vegetation species, protected coastal resources.

(c) Economic development (infrastructural facilities such as water supply, sewerage, flood control, roads, land use, power sources, agricultural development, mining and tourism).

(d) Social and cultural resources (e.g. population numbers, locations, composition, employment, health facilities, socio-economic conditions e.g. social well-being, physical or cultural heritage, current use of lands and resources for traditional purposes by indigenous people, sites that are for historical, archaeological, paleontological of architectural significance**.**

3.2 Physical Resources

3.2.1Topography and Soils

The county is generally hilly and well drained. The factory catchment is found in a region where volcanic eruptions had occurred hence origin of volcanic soil types. The county's geology is characterized by volcanic as well as the igneous and metamorphic complexes. The County is predominantly underlain by tertiary (phonolites) and intermediate igneous rocks. A small part of the district is dominated by undifferentiated basement system rocks (granites), volcanic ash admixture and other pyroclastic rocks. The rock formation in the district has fostered exploitation of ballast, building stones and sand and thus making the district self-

reliant in these building rocks. Vegetation cover helps to reduce soil erosion despite the gentle rolling topography of the district.

The soils can be classified as latosols i.e dark red clay loam. These soils are rich in plant nutrients and can accommodate productively varied kind of Agricultural crops due to being rich in availability of nutrients and good water holding capacities.

Figure 3.2.1: View of the topography at project site

3.2.2 Agro ecological zones

Kericho is in Zone-III. This zone occurs mainly at elevations between 900-1800 m with an annual rainfall between 950 and 1500 mm. This zone is the most significant for agricultural cultivation and several legume fodders are found here in crop-livestock systems. It is also the most resettled area because of its favourable conditions.

3.2.3 Climate

The county experiences highland sub-tropical climate with moderate temperatures, low evaporation rates and high rainfall in lower areas, and high temperatures, high evaporation and low rainfall in the upper highland areas. The county further receives conventional type of rainfall influenced by altitude and by the movement of the inter-tropical convergence zone (ITCZ). Due to the convectional origins of rainfall, there is high seasonal variability exhibiting high intra and inter-seasonal variation. Rainfall is well distributed except during the short dry

season in January and February. The wettest months are April and June, though there is no real break between the short and long rains in the whole county. The total annual rainfall ranges from 1,700mm to 2020mm per annum.

3.2.3.1 Temperature:

Temperatures range from about 16ºC to about 20ºC. The coldest month is usually July with an average of 16.6ºC, while the hottest season starts from around December to February with temperatures ranging from about 16.8ºC to 18.6ºC. Temperature variation in the County is caused by varying altitude levels and the rate of removal of cover. Kericho's warm climate makes it an ideal location for agriculture and in particular, the large scale cultivation of tea and in the warmer areas of Soin suitable for cane and maize growing.

3.2.4 Hydrology

The Proposed site is located near River Kipkwes which flows to the East of the proposed site. Topographically, Kericho is characterized by an undulating landscape. The north and central part of the district is well watered with major rivers such as Youth, Kiptaret, Tumbilil, Mara, Nyando, Kipchorian and Maraget. The rivers are characterized by falls and rapids which have made electricity generation possible. Indeed, most tea factories especially multinational companies and KTDA factories install and generate their own electricity.

Figure 3.2.4: View of River Kipkwes which passess near the proposed project site

3.3. Ecological resources

3.3.1 Flora

The natural vegetation in the project area have substantially been disturbed by human activity. Natural vegetation is only found in the protected areas in the Mau complex to the east. Most of the land in the project area is used for human habitation, farming especially sugar cane, tea cultivation, dairy farming, urban development, floriculture and other land uses. The area here does not have wildlife because it is densely populated with people practicing intensive agriculture.

Figure 3.3.1: Vegetation currently found at the proposed site

3.4 Social and cultural resources

3.4.1 Population characteristics

Kericho county's population was 901,777 in 2019 as per the national Population and Housing Census. The inter-censal growth rate between 2009 and 2019 was 2.5 per cent per annum. The population consists of 450,741 males and 451,008 females. There are 206,036 households with an average of 4.4 person per household and a population density of 370 people per kilometer. The male to female ratio is 1:1.01.

A number of ethnic groups have settled in Kericho. None of them are considered as vulnerable ethnic minorities. The main ethnic groups in the project area are the Kipsigis people who originally inhabited the greater Kericho and the south rift generally. Cultivation practices have

generally shaped the settlement profile. In most of the areas, small-scale subsistence farming is the predominant activity and the inhabitants tend to be located on their properties.

3.4.2 Economic profile

Poverty in Kenya remains a challenge requiring urgent attention. The bigger challenge is unemployment for the youth who some have graduated from universities but have no meaningful engagement. This has resulted in inadequacy of income and deprivation of basic needs and rights, and access to productive assets as well as to social infrastructure and markets.

Kericho county has a low economic base despite the presence of tea industry. The local populace depend on subsistence farming. Unemployment rate is high, many youth are therefore involved in petty trade, other do causal work plucking tea, while a few who can afford do transport business otherwise commonly known as '*boda boda'.* A bigger group will be found idle around the market centres.

The economic, social and political status of women in the entire Project affected area is relatively weak. Apart from land ownership, most women are vulnerable in many ways. Many get into early marriages after which their roles are largely confined to household management and agricultural production especially tea plucking. They are generally economically dependent upon men who tend to make the decision at the family level.

The quality of housing in the project affected area consists of a mix of permanent, semi-permanent houses and grass thatched houses.

3.4.3 Physical infrastructure

Roads

The factory will be sited in a country side setting within a rural population. Apart from the main road connection Kisumu and Kericho, the area is accessed through a tarmarc road all through using Kericho-Muhoroni road at Thesalia. The other roads in the area are mainly murrum roads. However, they are well maintained. It would therefore make the movement of sugarcane from the farms to the factory quite easy. It is anticipated that these feeder roads will be well maintained especially after the wet seasons.

Sewer line

In view of the rural setting, the area has no sewer lines. Most homes in the area use pit-latrines. We do not anticipate the development of a sewer system to cover the area in the near future. Other homes use septic tanks which are often exhausted. For now, it is sufficient. However, for

the factory development, we shall recommend the use of bio-digester to treat human waste. Other effluent will utilize efficient ETPs with final Reverse Osmosis to be constructed. The proponent has set aside adequate land for this purpose.

Figure 3.4.3: The technical team and stakeholders conducting assessment at the proposed site led by the Lead consultant in the project

Water supply

The project area has easy access to river and springs as water sources. During construction, the proponent may need to use water tanks to store water. Water sources are reliable and the proponent will utilize water from the nearby river Kipkwes located approximately 300 metres from the proposed site.

Neighbouring development

The proposed site is situated in a rural set-up. There are no major factories in the area. There are no 'commercial activities' in the sense of factories. The main economic activity is growing of maize and sugarcane farming. The proponent has also practiced dairy farming in the same parcel of land next to the proposed site.

CHAPTER FOUR

POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

4.1 Overview

There is a growing concern in Kenya and at global level that many forms of development activities cause damage to the environment. Development activities have the potential to damage the natural resources upon which the economies are based. A major national challenge today is how to maintain sustainable development without damaging the environment. The Environmental Impact Assessment is a useful tool for protection of the environment from the negative effects of developmental activities.

It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound. It is a condition of the Kenya Government to conduct Environmental Impact Assessment on the development Projects. According to Sections 58 and 138 of the Environmental Management and Coordination Act (EMCA) No. 8 of 1999 and Section 3 of the Environmental (Impact Assessment and Audit) Regulations 2003 (Legal No. 101), new projects require an Environmental Impact Assessment Study Report prepared and submitted to the National Environment Management Authority (NEMA) for review and eventual Licensing before the development commences. This was necessary as many forms of developmental activities cause damage to the environment and hence the greatest challenge today is to maintain sustainable development without interfering with the environment.

4.2 Policy Framework

4.2.1 Environmental policy framework

Environmental Impact Assessment (EIA) is a methodology used to identify the actual and probable impacts of the projects and programmes on the environment and to recommend alternatives and mitigating measures. The assessment is required at all stages of project development with a view to ensuring environmentally sustainable development for both existing and proposed public and private sector development ventures. The National EIA regulations were issued in accordance with the provisions of Environmental Management and Coordination Act (EMCA) of 1999. The EIA Regulations must be administered, taking into cognizance provisions of EMCA 1999 and other relevant national laws. The intention is to approve and license only those projects that take into consideration all aspects of concern to the public as they impact on health and the quality of the environment.

4.2.2 Kenya's Vision 2030

Kenya Vision 2030 is the country's new development blueprint covering the period 2008-2030. It aims to transform Kenya into a newly industrializing, ''middle income country providing a high-quality life to all its citizens by the year 2030''. The vision was developed through an all-inclusive and participatory stakeholder consultative process, involving Kenyans from all parts of the country The Vision 2030 is based on 3 key pillars; Economic Pillar, Social Pillar, and Political Pillar. The economic, social and political pillars of Kenya Vision 2030 are anchored on the following foundations: macroeconomic stability; continuity in governance reforms; enhanced equity and wealth creation opportunities for the poor; infrastructure; energy; science, technology and innovation (STI); land reform; human resources development; security and public sector reforms

The 2030 goal for equity and poverty elimination is to reduce the number of people living in absolute poverty to the tiniest proportion of the total population. The initiative aims to expand access across different social and political dimensions, including: widening coverage of "essential health care"; equitable distribution of water, sewerage and sanitation services; improvements in public transport; and attaining gender parity and fairness in the delivery of justice. Reducing social inequalities, in short, cuts across all the economic and social initiatives proposed by Vision 2030.

4.2.3 The National Land Policy

The National Land Policy adopted by the cabinet as Sessional Paper No. 3 of 2009, acknowledges environmental problems faced by Kenya. These include degradation of natural resources such as forests, wildlife, water, marine and coastal resources as well as soil erosion and the pollution of air, water and land. In its section 129 the policy provides for ecosystem protection, urban environment management, environmental assessment and audits to be undertaken to conserve and manage the environment.

4.3 Institutional framework

At present there are over twenty (20) institutions and departments which deal with environmental issues in Kenya. Some of the key institutions include the National Environmental Council (NEC), National Environmental Management Authority (NEMA), the Forestry Department, Kenya Wildlife Services (KWS) and others. There are also local and international NGOs involved in environmental issues in the country.

4.3.1 National Environmental Management Authority (NEMA)

The object and purpose for which NEMA is established is to exercise general supervision and co-ordinate over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment.

4.3.2 National Environmental Tribunal

The National Environment Tribunal (NET) is created under Section 125 of the Environmental Management and Coordination Act (EMCA) of 1999. Its functions are:

- To hear and determine appeals from NEMA's decisions and other actions relating to issuance, revocation or denial of Environmental Impact Assessment (EIA) licences or amount of money to be paid under the Act and imposition of restoration orders;
- To give direction to NEMA on any matter of complex nature referred to it by the Director General.

4.3.3 National Environmental Tribunal

This is established as a superior court to hear and determine disputes relating to the environment and the use and occupation of, and title to, land, and to make provision for its jurisdiction functions and powers, and for connected purposes. Section 13 (2) (b) of the Land and environment Court Act outlines that in exercise of its jurisdiction under Article 162 (2) (b) of the Constitution, the Court shall have power to hear and determine disputes relating to environment and land.

4.3.4 Ministry of Agriculture, Livestock and Fisheries

The overall function of the ministry is to enhance production of crops, livestock and fisheries, marketing and processing. The Ministry has also the mandate to provide development and extension services to smallholder farmers through its extension department. The functions of the ministry are as follows:

- Formulate, implement and monitor legislations, regulations and policies;
- Provide extension services;
- Support research and promote technology delivery;
- Facilitate and represent agricultural state corporations in the government;
- Develop, implement and coordinate programmes in the agricultural sector;

- Regulation and quality control of inputs, produce and products from the agricultural sector;
- Management and control of pests and diseases;
- Promote management and conservation of the natural resource base for agriculture; and
- Collect, maintain and manage information on the agricultural sector

4.3.5 Kenya Sugar Board

The KSB acts as a technical unit to advise the Ministry in promoting all aspects of producing, processing and marketing of sugar cane, sugar and molasses. The KSB also advises on pricing and necessary legislation for the industry. Kenya Sugar Board (KSB) is a public body set up by the Sugar Act of 2001 under the Ministry of Agriculture. The Board succeeded the Kenya Sugar Authority, now defunct, and is mandated to:

- regulate, develop and promote the sugar industry
- co-ordinate the activities of individuals and organizations within the industry
- facilitate equitable access to the benefits and resources of the industry by all interested parties

4.4 Environmental legal framework

Environmental Management and Co-ordination Act No. 8 of 1999, provide a legal and institutional framework for the management of the environmental related matters. It is the framework law on environment, which was enacted on the 14th of January 1999 and commenced in January 2002. Topmost in the administration of EMCA is National Environment Council (NEC), which formulates policies, set goals, and promotes environmental protection programmes. The implementing organ is National Environment Management Authority (NEMA). EMCA comprises of the parts covering all aspects of the environment.

Part VIII, section 72 of the Act prohibits discharging or applying poisonous, toxic, noxious or obstructing matter, radioactive or any other pollutants into aquatic environment. Section 73 requires that operators of projects which discharge effluent or other pollutants submit to NEMA accurate information about the quantities and quality of the effluent. Section 74 demands that all effluent generated from point sources are discharged only into the existing sewages system upon issuance of prescribed permit from the Local Authorities.

4.4.1 Environmental Management and Coordination Act (EMCA), 1999

Environmental Management and Co-ordination Act No. 8 of 1999, provides a legal and institutional framework for the management of the environmental related matters. It is the framework law on environment, which was enacted on the 14th of January 1999 and commenced in January 2002. Top most in the administration of EMCA is National Environment Council (NEC), which formulates policies, set goals, and promotes environmental protection programmes.

The implementing organ is National Environment Management Authority (NEMA). EMCA comprises of the parts covering all aspects of the environment. The Second Schedule of the Act specifies the projects for which an EIA and environmental audit must be carried out. According to the Act, Section 68, all projects listed in the Second Schedule of the Act must undertake an Environmental Impact Assessment, keep accurate records and make annual reports to NEMA or as NEMA may, in writing, require.

The main objectives of the Act are to:

- Provide guidelines for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya;
- Provide a framework legislation for over 70 statutes in Kenya that contain environmental provisions;
- Provide guidelines for environmental impact assessment, environmental audit and monitoring, environmental quality standards and environmental protection orders.

4.4.1.1 The Environmental (Impact Assessment and Audit) Regulations, 2003

The Environmental (Impact Assessment and Audit) Regulations, 2003, provide the basis for procedures for carrying out Environmental Impact Assessments (EIAs) and Environmental Audits (EAs). It states in Regulation 3 that "the Regulations shall apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Act". Regulation 4(1) further states that: ''No proponent shall implement a project:

a) Likely to have a negative environmental impact; or

b) 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''

Relevance

- *The Proponent has commissioned the Environmental Impact Assessment for submission to NEMA for approval.*
- *The Proponent undertakes to protect the environment during the implementation (Construction and Operation) of the project and also carry out annual Environmental Audits.*

4.4.1.2 Waste Management Regulations, 2006

Part II of the Waste Management Regulations 4 (1) states that no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated receptacle. Regulation 4 (2) further states that a waste generator shall collect, segregate and dispose such waste in the manner provided for under the regulations.

Relevance

- *The proponent will undertake to ensure that all waste generated is collected and handled appropriately and disposed off at a designated waste disposal site*.

4.4.1.3 Noise and Excessive Vibrations

Part II of the Noise and Excessive Vibrations regulations, regulation 3 (1) states that Except as otherwise provided in these Regulations, no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

Regulation 4 of the Noise and Excessive vibrations: - states that except as otherwise provided in the Regulations, no person shall-

a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or

b) cause to be made excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source; Regulation 11 on

Machinery: - states that any person wishing to operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device; or

c) engage in any commercial or industrial activity, which is likely to emit noise or excessive vibrations.

Proponents shall carry out the activity or activities within the relevant levels prescribed in the First Schedule to the Regulations as shown in the ***Table 5*** *below*:

Table 2: Sound levels

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

Relevance

- *The project contractor shall undertake to ensure that all noise and vibration will be kept below the maximum allowable threshold.*

4.4.1.4 Water Quality Regulations, 2006

Part II of the Water Quality Regulations 4 (1) states that every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act. Regulation 4 (2) further states no person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution. Regulation 6 (b) further states that no person shall abstract ground water or carry out any activity near any lakes, rivers, streams, springs and wells that is likely

to have any adverse impact on the quantity and quality of the water, without an Environmental Impact Assessment license issued in accordance with the provisions of the Act; or (c) cultivate or undertake any development activity within a minimum of six meters and a maximum of thirty meters from the highest ever recorded flood level, on either side of a river or stream, and as may be determined by the Authority from time to time.

Relevance

- *The Proponent undertakes to safeguard the underground water sources ensuring that no solid waste or waste water effluent emanating from the proposed project is discharged haphazardly. The design will incorporate an efficient Effluent treatment plant for handling effluent.*

4.4.2 The Occupational Safety and Health Act, 2007

This is an Act of Parliament to make provision for health, safety and welfare of persons employed in factories and other places, and for matters incidental thereto and connected therewith.

Building Operations and Works of Engineering Constructions

The provisions of the Factories and Other Places of Work Act relevant to engineering construction works are contained in the Abstract of the Act for Building Operations, and Works of Engineering Construction Rules. These are summarized in Table 7 below.

Table 3: Summary of Building Operations, and Works of Engineering Construction Rules

Legal Requirements	**Description**
General Requirements	
Give notice of particular operations or Works	Notice should be sent in writing to the Occupational Health and Safety Officer, not later than seven days after commencement of construction and building works except where the construction works will be complete in less than six weeks or notice had already been given to the Occupational Health and Safety Officer (Section 60 of the Act).
General Register	A general register of every person undertaking building operations or construction works is kept in adherence to the prescribed form L.D.B.C.R.2.

	This register is kept at the site of operations or at the office of the person undertaking the operations or works. The register should contain: • The certificate of registration of the workplace; • Every other certificate issued by the Chief Inspector under this Act; • The prescribed particulars as to the finishing (washing, white washing, colour washing, painting or varnishing) of the facility; • The prescribed particulars as to every accident and case of occupational disease occurring in the workplace of which a notice is required to be sent to a labour officer under the provisions of any law for the time being in force; • All reports and particulars required by any other provision of this Act to be entered in or attached to the general register; • Such other matters as may be prescribed (Section 62 of the Factories and Other Places of Work Act).
Special rules and welfare	Printed copies or prescribed abstracts of the Factories and Other Places of Work Act must be kept posted at the site of operations or works (Section 61 of the Factories and Other Places of Work Act).
Safety Requirements	
Air receivers	These should be of sound construction and be properly maintained. They should be thoroughly examined by a competent person at intervals of 24 months and the reports of such examinations attached to the General Register (Section 39 of the Factories and other Places of Work Act).
Cylinders for compressed, liquefied and dissolved gases	Such cylinders should be of good construction, sound material, and adequate strength and free from patent defect. The cylinders should conform to standards specified under the Standards Act or to a prescribed standard specification, approved in writing, by the Director, Kenya Bureau of Standards. They should be thoroughly examined by a competent person at

	regular intervals and a maintenance register kept (Section 39A of the amendment of the Factories and Other Places of Work Act).
Notification of accidents	The particulars of an accident causing death or disablement of a worker for more than three days from earning full wages at the work place where he was employed must be sent in the prescribed form (L.D.B.C.R) 6) to the Occupational Health and Safety Officer and entered in the General Register. Certain dangerous occurrences must also be reported whether or not they cause disablement (Section 62 of the Factories and Other Places of Work Act).
Health Requirements	
Sanitary accommodation	Sufficient and suitable sanitary conveniences must be available for persons employed. These must be kept clean and well lit (Sections 16 and 18 of the Factories and Other Places of Work Act).
Miscellaneous Requirements	
Prohibition of deduction from wages	The occupier must not make a deduction from wages in respect of anything he has to do or provide in pursuance of the Factories Act or permit any person in his employment to receive payment from other employees for such services (Section 66 of the Factories and Other Places of Work Act).
Duties of persons employed	An employee must not wilfully interfere with or misuse any means, appliance, convenience or other thing provided in pursuance of the Act for securing health, safety or welfare provided for his use under the Act. He must not wilfully and without reasonable cause do anything likely to endanger himself or others (Section 65 of the Factories and Other Places of Work Act).
Inspection	The Occupational Health and Safety Officer has the power to inspect every part of the premises by day or by night. He may require the production of registers, certificates and other papers. May examine any person alone or in the presence of any other person as he thinks fit and may require him to sign a declaration of truth of the matters about which he is examined.

	Every person obstructing an Occupational Health and Safety Officer is liable to a penalty (Section 69 of the Factories and Other Places of Work Act).

Medical Examination Rules

These are described in Legal Notice No. 24 of the Kenya Gazette Supplement No. 22 of April 2005. The Medical Examination Rules apply to all those employees in employment or who have been in employment in every workplace to which the provisions of the Factories and Other Places of Work Act (Cap 514) apply. The Rules describe the following:

- Occupations requiring medical examination;
- Duties of employer and employees with regard to medical examination;
- Reports on examination;
- Certificate of redeployment;
- Certificate of fitness;
- Notification of occupational diseases; and
- Offences and penalties.

4.4.3 Public Health Act (Cap. 242)

Part IX, section 115, of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drainers or refuse pits in such state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into the public street or into the gutter or side channel or watercourse, irrigation channel, or bed not approved for discharge is also deemed as nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.

Relevance

The Proponent undertakes to safeguard the environment ensuring that all solid waste or waste water effluent emanating from the proposed project is discharged appropriately so as not to cause pollution or nuisance or be injurious to the neighbours.

4.4.4 Physical Planning Act (Cap 286)

The Local Authorities are empowered under Section 29 of the Act to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section, therefore allows for the prohibition or control of the use and development of land and buildings in the interest of proper and orderly development of an area.

Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective Local Authority.

Finally, section 36 states that if connection with a development application, Local Authority is of the opinion that the proposed development activity will have injurious impact on the environment, the application shall be required to submit together with the application an environment impact assessment EIA report. EMCA, 1999 echoes the same by requiring that such an EIA is approved by the NEMA and should be followed by annual environmental audits. Land Planning Act (Cap. 303)

Section 9 of the subsidiary legislation (The Development and Use of Land Regulations, 1961) under this Act requires that before the Local authorities submit any plans to then Minister for approval, steps should be taken as may be necessary to acquire the owners of any land affected by such plans. Particulars of comments and objections made by the landowners should be submitted. This is intended to reduce conflict of interest, such as, settlement and other social and economic activities.

Relevance

- *The Proponent shall apply for any other required approvals of the project development and licenses from all relevant Local Authority Offices prior to commencement of construction works.*

Licenses and permits

Ideally, the Proponent should demonstrate compliance to the legislation through acquiring of the appropriate licenses and permits. Further all contractors and consultants who will be engaged during the planning and design, construction, operation and maintenance and decommissioning should demonstrate compliance with the necessary pieces of legislation.

Those who will be involved should therefore provide the Proponent with all legal documents that shows that they are legally in the business or services that they intend to deliver to the Proponent. These includes: NEMA licenses, trade licenses, etc.

Relevance

- *The Proponent shall apply for any other required approvals of the project development and licenses from all relevant Local Authority Offices.*

4.4.5 Employment Act No 11 of 2007

The Act is enacted to consolidate the law relating to trade unions and trade disputes, to provide for the registration, regulation, management and democratization of trade unions and employers organizations and federations. Its purpose is to promote sound labour relations through freedom of association, the encouragement of effective collective bargaining and promotion of orderly and expeditious dispute the protection and promotion of settlement conducive to social justice and economic development for connected purposes. This Act is important since it provides for employer – employee relationship that is important for the activities that would promote management of the environment within the housing sector.

Relevance: The developer, the contractor and the employees' relationship during the construction and later phases of this project shall be guided by this Act.

4.4.6 Penal Code Cap 63

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

4.4.7 The Factory and Other Places of Work Act Cap 514 of 2005

This act governs noise prevention and control and in section 4 (1) it sets limits of how much noise a worker may be exposed to (a) as the continuous equivalent of ninety dB (A) in eight hours within any twenty-four hours duration; and (b) one hundred and forty dB (A) peak sound level at any given time. Section (3) adds that where noise is intermittent, noise exposure shall not exceed the sum of the partial noise exposure equivalent continuous sound level of ninety dB (A) in eight-hour duration within any twenty-four hours duration. It also places the duty of

ensuring an effective noise control and hearing conservation programme on occupiers in section 5, which the act states in subsection 5 (2) to include: a) Noise measurement;

b) Education and training;
c) Engineering noise control;
d) Hearing protection.
e) Posting of notices in noisy areas;
f) Hearing tests; and
g) Annual programme review.

The act places responsibility of recording noise levels at workplaces and reporting to the Director of Occupational Safety and Health on occupiers and in Section 10 (1) it states that machinery or plant in the workplace should be installed in such a way that the lowest possible noise is emitted when the machine is in operation. In section 12 it states that where measures to segregate noisy areas (beyond 90 dB(A)) are not feasible then occupiers should provide workers with adequate PPEs.

Relevance: The contractor through the proponent shall not conduct construction activities at night and shall provide PPES to workers at all time. Similarly during operation phase, all workers in noisy areas shall be provided with ear muffs.

4.4.8 The National Construction Authority Act, 2011

This act establishes the national construction authority, a state corporation under the Public Works Ministry. The authority is mandated to regulate and aid development of the construction industry through registration and accreditation of contractors, skilled construction workers and construction site supervisors and regulate their activities. It is also mandated to monitor the construction process as detailed in the Physical Planning Act.

Relevance: The proponent shall ensure that any hired contractors are registered by this authority and that the project is registered with NCA and including the number in the construction board.

4.4.9 County Governments Act, 2012

This Act vests responsibility upon the County Governments in planning of development projects within their areas of jurisdiction be it projects of importance to the local County government or those of national importance. Section 102 of the Act provides the principles of

planning and development facilitation which include integration of national values in county planning, protect the right to self-fulfillment within the county communities and with responsibility to future generations, protection of rights of minorities and marginalized groups and communities, promotion of equity resource allocation, among others. Section 103 of the Act outlines the prime objective of county planning which aligned to the bill of rights and the constitution of Kenya.

Section 114 and 115 indicate and give guidelines in planning of projects of national significance and instill the aspect of public participation in every aspect of the planning process through that: clear strategic environmental assessments; clear environmental impact assessment reports; expected development outcomes; and development options and their cost implications. Each county assembly is tasked with the role to develop laws and regulations giving effect to the requirement for effective citizen participation in development planning and performance management within the county.

Relevance: The project proponent has initiated the process of County Government engagement in the initial project planning through writing to the County government about the proposed project and received a letter of No objection from the County Government of Kericho. In addition, he is expected to make application of essential development approvals from the County Government of Kericho.

4.4.10 Food Substances and Chemicals Act (Cap 254)

Among other provisions, the "Food Hygiene, Drugs Substances and other Chemicals Act", (Cap 254) provides for hygiene, safety and licensing of food and food-staff‟ handlers. The handlers should also be medically assessed by a qualified and authorized medical officer to diagnose existence of transmittable diseases in order to prevent consequent infection to persons or food consumers. *Since handling of the sugar processing, raw materials and ingredients etc. could pose a risk of contamination as described above, the proponent shall ensure all food handlers are subjected to medical examination.*

4.4.11 Standards Act, (Cap 496) Laws of Kenya

This is the principle law; that ensures that products, services and policies offered within the country by any person are safe, genuine, standard and certified. In Kenya, these are the principle laws that regulates on importation, export, trade and locally manufactured or processed products.

All materials to be used shall be approved by KEBS. During operation, the proponent will ensure to comply including acquiring all trademarks and comply with V.A.T.

4.4.12 The Sugar Act, (No. 10 of 2001)

An Act of Parliament that provides for the development, regulation and promotion of the sugar industry. These laws guide and regulates the registration, trade and conduct in the sugar sector. It regulates how the miller deals with the out growers, cane pricing, puts control measures etc.

Kenya Sugar Board (KSB) is a public body set up by the Sugar Act of 2001 under the Ministry of Agriculture. The KSB acts as a technical unit to advise the Ministry in promoting all aspects of producing, processing and marketing of sugar cane, sugar and molasses. The KSB also advises on pricing and necessary legislation for the industry. The Board succeeded the Kenya Sugar Authority, now defunct, and is mandated to:

- Regulate, develop and promote the sugar industry
- Co-ordinate the activities of individuals and organizations within the industry
- Facilitate equitable access to the benefits and resources of the industry by all interested parties

A sugar development levy of 7% of the market price is charged by the Kenya Government on all sugar sales. This levy is collected by the Kenya Revenue Authority and is managed by KSB. The levy comprises the following:

- ♣ Cane Development 2%
- ♣ Infrastructure 1%
- ♣ Factory Rehabilitation 3%
- ♣ Grants to Research 0.5%
- ♣ KSB Administration 0.5%

The setting up of a single regulatory body, the Kenya Sugar Board (KSB) ensures that investors get a single source of investment advice on the sector. The sugar companies operate under the umbrella of the Kenya Sugar Board, which is a public body charged with the responsibility of promoting and fostering the effective and efficient development of 44 sugar cane for production of white sugar. KSB is also charged with the mandate of regulating the sector and ensuring the country is self-sufficient in white sugar production.

Relevance

The proponent shall comply by applying and acquiring license from the Kenya sugar board before establishing the factory.

4.4.13 *The Wildlife Conservation and Management Act, 2013*

This Act became operational on 10 January 2014. One of its 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 land-use, better access to benefits from wildlife conservation, and adherence to the principles of sustainable utilization. Section 25 of the act provides for compensation for injuries and damages caused by wildlife (species listed in its third schedule) to humans and their properties respectively. Such compensation claims are to be reviewed and awarded by County Wildlife Conservation and Compensation Committees at the ruling market rates: provided that no compensation shall be paid where the owner of the livestock, crops or other property failed to take reasonable measures to protect the properties from damage by wildlife or land use practices are incompatible with the ecosystem-based management plan for the area. 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. Relevance: 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.

4.4.13 *Agriculture, Fisheries and Food Authority Act, No. 13 of 2013*

This is an Act of Parliament to repeal the agriculture Act, Cap 318 to align with the new constitution. The Act abolishes some of the institutions created under the repealed agriculture act like KEPHIS and PCPB. It has replaced them with Agriculture, Fisheries and Food Authority. The Authority shall, in consultation with the county governments, perform the following functions:

- Administer the Crops Act, and the Fisheries Act in accordance with the provisions of these Acts;

- Promote best practices in, and regulate, the production, processing, marketing, grading, storage, collection, transportation and warehousing of agricultural and aquatic products excluding livestock products as may be provided for under the Crops Act, and the Fisheries Act.

- Collect and collate data, maintain a database on agricultural and aquatic products excluding livestock products, documents and monitor agriculture through registration of players as provided for in the Crops Act and the Fisheries Act;

- Be responsible for determining the research priorities in agriculture and aquaculture and to advise generally on research thereof;

- Advise the national government and the county governments on agricultural and aquatic levies for purposes of planning, enhancing harmony and equity in the sector; and

- Carry out such other functions as may be assigned to it by this Act, the Crops Act, the Fisheries Act and any written law while respecting the roles of the two levels of governments.

Relevance: *This piece of legislation is practical in this project since it will be subject to management and operational decisions made by the ministry of Agriculture, Livestock and Fisheries and the newly established Agriculture, Fisheries and Food Authority.*

4.4.14 *Sexual Offences Act (No. 3 of 2006)*

The Sexual Offences Act, No.3 2006 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.

The proponent shall put in place all mechanism to discourage unlawful sexual acts in the entire project life, these includes massive awareness.

4.4.15 *Workmen Injury & Benefits Act (WIBA-2007)*

In Kenya, this is the principal law that regulates on benefits and compensation for workers in situations where personal injury happens in a work environment. *The contractor and the proponent shall ensure to provide PPEs to workers to protect them from injuries and develop a compensation structure for workers who will get injured while at work.*

4.5 International Conventions

4.5.1 The 1985 Vienna Convention for the Protection of the Ozone Layer

Intergovernmental negotiations for an international agreement to phase out ozone depleting substances concluded in March 1985 with the adoption of the Vienna Convention for the Protection of the Ozone Layer. This Convention encourages intergovernmental cooperation on research, systematic observation of the ozone layer, monitoring of CFC production, and the exchange of information. The Montreal Protocol on Substances that Deplete the Ozone Layer was adopted in September 1987, and was intended to allow the revision of phase out schedules on the basis of periodic scientific and technological assessments. The Protocol was adjusted to accelerate the phase out schedules. It has since been amended to introduce other kinds of control measures and to add new controlled substances to the list.

4.5.2 The 1987 Montreal Protocol on Substances that Deplete the Ozone Layer

This Protocol was drawn to cut down on the production and consumption of ozone depleting substances in order to reduce their abundance in the atmosphere, and thereby protect the earth's fragile ozone Layer. The Parties to the Montreal Protocol have amended the Protocol to enable, among other things, the control of new chemicals and the creation of incentive measures to enable developing countries to comply. The project envisages use air conditioning equipment. Coolants used should be those of none ozone depleting components as required by NEMA

4.5.2 The 1992 United Nations Framework Convention on Climate Change (UNFCCC)

The primary purpose of the convention is to establish methods to minimize global warming and in particular the emission of the greenhouse gases. The UNFCCC was adopted on 9th May 1992 and came into force on 21st March 1994. The Convention has been ratified by 189 states. Kenya ratified the Convention on 30th August 1994. NEMA is the focal point for the Convention. The fuel used by the power back-up generator should be friendly to the environment and approved by the energy regulatory body, Energy and Petroleum Regulatory Authority (EPRA)

CHAPTER FIVE

PUBLIC PARTICIPATION AND STAKEHOLDERS' CONSULTATION

5.1 Overview.

Public participation and Stakeholders Consultation in ESIA is a systematic way of involving the public and stakeholders in the planning, development and decision-making process. Public participation aims at improving project design, environmental soundness and social acceptability. It provides opportunity for public involvement in scoping, ESIA review and monitoring.

5.2 Categorization of Community Participants and stakeholders

Key informants were consulted where a stakeholders meeting was organized on **21st September 2021** at the proposed project site. The forum served to obtain their views, input and sectoral concerns about the proposed project. Those in attendance and consulted in this exercise included:

i. Local administration (Assistant chief Mr. Benard Kimutai)
ii. Local administration (Chief of Mr. Philip K. Terer)
iii. Area MCA-Mr. Kimutai Rutto
iv. Area Village elders
v. Vulnerable and marginalized group members
vi. County Government of Kericho Represented by Hon. Charles Birech, CEC Dept. of Trade, Industrialization, Cooperative, Tourism and Wildlife (See *letter of No Objection to the project attached).*
vii. NEMA – Kericho Office CDE
viii. Water Resources Authority- CCEO
ix. DOSHs -COSHO
x. Kenya Sugarcane growers Association (KESGA) organizing Secretary
xi. Agricultural officer, Soin Area
xii. Public Health Officer (ACPHO)
xiii. Farmers 'Cooperative Societies
xiv. Lead Sugar Consultant in the project-MK Changwony and Associates

Figure 5.2.1: The lead sugar Consultant addressing the Key Stakeholders during consultation meeting at the proposed project site

Figure 5.2.2: The Area Chief addressing the Key Stakeholders

5.3 Methodology of Public Participation

The members of the public were involved in this ESIA process. Views from the 'would be affected' people were sought from the public through 2 different Public Barazas held on **29th May 2021** and **19th June 2021.** Both Public Participation exercise were chaired by the area chief and the Area MCA on the two respective dates. The data collection was carried out through structured questionnaires where **25 questionnaires** were administered on **29th June** meeting. Out of these, 19 were filled and returned. Another set of 30 questionnaires was administered on **19th June 2021** and all 30 questionnaires filled and returned. (*See attendance list)*

During public and public consultations, all the MOH set guidelines on prevention of spread of COVID-19 were strictly followed.

The exercises were conducted by a registered environmental expert. The objective of the consultation and public participation was to:-

- Disseminate and inform the stakeholders about the project with special reference to its key components and location
- Gather comments, suggestions and concerns of the interested and affected parties
- Propose solutions and mitigation measures to the various concerns
- Incorporate the information collected in the ESIA study

In addition, the Environmental Impact Assessment public consultation exercise enabled: -

a) The establishment of a communication channel between the general public and the Lead Expert, the project proponents and the Government.
b) the concerns of the stakeholders to be known to the decision-making bodies at an early phase of project development

The purpose for such interviews was to identify the positive and negative impacts and subsequently promote and mitigate them respectively. It also helped in identifying any other miscellaneous issues which may bring conflicts in case project implementation proceeds as planned.

The Consultation and Public Participation (CPP) Process is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by EMCA 1999 section 58, on Environmental Impact Assessment for the purpose of achieving the fundamental principles of sustainable development.

5.4 Issues raised by the community during public Participation

(a) Improved infrastructure

It was acknowledged by the local community that the construction of a sugar factory in this neigborhood may improve infrastructure around the project site such as construction and regular maintenance of roads, storm water drainages and power lines among other facilities.

(b) Job opportunities

During the exercise, it was noted that the proposed project is bound to create employment opportunities, especially to casual workers during construction phase. Apart from casual labourers, semi-skilled and skilled labourers are expected to obtain gainful employment during the period of construction and operational phases of the project. Skilled manpower will also be required for operation of sugar factory and Cogen power plant.

(c) Population increase

As a result of the proposed project taking place, population increase will be experienced in the area. This will be as a result of workers directly employed at the factory and persons engaged in other activities related to tea processing.

(d) Air pollution

Air pollution was noted as a possible cause of concern. Potential impacts on the air quality during the construction stage will be due to the fugitive dust and the exhaust gases generated in and around the construction site by use of heavy vehicles and machinery/equipment at the construction site. These emissions can have significant respiratory and cardio-pulmonary effects on the local population and thus adequate mitigation measures should be implemented. During operation phase, it was identified the sugar factory is likely to emit air pollution such as sulfur dioxide, carbon monoxide and nitrogen oxide that can be a nuisance. The expert explained that proper control measures will be put in place to ensure emissions are trapped and no harmful emissions will be allowed to escape.

(e) Noise and Vibration

There was concern over the possibility of high noise and vibration levels in the project site as a result of excavation, construction works. The source of noise pollution will include transport vehicles, construction machinery and metal grinding and cutting equipment. Although the level of discomfort caused by noise is subjective and relies mainly on the distance between the noise

source and recipients, the real impact of noise on the area's residents will depend on the nature of equipment used and the timing of their use. Excavations will cause vibrations; however, the proponent will take appropriate steps to minimize noise impacts including provision of appropriate protective equipment to construction workers, planning and minimizing the frequency materials transport and ensuring that all equipment are well maintained. During operation phase, noise will be mainly from operations and vehicles e.g trucks ferrying sugar cane.

(f)Water Shortage

Although River Kipkwes was identified to be permanent, there was still uncertainty over the prevailing water condition in the area in the site. The proponent was requested to ensure that water storage tanks are put in place as a back-up system in case of water shortage problems or consider drilling a borehole. The expert explained that WRA had indicated that the water is sustainable for downstream users considering that the proponent wants to abstract a maximum of $30M^3$. He added that borehole drilling was already considered as the main alternative by the proponent.

(g) Dust Generation

The participants expressed concern over possibility of generation of large amounts of dust within the project site and surrounding areas as a result of demolition, excavation works and transportation of building materials. The proponent will ensure that dust levels at the site are minimized through sprinkling water in areas being excavated and along the tracks used by the transport trucks within the site. Additional mitigation measures presented in this report will be fully implemented to minimize the impacts of dust generation.

(h)Effluent Discharge

The community expressed their interest in how the effluent generated by the sugar factory will be managed. They recommended that the proponents to consider an efficient effluent treatment method during their planning. The Director of the proposed factory assured them that a modern ETP that will be very effective has been incorporated in the design and that there should be worry about that.

(i)Environmental Aesthetics

It was seen that the aesthetics of the area would be affected negatively during construction. It is proposed that the proponent should ensure high hygiene standards within the premise and surrounding areas during construction possibly by landscaping. More so via the prescribed EMP, the proponent shall put in place several measures aimed at ensuring high standards of hygiene and housekeeping within the building and surrounding areas.

(j) Social and Economic effects

The participants agreed that the project have some levels of impacts including the following but were contented with the proposed mitigation measures suggested:

a) Business competition will intensify;

b) Neighbors will be affected by too much noise and exhaust fumes from the parking lot; The expert read the proposed mitigation measures among them shutting down engines while offloading and restrict hooting. He assured them that if mitigation measures are followed, noise will easily be controlled.

c) Fears of ground water contamination were expressed; It was suggested that the proponent to always ensure that the ETP are functioning. Also, periodic checks by WRUAs on the facility compliance.

d) Human traffic jam will be experienced more especially in the morning and evening for those who will be working in the factory;

e) Cases of HIV and AIDS will increase as a result of influx of people in the project area; The community agreed to withhold good morals as this is a social issue.

Suggestions made by the Participants

- The welfare and comfort of the community and neighbours should be considered seriously by the developer.
- The proponent to have an Efficient Effluent Treatment Plant (ETP) to handle effluent from the factory
- The proponent should consider employing local construction workers.
- The environment and public health should be protected from degradation.

- The proponent should consider supporting the local Schools or health centres when the project is operational.
- The community requested that the proponent should spare some baggase and give to the farmers for use as manure in improving agricultural lands.

5.5: Photos of ongoing Public Participation Exercise

Figure 5.5.1: First public consultation meeting held at the site on 29/05/2021

Figure 5.5.2: The Expert addressing stake holders at a public participation meeting on 29/5/2021 chaired by the area Assistant Chief.

***Figure 5.5.3: Residents actively participating in consultations during the second public participation meeting held on 19/6/2021 chaired by the area* MCA**

5.6 Summary of Sectoral Concerns Raised by Key Stakeholders

The concerns and views of the Key stakeholders raised during the Key stakeholders meeting are summarized below:

Department	Particulars	Designation	Comments/Sectoral Concerns
County Government of Kericho	Eng. Phillip Mason	County Executive Committee Member (CEC) Dept of Trade, Industrialization, Cooperative Management, Tourism & Wildlife	The County Government is in full support of the project and welcomes the project since it's going to positively affect Kericho cane farmers who have been travelling for long distances to market their sugar cane in other counties. Appeal that the proponent ensures to comply with the sugar regulation under the Sugar Board of Kenya.
Water Resources Authority	Lucy Chemisto	CCEO	Pointed out that $30M^3$ that has been proposed for the factory will be granted upon the proponent making application

			and paying the necessary fees. She listed all the requirements that the proponents must comply with prior to abstracting water from River Kipkwes
Ministry of Agriculture	Victor Kiprotich	Agricultural Officer for Soin	He highly welcomed the project and insisted on proper survey for purpose of sugarcane sustainability
Directorate of Occupational Safety and Health	Mwita Christopher	County Occupational Safety and Health Officer	He expressed his full support for the project. Have the departmental statutory requirements and urged the proponents to acquire workplace registration before commencement. Other requirements mentioned includes insurance for the workers, establishment of OSH unit at the factory and annual OSH Audits.
Kenya Sugar Growers Association (KESGA)	Joseah Chepkwony	Organizing Secretary (KESGA)	Expressed his full support for the project and urged for the process to be fast-tracked for the benefit of the area sugarcane farmers
Ministry of Interior and Coordination of National Government	Phillip K. Terer	Area Chief	Registered his happiness to have the first factory of this kind in his backyard. He pointed that the government is soon putting a police post near the project site and assured all for security.
National Environment Management Authority	Mr. Valentine Lala	NEMA CDE Kericho	Advised the Experts on Regulatory Requirements and compliance with NEMA. Emphasized on addressing key impacts for such a facility such as effluent management.
Public Health	Mathew Chepkonga	ACPHO	He emphasized on air quality, solid and effluent management throughout the project cycle. Advised that the final drawings should undergo approval by the

			County Government of Kericho. He supported the project in general pointing that it will expend the areas health and social amenities as well.
Sugarcane Farmers' Cooperative Societies	Stephen Milgo	Member of sugarcane FCS and village elder	He welcomed the project on behalf of FCSs and requested NEMA officers to fast-track the process for the project to kick off.
Lead Sugar Consultant (Consulted by the proponents for the design up to final construction of the factory)	Moses K. Changwony	MK Changwony & Associates	The consultant assured that all the components in the final detailed report will be installed including an effective ETP with final Reverse Osmosis to manage all effluents in acceptable manner.

5.7 Conclusion from Public Participation and Stakeholders Consultation (PPO&SC)

From the various public consultations undertaken by the EIA study team, it is obvious that the project is very welcome in the Koitaburot and in Kericho County. The local community pointed how they will stand to gain from the project as most of their land is lying idle and it has high potential for cane production. Those with sugarcane have been suffering great loss due to long distance travelled from Kipsitet Weighbridge all the way to Western Kenya factories. The community unanimously welcomes and supports the project without any single objection. The stakeholders too led by the County Government of Kericho have agreed that the project is important and all key stakeholders have welcomed the proposed project as well.

CHAPTER SIX:
ANALYSIS OF PROJECT ALTERNATIVES

6.1The Proposed Alternatives

Due to the various negative repercussions of sugar processing industries on man and the environment, it is not possible to set up such facilities anywhere. To be economically viable, the preselected sites must combine the following:

i) Abundant resources, available all year long and the possibility of sustainable production;
ii)Existing water supply all year long in acceptable quantity and quality;
iii)Existing transportation facilities or possibilities to create them at a reasonable cost; and
iv)Existing energy supply.

The following checklist was prepared for the site selection process: -

Table 4: Checklist for site selection process

QUESTIONS	**YES**	**NO**
Is the water supply sufficient all year long?	Yes	
Is the water supply of good quality?	Yes	
Are there sufficient raw material resources in this area mainly sugar cane supply?	Yes	
Is a sustainable management of these resources possible?	Yes	
Are there resources sensitive to the proposed site?		No
Are there threatened species in this site?		No
Are there sensitive biotopes like forest,wetland?		No
Is the transport infrastructure sufficiently developed?	Yes	
If no, is there negative impact linked with the transportation framework to be built?		
Is the energy supply assured?	Yes	
If no, will the energy supply have negative impact?		
Will the sugar factory emissions have negative impact on the environment?	Yes	
Are there affected groups?		No
Will the project destroy important man made patrimony?		No

Does the project imply resettlements?		No
If yes, are there sufficient land resources in the area to allow a correct resettlement?		
Are there particular risks attached with this area?	Yes	
Is there positive impact of the project in the area ? (to detail)	Yes	
Other (to be mentioned)?		

6.2 Site alternative

The Site was identified as the most suitable site that the proponent currently has. The criteria kept for candidate sites included:

- Availability of land
- Availability of Sugar Cane
- Proximity and purity of sugar cane
- Ease of conveyance of sugar cane
- Dispatch facilities
- Topography of site
- Availability of power and water supply to be obtained from River Kipkwes
- Maximizing capacity utilization
- Social amenities in existence

The proponent wishes to ensure the maximum use of land in the area for the production of sugar cane. Hitherto, farmers had been concerned about the transport cost of cane all the way to Soin Sugar, before it closed down, and other neighboring factories, and therefore, have either stopped production or reduced it to minimal production on their lands. It is necessary that sufficient land is brought into production of cane in order to supply sufficient cane to the factory. The establishment of a sugar mill in the area will encourage the community to resume production.

The proposed project site is well connected by road, so that the finished products can be easily transported to the market. There is easy access for the farmers to supply their cane as the project site is right in the centre of the cane catchment area. The access roads are well maintained and will be kept in good condition by the proponent with the assistant of the Sugar Development Levy.

6.3 Raw Materials

The major raw materials to be used here are the following: -

i. Sugar cane
ii. Bagasse for power generation
iii. Sulphur

The sugar cane can be easily accessed once it is planted and due to the site's proximity to the local community lands, assisting them in cane production will be very convenient and economical.

6.4 Alternatives to Technology

The sugar factory will connect to Kenya Power for energy apart from using its own by-product bagasse as fuel and production of co-gen power. Alternatives like utilizing diesel for generator or solar power for manufacturing are too expensive. Solar power can be utilized for the housing estate for the provision of hot water and security purposes.

It is also recommended that the factory harvest rain water from the roofs both in the factory and the residential estates for sugar processing and domestic use respectively. Other technologies include Resource Recovery and Waste minimization.

(a) Resource Recovery

The by-products available from sugar mills are **bagasse, furnace ash, molasses and filter mud**. The uses of these byproducts are given below. If all the byproducts are used for transformation into value added products, (resource recovery), it will minimize the pollution to large extent.

Bagasse: These are used for steam, power, sugar production, pulp and paper.
Molasses: These are used for production of ethanol (power alcohol).
Filter mud: For fertilizer.
Boiler ash: For mixing with filter mud.

(b) Waste Minimization

Through waste minimization, it is possible to minimize water consumption by almost 80%. As a result, abstraction from the surface water source (a river) is reduced thus conserving water resource. This also makes it very easy to comply with government standards and

regulations on effluent discharge. With regard to reduced consumption of lead sub-acetate, the benefits from reduced lead pollution are significant

6.5 Treatment Alternatives:

The sugar industries effluent is characterized by oil and grease, BOD, COD, suspended solids and pH requiring treatment. Unlike distilleries, the BOD level is not high. The factory can consider to use the activated sludge process, extended aeration, aerobic lagoon, anaerobic treatment alone e.g. upflow or anaerobic sludge blanket (UASB) or diphasic anaerobic reactor or UASB followed by aerobic lagoon for the treatment of factory effluents.

Though this system is very effective in the treatment of wastewaters, require large tracts of land and release serious odors.

An alternative has been recommended for use by the directors of the proposed West Valley Sugar Factory is to install a modern Effluent Treatment Plant with a final Reverse Osmosis that will produce high quality of treated wastewaters and avoids serious odors. Reverse Osmosis and Microfiltration technologies for treatment of industrial raw water are better, both in terms of quality and quantity of treated water, when compared to the more conventional lagoon technologies.

To avert large quantities of wastewater generated, wastewater can be reused as a reduction measure and can involve the following:

Washing Water: Wash water may contain sugar and therefore requires treatment and should not be recycled. Periodic cleaning results in high BOD and it also contain caustic soda and weak acids.

Testing Water: This water is safe for returning it to the service water tank.

Oil and Grease: Providing suitable oil and grease traps can eliminate this.

Chemical Reuse: The stored and settled supernatant can be reused with a little addition of fresh caustic soda for next cleaning operation. Molasses Handling: It is necessary to store molasses in RCC tanks or steel tanks above ground level. Otherwise, there is a possibility of ground water contamination. The high BOD of molasses may cause pollution problems due to mishandling.

6.6 "No Project" Alternatives

The Government of Kenya's policy is to encourage investment in the industrial sector. In this option, it is required to be considered as to whether it is more advantageous to the Nation not to invest in this project at all. Poverty in the larger Soin/Sigowet sub-County is high, and the way to mitigate it is to invest in industry to provide employment both direct and indirect. Further the area does not have an appreciable cash crop and mainly practices subsistence farming. The community holds large parcels of land but these are mostly used for subsistence farming and the vast majority of fertile lands lies idle, further exacerbating poverty in the region.

An additional rationale would be the diversification strategy in light of the anticipated lifting of the COMESA restriction on sugar imports in December 2011. COMESA countries produce sugar cheaply than local sugar. To this end, the Kenya Sugar Board is pushing two agendas; co-generation and ethanol production of the local sugar firms to curb against effects of the lift of this restriction, which will open up the market to sugar imports.

It is noteworthy that the activity now proposed will support this cause of national productivity, of saving the foreign exchange, of providing employment and in an environmentally friendly manner. It will also produce organic bio-compost fertilizer, which is much in demand in place of chemical fertilizers, the latter of which is currently very expensive and costing the Government of Kenya a lot in terms of subsidy to farmers. This project is also one of the directions to go to ensure Kenya sugar millers are not made irrelevant when the COMESA market is open to importation of cheap sugar from outside the country. The local farmers may be the hardest hit due to the expensive sugar cane farming in the country.

This project, aims at sustainable development. Environmentally, it will lead to zero-discharge of harmful effluents into the environment and sustainably manage the environment utilizing all by products and waste products from sugar milling in a highly productive manner. 'No Project' option is adopted only in an extreme last step of negative listing and is not warranted at all in the present case.

CHAPTER SEVEN
IDENTIFICATION OF POTENTIAL IMPACTS

7.1 Introduction

This Chapter identifies and discusses both positive and negative impacts associated with the construction and operation of the proposed sugar factory. On-site and off-site impacts can occur due to project location, and during construction, operation and decommissioning phases of the proposed Project. Identification and assessment of impacts depend on the nature and magnitude of the activity being undertaken and also on the type of pollution control measures that are envisaged as part of the Project proposal. The impacts are identified according to phases namely: Impacts during construction, operation and decommissioning phases.

7.2 CONSTRUCTION PHASE IMPACTS

(a) POSITIVE IMPACTS DURING CONSTRUCTION PHASE

A number of positive impacts are associated with the proposed Sugar factory during construction phase. These are as discussed below.

7.2.1 Employment opportunities

The proposed Project will directly and indirectly create employment for a big number of workers, especially casual workers within Koitaburot and the larger Soin/Sigowet. However, the exact number cannot be predetermined at this stage. All in all, the services of the following groups of people will be required during the construction phase:

- Contractor;
- Casual labourers;
- Site manager;
- Foremen;
- Masons;
- Carpenters;
- Electricians;
- Plumbers;
- Painters;
- Transporters;

- Security agents; and
- Landscapers.

Though the employment will be temporary, those who will be employed will earn income hence use the money to satisfy some of their needs.

7.2.2 Provision of market for supply of building materials

The Project will require supply of large quantities of building materials most of which will be sourced locally in Kericho and in the surrounding areas. Producers and suppliers of materials such as building stones, timber, electrical cables, paint, sand, and cement will thus get market for their goods. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials. However, the hard rocks that will be excavated from the site during construction will also be reused.

7.2.3 Provision of market for food vendors and owners of nearby business premises

The construction workers will attract food vendors in the area to supply food to the construction workers. The food vendors will therefore increase their sales and income as a result of selling food to the construction workers. In addition, the owners of the nearby business premises are also likely to benefit as a result of the construction workers purchasing some of the items from their shops.

7.2.4 Improvement in local business

There is a likelihood of different types of businesses being set up in Koitaburot area and environs. Such businesses will include housing, transport, hotels, restaurants and shops, among others. In addition, since the area will open up, there is a high possibility of more investments including educational tours to see the factory which eventually could boost the local ecotourism sector in a significant way. The influx of population will require accommodation in the vicinity as well as food stuff therefore creating demand for agricultural produce.

7.2.5 Industrial development in Kericho County

The success of this project will offer other diverse benefits to Kericho County including the upgrading of its industrial sector as an important economic and employment sector in the country. This is also in line with the Vision 2030 economic development agenda of refurbishing and expanding the manufacturing industries in Kenya.

7.2.6 Enhancement conservation

The proponent will ensure spectacular landscaping which will uplift the general aesthetic outlook of the area. The proponent will also support reforestation and agro-forestry in the area.

7.3 NEGATIVE IMPACTS DURING CONSTRUCTION PHASE

The following negative environmental and social impacts are also associated with the construction of the proposed Project.

7.3.1 Local increase of construction traffic

The construction of the proposed Project will make local increase of construction traffic inevitable. This is as a result of the movement of the construction vehicles and machines in and out of the construction site as the construction site is about 9 km to Kericho-Kisumu Road, and 200 meters from Ainamoi-Muhoroni-Thesalia road. However, there is unlikely to be significant increased traffic jam along Ainamoi-Muhoroni-Thesalia Road as a result of the construction vehicles turning to the proposed Project site.

7.3.2 Noise pollution and vibration

Noise pollution and vibration is likely to occur due to site excavation, grading and offloading of construction materials at the proposed site. Noise pollution and vibration is also likely to occur as a result of excavation activities, use of porker vibrator, use of mixers and already constructed commercial and industrial premises, the proposed Project construction will be a potential source of disturbance to the neighbors both week days and weekends. However, since excavation will be manual and explosives are not likely to be used, adverse impacts to the construction workers and neighboring premises will not be experienced.

7.3.3 Vegetation Loss Impact:

Construction of the sugar factory will require all the vegetation to be removed from the site to pave way for the construction of buildings, roads, walkways and other facilities.

Occupational health and safety

Construction sites always present an element of danger. Construction workers are likely to encounter accidental injuries as a result of the intensive engineering and construction activities including erection and fastening of materials, metal grinding and cutting, concrete work, steel erection and welding among others. Such injuries can result from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal

sheets and collapse of building sections among others. Deaths have also been experienced as a result of poor construction activities leading to occupational health and safety concerns.

Workers are also likely to be exposed to diseases from building materials during the construction phase of the Project. It is therefore recommended that before the construction phase of the proposed Project commences, building materials will be inspected according to the occupational health and safety standards.

Occupational health and safety of the workforce will have to be monitored by the respective contractor's supervisors and foremen. As long as proper procedures are followed and personal protective equipment (PPE) provided and their use enforced, risks of accidents and incidents can be substantially reduced.

7.3.4 Impact on air quality

Potential impacts on the air quality during construction phase will be due to exhaust and dust emissions generated in and around the construction site by the construction equipment. Motor vehicles used to mobilize materials for construction and operating of construction vehicles and equipment would cause a potentially significant air quality impact by emitting pollutants through exhaust emissions.

The sources of air emission can be grouped into three categories namely:

- Point Source;
- Area Source; and
- Line Source.

A point source is a single source of emission with an identified location; an area source is when the sources of emission are many widely distributed point sources having relatively comparable significance; and a line source is when the sources of emission from a number of fixed or moving facilities have relatively comparable significance, such as roads.

Air emissions result from construction activities such as excavation, earthmoving and land filling, stone cutting and concrete processing as well as the loading and unloading of construction material and waste. Impacts include increased dust and airborne particulates caused by grading, filling, removals and other construction activities. After construction is complete, dust levels are expected to return to near non-existing conditions. Air quality

impacts may also result from emissions from construction equipment and possibly from traffic stopped at the entrance of the building site to deliver materials.

During the period of maximum construction activity, the fuel consumption at the Project site is expected to rise significantly and the background concentrations of Suspended Particulate Matter (SPM), Respiratory Particulate Matter (RPM), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and both Carbon Monoxide (CO) and Lead (pb) are also expected to rise.

These emissions can have significant cardio-pulmonary and respiratory effects on the local population; the health effects may range from subtle biochemical and physiological changes to difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac condition. The impact of such emissions can be greater in areas where the materials are sourced and at construction site. Activities associated with site clearance, excavations, spreading of the top soil during construction, frequent vehicle turning and slow vehicle movement loading and off- loading areas can be implicated in this process.

Table 5-1: Summary of impacts of emissions on human health

Pollutant	**Source**	**Primary effects**
Sulphur Dioxide (SO_2)	Combustion of sulphur containing fossil fuels for: ▪ Construction equipment ▪ Vehicle ▪ Diesel engine	▪ Plant injury ▪ Reduced visibility ▪ deterioration of metals, textiles, leather, finishes and coatings ▪ aggravation of respiratory diseases (asthma, emphysema) ▪ irritation
Nitrogen Oxides (NO_X)	Combustion of fossil fuel from: ▪ Construction equipment ▪ Vehicles ▪ Diesel generators	▪ Aggravation of respiratory illness ▪ Reduced visibility ▪ Reduced plant growth ▪ Formation of acid rain
SPM (Dust)	▪ Construction activities ▪ Combustion of fossil fuels for construction	▪ Soiling ▪ Reduced visibility ▪ Aggravation of the effects of

	equipment, vehicle and diesel generators.	gaseous pollutants ▪ Increased cough and chest discomfort ▪ Reduced lung function ▪ Aggravation of respiratory and cardio-respiratory diseases
Carbon Monoxide (CO)	Combustion of fossil fuels from ▪ Construction equipment ▪ Vehicles ▪ Diesel Generators	▪ Plant injury ▪ Reduced visibility ▪ Deterioration of metals, Textiles, Leather, finishes, coatings ▪ Irritation of eyes ▪ aggravation of respiratory diseases (asthma, emphysema)

7.3.5 Disposal of solid waste

Construction activities create solid wastes that need to be disposed. Such wastes include: Timber, metals, nails, wires, glass, plastic piping, excavated soil and rocks, packaging materials and containers e.g. paint pails, cement bags, metallic straps, etc.

Soils will be excavated at the proposed Project site; the excavation works to level the site and to come up with the foundation will result in the generation of the excavated material.

These wastes may have a direct impact on the neighboring premises. Disposal of the same solid wastes off-site could also be a social inconvenience if done in wrong places. The offsite effects could be un-aesthetics view, pest breeding, unhygienic conditions, chocking of nearby drains and stream and pollution of physical environment. Proper waste management will however be taken into consideration and proper dumping done according to the requirements and directions of NEMA.

If not properly disposed, these wastes will result in the pollution of soil, ground water and air (paint). Materials consisting of chemicals e.g. paints, cement and thinners will alter the chemical composition of these regimes.

Mitigation Measures

i) During the construction period an area will be specifically designated for solid wastes. These will be segregated and categorized into re-usable, those for re-sale and those that cannot be used again. Reusable material will be recovered so as to reduce wastage and cost of raw materials.

ii) The waste designated area will be well protected from the elements to ensure reduced chances of them being carried away by wind or rain.

iii) Surplus material that cannot be reused in any way will be removed from site by licensed waste handlers

7.3.6 Increased water demand

During the construction phase, the construction works will create additional demand for water in the area especially Kapkwes river, in addition to the existing demand at the project area. Water will mostly be used in the following activities:

- Concrete works including curing;
- Controlling dust on site;
- Washing of machinery and equipment;
- Preparing of mixtures, including water-based emulsion paints;
- Washing and drinking by construction workers;
- General cleaning; and
- Landscaping.

Increased water demand could result in increased Project costs, increased health risks, and increased soil erosion if not properly managed.

7.3.7 Energy consumption

The proposed Project will consume fossil fuels to run transport vehicles and construction machinery. The machinery will include: construction vehicles and compactors. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. Electricity will also be used during the construction of the proposed Project. The consumption of electricity is likely to be on the higher side. It should be noted also that manual labour as a source of energy will mainly be used during construction of the proposed Project. Efficient management of energy consumption is therefore required for optimal performance of the Project and to control Project costs.

7.3.8 Increased storm water runoff from new impervious areas

Construction of the proposed Project and access driveway could result in additional runoff through creation of impervious areas. These areas generally have higher runoff coefficients than natural area, and increased flood peaks are a common occurrence in developed areas.

The storm water runoff is likely to increase the flooding along access roads.

7.3.9 Extraction and use of building materials and procurement

Building materials such as hard core, ballast, cement, rough stone and sand required for the construction will be obtained from quarries, hardware shops and sand harvesters. These materials are mainly extracted from natural resource bases such as river banks, and forests among others. Since substantial quantities of these materials will be required. The availability and sustainability of such resources at the extraction sites will be negatively affected as they are not renewable in the short term. In addition, the sites from which the materials will be extracted may be significantly affected in several ways including landscape changes, displacement of animals and vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health impacts.

Certain construction materials are also hazardous and expose the construction workers to diseases. These include materials or substances made of asbestos, silica, heavy metals (such as lead and cadmium). It is therefore recommended that before the construction phase of the proposed Project commences, building materials will be inspected according to the occupational health and safety standards.

7.3.10 Oil spills

The machines to be used on site will have moving parts which will require continuous oiling to minimize the usual corrosion or wear and tear. Possibilities of such oils spilling and contaminating the soil on site are real. Likewise, moving vehicles on site may require oil change leading to oil spills. Irrespective of these possibilities, no significant adverse effects are expected as a result of oil spills given the scope, nature and duration of time to be taken on the construction of the proposed Project.

7.3.11 Sexual Exploitation and Abuse (SEA)

This impact refers to sexual exploitation and abuse committed by Project staff such as contractor or his employees against communities and represents a risk at all stages of the

Project, especially when employees and community members are not clear about prohibitions against SEA in the Project.

7.3.12 Human Health Impact-Increase in incidences of HIV/AIDS and STIs

The project will attract new people to the project area and this can lead to several repercussions such as the spread of HIV virus. Influx of new people to the project area especially construction workers can affect the number of new cases of HIV & AID, because they often interfere with an otherwise stable situation but the contrary can also happen where the newcomers find themselves at higher risk.

7.3.13 Spread of COVID-19

During project execution (civil works), large numbers of workers will be required to assemble together in meetings, toolbox talks and even at work sites; varied number of workforce including suppliers of material and services are also expected to come in from various places in the country which may be COVID-19 hot spots; and interaction of workers with the project host community will happen as workers find accommodation close to work sites, and/or return to their homes after works.

7.3.14 Labour Influx Effects

This impact is triggered during Project Construction Phase due to the Project attracting various categories of workers from local and national or even international markets. This therefore can lead to new people coming to Koitaburot area drawn from diverse social and cultural backgrounds often resulting to a number of issues as listed below;

(i) Strain on various resources especially water resources
(ii) Grievances from local community members over job opportunities
(iii) Sexual Exploitation and Abuse
(iv) Unwanted Pregnancies

Mitigation Measures

i) The sugar mill will source almost all of its unskilled labour from the local communities in order to reduce an influx of population from outside the area;
ii) Requirements by the facility will be made in an organized manner from the surrounding communities; thereby reducing occurrence of opportunistic hawking that could result in a myriad of vices such as drug use and peddling, petty crime, alcohol abuse and harboring of criminals.
iii) During construction phase close monitoring of workers will be undertaken to ensure that unwanted characters are not absorbed.

iv) In addition, activities will be undertaken in a closed environment and food and other requirements will be provided within to reduce traffic in and out of the building site.

v) Security will be enhanced in and around the project site to reduce cases of material theft and any other uncalled-for occurrences.

vi) Security agencies will be requested to beef up the current small police post in the area.

7.3.14 Gender Based violence and Sexual Harassment

This impact is triggered during Project Construction Phase when the Contractor fails to comply with the following provisions.

(i) Gender inclusivity requirements in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 gender rule.

(ii) Failure to protect human risk areas associated with, Disadvantaged groups, interfering with Participation Rights, and interfering with Labour Rights.

7.4 OPERATION PHASE IMPACTS

(a) POSITIVE IMPACTS

Just as in the construction phase, there are positive impacts associated with the construction of West Valley Sugar factory during operation phase. These positive impacts are discussed below:

7.4.1 Employment opportunities

Employment creation is one of the major impacts of the proposed Project during its operational phase. Technicians and operators will be employed in the project. Those contracted or employed will generate income as a result of being employed or contracted.

7.4.2 Optimal use of land

The proposed sugar factory project will enhance economy of land through intensification of land use in addition to provision of sugar and related by -products. This will be significant since the country is currently experiencing shortage of sugar and related by -products.

7.4.3 Increase in revenue to the national and County Government

The operation of the proposed Project will result in positive gains for numerous authorities. The local county government, Kenya Revenue Authority (KRA), Kenya Power and Lighting Company (KPLC), Kenya Sugar Board (KSB) through payment of relevant taxes, rates and fees to respective institutions.

7.4.4 Improved amenities

The operation of the proposed sugar factory is expected to improve amenities such as roads, water, health care and social facilities in the surrounding area in that the proposed Project will construct class rooms, a health center, water points and support the needy in the society as part of their CSR.

7.4.5 Increased market for sugar and related by-products

The farmers and the general consumer community are likely to benefit from the operation of the sugar factory since wholesalers who will purchase sugar and by-products products from the factory premises will improve their sales.

7.4.6 Increased Participation of Women in Socio-economic Development

The prevailing socio-cultural norms influencing household division of labor will determine women income over the normal routines such as; looking after children, preparation of food and collecting water and firewood which are tasks for the women. By constructing of the sugar factory closer to the communities, the women will be able to spend their time in other productive activities thereby increasing their participation in socio- economic development. It is also expected that same will improve the economic and social status of women.

7.5 NEGATIVE IMPACTS DURING OPERATION PHASE

The following negative impacts are associated with the proposed sugar factory project during its operation phase.

7.5.1 Increased water use

The industrial activities during the operation phase of the Project will involve use of large quantity of water. This will increase the water demand in project area and increase pressure due to excess abstraction of River Kipkwes.

7.5.2 Disposal of waste water

Since the disposal of waste water will be directed to the effluent treatment plant, if the plant is not efficient enough it may require alternative treatment, which may be costly. However, since the factory will utilize the effluent treatment plant as proposed, it is anticipated that the plant will work efficiently. The sources of wastewater in the factory will result from the following:

Mill house: Due to gland cooling and intermittent floor washing and contains high amounts of oils and grease and sugar from spills and leaks

Boiler Blow-down: Boiler blow-down is fairly clean water except that it contains high dissolved solids and phosphates.

Rotary filter: Filter cloth is periodically washed and constitutes a source of wastewater. **Condensates:** The vapours from the last effect evaporator and pan boiling are separately cooled in barometric condensers and the condensate goes to the pond. A part of the cooled water from the pond is recycled into the sugar mill, but a large portion is discharged as wastewater. If the mill operates without overloading, the evaporator and vacuum pan condensate is quite clean and the entire quantity can be reused. But many a times, overloading and poor operating conditions can lead to significant sugar losses in the condensates through entrainment and thus polluting the water.

Occasional Spills and Leaks: Leaks from pumps and pipes in the evaporators and centrifuge house, along with periodical floor washings, constitute another source of wastewater. Although the flow is intermittent and volume discharged is not large, it represents the most polluting fraction of sugar mill wastewater.

Condensate Washings: Evaporators, juice heaters, pans, etc are cleaned once in 20 days for removal of deposited scales. Caustic soda, sodium bicarbonate and hydrochloric acid are used for scale removal. Normally the caustic soda washings are stored and reused for cleaning operations. After the equipment is boiled with caustic soda and rinsed with fresh water, it is cleaned with dilute hydrochloric acid using an inhibitor. The wastewater is discharged into the drains, as the recovery of the chemicals may not prove to be economical. It is seen that the wastewater has small organic load but inorganic content may be high to pose a shock-load to wastewater treatment facility (occasional discharge, once in fortnight). It is suggested to have a holding tank and mix this wastewater gradually to the final effluent to avoid shock loading on the treatment plant.

Sulphur and Lime Houses: The washings of sulphur and lime house would contain a considerable number of inorganic solids, which include carbonates and sulphates. The effluents from these two units when combined would give neutral pH value of waste. This wastewater does not contribute to organic pollution but can be characterized as inorganic wastewater

7.5.3 Increased storm water flow

Upon completion, the building roofs and pavements of the Project will lead to increased volume and velocity of storm water or run-off flowing across the area covered by the proposed Project.

7.5.4 Impact on air quality

Potential impacts on the air quality during operation phase will be due to exhaust and dust emissions generated in and around the plant by the ovens, furnaces and other machinery.

The bagasse, on burning, produces particulates, viz., unburnt fibres, carbon particles and gaseous pollutants like oxides of nitrogen, water vapour and other organic compounds. Of the particulate waste, the heavier particles slowly settle down in the surrounding area. Such dust fall leads to the problems of cleaning, reduction in property value, effect on vegetation, etc. The main gaseous pollutants are CO, which is altogether not measured by any unit, and CO2 is reported to be in the range of 12 – 14%.

Motor vehicles used to mobilize materials and equipment would cause a potentially significant air quality impact by emitting pollutants through exhaust emissions.

During the period of operation, the fuel consumption at the Project site is expected to rise significantly and the background concentrations of Suspended Particulate Matter (SPM), Respiratory Particulate Matter (RPM), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and both Carbon Monoxide (CO) and Lead (pb) are also expected to rise.

These emissions can have significant cardio-pulmonary and respiratory effects on the workers; the health effects may range from subtle biochemical and physiological changes to difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac condition.

7.5.5 Generation of solid waste

Operation activities create solid wastes that need to be disposed. Such wastes include:

- Baggase
- Press mud
- Paints, lubricants and petroleum wastes;
- Packaging materials;
- Metal, glass, plastic containers and other unwanted materials; and
- Food remains.

Bagasse: It is estimated that bagasse contributes to 33.3% residue of the total cane crushed. It has a calorific value of about 1920 kcal/kg and is mainly used as fuel in boilers for steam generation.

Press Mud: It contains all non-sucrose impurities along with CaCO3 precipitate and sulphate. Press mud from double sulphitation process contains valuable nutrients like nitrogen, phosphorous, potassium, etc, and therefore used as fertilizer. The press mud from double carbonation process is used for land filling and is not used as manure.

Put together, these wastes may have a direct impact on the immediate surrounding and neighboring premises. Disposal of the same solid wastes off-site could also be a social inconvenience if done in wrong places. The off-site effects could be un-aesthetics view, pest breeding, unhygienic conditions, chocking of nearby drains and stream and pollution of physical environment. Proper waste management will however be taken into consideration and proper dumping done according to the requirements and directions of NEMA.

7.5.6 Energy consumption

The proposed Project will consume fossil fuels to run and heat the machinery, lighting and other operations. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. Electricity will also be used during the operation of the proposed Project. The consumption of electricity is likely to be on the higher side. It should be noted also that manual labour as a source of energy will mainly be used during operation of the proposed Project. Efficient management of energy consumption is therefore required for optimal performance of the Project and to control Project costs.

7.5.7 Oil and fuel spills

The machinery to be used in the plant will have moving parts which will require continuous oiling to minimize the usual corrosion or wear and tear. Possibilities of such oils spilling and contaminating the soil on site are real. Likewise, combustion processes would require fuels, which may lead to fuel spills. Irrespective of these possibilities, no significant adverse effects are expected as a result of fuel and oil spills given the scope, nature and duration of time to be taken on the operation of the proposed Project.

7.5.8 Occupational health and safety risks

Workers are likely to encounter various occupational risks ranging from physical to biological and chemical hazards at the plant. Occupational health and safety hazards for sugar manufacturing facilities are similar to those of other industrial facilities and recommendations for the management of these issues can be found in the OSHA 2007. In addition, occupational

health and safety issues that may be specifically associated with sugar manufacturing operations can be found in the World Bank EHS Guidelines and include the following:

i. Physical hazards
ii. Exposure to dust and biological hazards
iii. Exposure to chemicals (including gases and vapors)
iv. Exposure to heat and cold and radiation
v. Exposure to noise and vibrations

Physical hazards

The most severe injuries in this sector are often attributable to the failure of lockout – tagout systems. Robust lockout – tag-out procedures should be implemented.

ii) Exposure to Bagasse dust

Exposure to bagasse dust is a potential concern in the bagasse handling area of sugar mills. Recommended measures to prevent, minimize, and control dust include:

i. Enclose and ventilate saws, shredders, dusters, and bagasse conveyors;
ii. Consider enclosed chip storage;
iii. Avoid use of compressed air to clear dust and waste paper;
iv. Enclose and ventilate areas where dry, dusty additives are unloaded, weighed, and mixed, or use additives in liquid form;
v. Regularly inspect and clean dusty areas to minimize dust explosion risk.

iii) Confined Spaces

Operation and especially maintenance work may include confined space entry. Examples include: boilers, dryers, degreasers, digesters, blow pits, pipeline pits, process and reaction vessels, tanks, and vats.

A confined space is defined as a wholly or partially enclosed space not designed or intended for human occupancy and in which a hazardous atmosphere could develop as a result of the contents, location or construction of the confined space or due to work done in or around the confined space. A “permit-required” confined space is one that also contains physical or atmospheric hazards that could trap or engulf the person.

Confined spaces can occur in enclosed or open structures or locations. Serious injury or fatality can result from inadequate preparation to enter a confined space or in attempting a rescue from a confined space.

Recommended management approaches include:

Engineering measures should be implemented to eliminate, to the degree feasible, the existence and adverse character of confined spaces.

Permit-required confined spaces should be provided with permanent safety measures for venting, monitoring, and rescue operations, to the extent possible. The area adjoining an access to a confined space should provide ample room for emergency and rescue operation

7.5.9 Accidents, injuries and falls

The employees are likely to encounter accidental injuries as a result of the intensive engineering and plant operation activities. Such injuries can result from accidental falls from high elevations, injuries from hand tools and operation equipment cuts from sharp edges of metal sheets among others.

7.5.10 Noise pollution and vibration

Noise pollution and vibration is likely to occur due to leveling and casting process at the proposed site. Since the proposed Project site is within already constructed commercial and industrial premises, the proposed Project construction will be a potential source of disturbance to the neighbors both week days and weekends. However, since there are noise abatement measures, adverse impacts to the workers and neighboring premises will be controlled.

7.5.11 Thermal effect

Operation of the proposed project would involve the use of ovens and furnace which burn at very high temperatures and can easily cause thermal effects to the workers. The effects could be acute to chronic with different degrees of burning.

7.5.12 Ergonomic effects

The relationship between the working posture and the machinery would affect the workers muscles and joints. The machinery should be designed to minimize adverse effects of poor working posture among the workers in the plant.

7.5.13 Gender Based violence and Sexual Harassment

This impact is triggered during Project when the proponent fails to comply with the following provisions.

(iii)Gender inclusivity requirements in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 gender rule.

(iv)Failure to protect human risk areas associated with, Disadvantaged groups, interfering with Participation Rights, and interfering with Labour Rights.

7.6 Positive impacts during decommissioning phase

The following positive impacts are associated with the proposed Project during the decommissioning phase:

7.6.1 Rehabilitation

Upon decommissioning of the proposed Project, rehabilitation of the Project site will be carried out to restore the site to its original status or to a better state than it was originally. This will include replacement of topsoil and re-vegetation which will lead to improved visual quality of the area.

7.6.2 Employment opportunities

For demolition to take place properly and in good time, several people will be involved. As a result, several employment opportunities will be created for the demolition staff during the decommissioning phase of the proposed Project.

7.7 Negative impacts during decommissioning phase

The following three negative impacts discussed below, are associated with the proposed Project during its decommissioning phase.

7.7.1 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.

7.7.2 Solid waste generation

Demolition of the proposed Project 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 as 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 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 leaching of demolition waste, are known to lead to degradation of groundwater quality.

7.7.3 Occupational health and safety impacts

During decommissioning phase, risks of accidents and ill health as a result of demolition activities are likely to take place. Demolition workers, neighboring premises are also likely to be affected by the dust generated and other fumes generated by the demolition machines.

7.7.4 Impact on air quality

Potential impacts on the air quality during decomissioning phase will be due to exhaust and dust emissions generated in and around the construction site by the construction equipment. Motor vehicles used to carry demolished materials would cause a potentially significant air quality impact by emitting pollutants through exhaust emissions.

CHAPTER EIGHT
MITIGATION MEASURES AND MONITORING PROGRAMMES

8.1 Overview

This Chapter highlights the mitigation measures for the anticipated negative impacts of the proposed West Valley Sugar factory. The potential impacts and the possible mitigation measures have been analyzed under three categories: construction phase, operational phase and decommissioning phase.

8.2 MITIGATION OF CONSTRUCTION RELATED IMPACTS

The following measures can be considered as mitigation measures of the negative impacts associated with the proposed project during construction phase.

8.2.1 Reduction of local construction traffic

The proponent through the contractor will put measures in place to mitigate the local traffic jam that will occur in the project are as a result of the construction vehicles turning to offload the raw materials to the site and after offloading the raw materials. To minimize the local construction traffic, construction vehicles will enter and leave the site at appropriate times. The contractor will also use signs and barriers to direct vehicles and pedestrian traffic as needed around the construction site. Some activities may also be scheduled in off-peak traffic times to minimize impacts.

8.2.2 Minimization of noise and vibration

Significance of noise and vibration impacts depends on whether the project would increase noise and vibration levels above the existing ambient levels by introducing new sources of noise and vibration. Noise and vibration impacts would be considered significant if the project would result in the following:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Exposure of persons to, or generation of, excessive ground-borne vibration or ground borne noise levels.
- A substantial permanent increase in ambient noise levels (more than five dBA) in the project vicinity above levels existing without the project.

- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Proponent of the proposed Project shall put in place several measures that will mitigate noise pollution and vibration arising during the construction phase. The following noise suppression techniques will be employed to minimize the impact of temporary construction noise at the Project site.

Install portable barriers to shield compressors and other small stationary equipment where necessary.

- Prescribe noise reduction measures if appropriate e.g. restricted working hours, transport hours and noise buffering.

Consult with the surrounding community on the permissible noise levels and best working hours.

- Use quiet equipment (i.e. equipment designed with noise control elements).
- Co-ordinate with relevant agencies regarding all construction activities in the Project area.
- Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible.
- Construct mainly during the day. The time that most of the neighbors are out working.

8.2.3 Minimization of occupational health and safety impacts

To reduce the occupational health and safety impacts during the construction phase of the proposed Project, the Proponent through the Contractor is committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Safety and Health Act, 2007. In this regard, the Proponent is committed to provision of appropriate personal protective equipment, as well as ensuring a safe and healthy environment for construction workers as outlined in the Environmental Management Plan (EMP). Construction Workers accidents especially in deep trenching operations and elevated areas shall be mitigated by enforcing adherence to safety procedures and preparing contingency plan for accident response in addition, safety education and training shall be emphasized.

8.2.4 Minimization of air quality impacts

Air quality impacts generated from exhaust emissions and dust emissions will be minimized as follows.

Exhaust Emission

The following measures shall be implemented during construction to minimize the exhaust emission:

- The engine size of the construction equipment shall be the minimum practical size;
- The number of construction equipment operating simultaneously shall be minimized through efficient management practices;
- Vehicle idling time shall be minimized; and
- Equipment shall be properly tuned and maintained as per the manufacturer's specifications.

This will also be achieved through proper planning of transportation of materials to be used during construction of the proposed Project to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road.

Dust Emission

Dust emissions from construction sites can also pose health risk to workers, and sensitive receptors surrounding the site, if not managed properly. It is the responsibility of the contractor to provide appropriate safety training, information equipment, signage, security and emergency response plans on site.

To mitigate the impact of SPM (dust), the following measures are recommended for implementation:

- Applying water to at least 80% of all inactive accessible disturbed surface areas on a daily basis when there is evidence of wind driven dust;
- Watering all roads used for any vehicular traffic at least twice per day of active operations or road used for any vehicular traffic once daily and restrict vehicle speed to 15 mph;
- The soil surface shall be kept humid through water spraying to control the level of dust during excavation works.
- Provide dust masks to construction staff working in dusty areas
- Construction materials must be properly stacked
- Dispose of debris from the construction site by licensed waste trucks to authorized dumping sites
- Down wash of trucks (especially tyres) prior to departure from site;

- Cover stockpiles of sand, soil and similar materials or surround them with wind breaks;
- Cover trucks hauling dirt and debris to reduce spillage on to paved roads surface or have adequate free board to prevent spillage;
- Trucks carrying construction waste shall be covered during their trip from the construction site to the final disposal location.
- Post signs that limit vehicle speeds onto unpaved roads and over disturbed soils; and
- Rapid onsite construction so as to reduce duration of traffic interference and therefore reduce emissions from traffic delays.

8.2.5 Minimization of solid waste during construction phase

The Proponent through the Contractor shall put in place measures to ensure that construction materials requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal. It is further recommended that the Proponent shall consider the use of recycled or refurbished construction materials. Purchasing and using once-used or recovered construction materials will lead to financial savings and reduction of the amount of construction debris disposed of as waste.

Additional recommendations for minimization of solid waste include: -

- Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time;
- Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements;
- Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste;
- Use of construction materials containing recycled content when possible and in accordance with accepted standards; and
- Adequate collection and storage of waste on site and safe transportation to the disposal sites and disposal methods at designated area shall be provided.

The proponent through the contractor will also make sure that the construction wastes generated are disposed to the approved dump site by the private waste management company that will be contracted.

8.2.6 Minimization of increased water demand

The Proponent of the proposed Project shall ensure that water is used efficiently at the site by sensitizing construction workers to avoid irresponsible water use. The contractor should also harvest rainwater and use in the construction activities. In addition, the contractor should:

- Install water conserving taps;
- Promote recycling and reuse of water as much as possible;
- Promptly detect and repair of water pipes and tank leaks; and
- Install discharge meter to determine and monitor total water usage.

However, it should be noted also that apart from the negative impacts likely to be caused by mismanagement of water, increased water demand is inevitable during construction of the proposed Project.

8.2.7 Reduction of energy consumption

The Proponent through the Contractor shall ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. In addition, proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. Complementary to these measures, the Contractor shall monitor energy use during construction and set targets for reduction of energy use. The Contractor will also develop energy management plan.

8.2.8 Reduction of increased storm water runoff from new impervious area

The proponent of the proposed Project will put in place some measures aimed at minimizing soil erosion and associated sediment release from the Project site during construction. These measures will include leveling the Project site to reduce run-off velocity and increase infiltration of rain water into the soil. A storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structures will be designed.

8.2.9 Reduction of impacts at extraction sites and impacts associated with construction materials and procurement

The Proponent of the proposed Project shall ensure that all building materials such as sand ballast hard core are extracted from registered quarry and sand mining firms whose facilities have undergone satisfactory environmental impact assessment/audit and received NEMA approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are presumably well mitigated.

To reduce the negative impacts on availability and sustainability of the materials, the Proponent will only order for what will be required through accurate budgeting and estimation of actual construction requirements. This will ensure that materials are not extracted or purchased in excessive quantities. Moreover, the Proponent will ensure that wastage, damage or loss (through run-off, wind, etc) of materials at the construction site is kept minimal, as these would lead to additional demand for and extraction or purchase materials.

In addition to the above measures, the Proponent shall consider reuse of building materials and use of recycled building materials. This will lead to reduction in the amount of raw materials extracted from natural resources as well as reducing impacts at the extraction sites.

The following should also be taken into consideration:

- The tender documents should specify required standards and certification for procurement of all materials and appliances;
- As far as possible, environmentally friendly and sustainable materials should be used.

Materials not to be used for construction of the proposed Sugar factory complex include:

- 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 fibres;
- Lead, lead paint or any other materials containing lead which may be inhaled, ingested or absorbed;
- Vermiculite, unless it is established as being fibre-free;

- Any products containing cadmium that are regarded as being injurious substances (refer to the UK Environmental Protection (Controls on Injurious Substances) (No.2) Regulations 1993);
- 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 Contractor should be instructed in the use of all materials that may have negative environmental (including health) effects; and
- 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.

8.2.10 Controlling oil spills during construction Phase

The Contractor shall control dangers of oil and fuel spills during construction by maintaining machinery in specific areas designated for this purpose. Prompt cleaning of oil and fuel spills, and proper disposal of clothing or rags contaminated with oil will also take place.

8.2.11 Mitigation against Vegetation Loss Impact

The vegetation loss is set to be confined to the project location and will mainly consist of grasses and weeds as the ground has hitherto been used for sugar cane farming.

8.2.12 Mitigation Measures against spread of COVID-19

(i) The Contractors will develop SOPs for managing the spread of Covid-19 during project execution and submit them for the approval by the Supervision Engineer and the Client before mobilizing to site. The SOPs shall be in line with the Ministry of Health directives on COVID-19 prevention, and site-specific project conditions;

(ii) Avoid concentration of more than 15 workers at one location. Where there are two or more people gathered, maintain social distancing of at least 2 meters;

(iii) All workers and visitors accessing factory worksites every day or attending meetings shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs;

(iv) Install hand washing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites including consultation venues and meetings and ensure they are used;

(v) Ensure routine sanitization of shared social facilities and other communal places

routinely including wiping of workstations, door knobs, hand rails etc.

8.2.13 Mitigation Measures against Social risk - Spread of COVID-19 amongst community members during Public consultations

During implementation of the ESIA, various consultative activities will be undertaken. For efficient and meaningful engagement, a wide range of individual participants, groups in the local community and other stakeholders will be involved. The types of consultations to be used to pass information shall be through public Baraza's, electronic means shall be used where possible and one-on-one basis meetings while observing the COVID-19 mitigation measures to ensure safety stakeholders involved, the community at large and the client.

- ❖ Avoid concentrating of more than 15 community members at one location. Where two or more people are gathered, maintain social distancing of at least 2 meters;
- ❖ The team carrying out engagements within the communities on one-on-one basis will be provided with appropriate PPE for the number of people they intend to meet;

8.2.14 Mitigation Measures against Gender Based violence and Sexual Harassment

- Ensure clear human resources policy against sexual harassment that is aligned with national law.
- Integrate provisions related to sexual harassment in the employee code of conduct.
- Ensure appointment of human resources personnel to manage reports of sexual harassment according to policy
- The Contractor shall require his employees, sub-contractors, sub-consultants, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct with specific provisions on protection from sexual exploitation and abuse
- The contractor will implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including:
    a) Effective and on-going community engagement and consultation, particularly with women and girls.
    b) Review of specific project components that are known to heighten GBV risk at the community level, e.g. compensation schemes; employment schemes for women; etc.

8.3 MITIGATION OF NEGATIVE IMPACTS DURING OPERATION PHASE

The anticipated negative impacts of the proposed Project arising during the operation phase shall be mitigated as discussed below:

8.3.1 Ensuring efficient solid and liquid waste management

During operational phase of the Project, scrap metal and waste oils and grease waste will be generated. NEMA has come up with the Environmental Management and Coordination (Waste Management) Regulations, 2006 on how various wastes should be managed.

The effluent treatment facility shall be monitored to ensure consistent efficiency in the emissions from the plant to the receiving environment.

The Proponent of the proposed Project will be responsible for efficient management of wastes generated by the Project during its operation. However, the waste metals, oils and grease will be collected in drums and resold. The Proponent shall provide waste collection facilities. As indicated in the Environmental Management and Coordination (Waste Management) Regulations, 2006, an integrated solid waste management system will be taken into consideration.

8.3.2 Minimization of air quality impacts

Emissions to Air

Air quality impacts generated from emissions will be minimized by the use of the particulate precipitate. The particulate precipitate will neutralize gaseous emissions and trap particulates to control air pollution.

Particulate Matter and Dust

Recommended measures to prevent or control particulate matter include the following: i. Typical control methods include boiler modifications or add-on controls, (e.g. flue gas cyclones, fabric filters, or electrostatic precipitators, wet scrubbers and local recirculation systems) to capture the ash and recycle the water to prevent the emission of particulate; ii. Use wet scrubbers to remove dust from drying and cooling of sugar; iii. Reduce fugitive dust from roads and areas by cleaning and maintaining a sufficient level of humidity;

8.3.3 Minimization of energy consumption

Energy conservation measures are often the easiest, quickest and cheapest way to reduce costs and be environmentally pro-creative. Energy conservation program will be implemented through measures taken both on energy demands and supply.

The following measures will be put in place to ensure effective and optimal use of energy:

- Selecting the most efficient lighting system design and minimum lighting level appropriate for the required application in various stages of industrial processes;
- Adopting the most effective lighting controls to ensure optimum operating efficiency and minimum energy wastage, e.g. central programmable time switches;
- Installing energy saving appliances e.g. energy saving bulbs; and
- Maximizing the contribution of daylight to reduce the use of artificial lighting. However, when dealing with the energy saving bulbs the following should be taking into consideration when one falls on the floor and breaks: □□The new eco-friendly bulbs contain toxic mercury.
- Toxic mercury inside the bulbs can aggravate a range of problems including migraines and dizziness hence everyone must leave the room for at least 15 minutes if one falls to the floor and breaks.
- Evacuate the room, taking care not to step on the shards of glass littering the floor.
- Do not use a vacuum cleaner to clear up the mess as the machine's sucking action could spread toxic mercury droplets around the rooms.
- Put on rubber gloves and sweep the debris into a dustpan.
- Place the remains in a plastic bag and seal it.
- Do not put the bag in a normal household dustbin.
- Try not to inhale dust from the broken bulb.

8.3.4 Efficient water use

A combination of water saving appliances and water management measures will be planned and implemented within the proposed sugar factory complex. Specific measures that will be implemented include the following:

- Re-use the water for cooling purposes;
- Promote awareness on water conservation and reducing water wastage;
- Quick fixing of licking pipes; and
- Sweep with a broom and pan where possible, rather than hose down external areas.

The following water saving investments should be taken into consideration:

- Reduce water delivery in taps, through the installation of low flow devices or aerators on taps;

- A manually pressed button flush valve which stops on release of button; and
- Water efficient plumbing fixtures to save water and energy.

Rain water harvesting should be taken into consideration to capture rain water and store. Rain water harvesting helps in utilizing the primary source water and prevent the runoff from going into storm drains and thereby serving dual purpose of:

- Making water available for future use; and
- Reducing the load on other service lines.

8.3.5 Disposal of waste water

The proponent will make sure that the effluent treatment plant to serve the proposed factory is well operated and that proper monitoring takes place to make sure that the surrounding environment is **not polluted.**

8.3.6 Storm water management

Rainwater runoff comprises of storm water, which flows into both surface water and ground water. Proper management of this resource ensures that storm water discharge is free from contamination.

A good storm water management policy should include:

- Good housekeeping to avoid contamination of storm water;
- Provision of slit traps in storm water drains; and
- Regular inspection and cleaning of storm drains.

8.3.7 Minimization of occupational health and safety impacts

To reduce the occupational health and safety impacts during the operation phase of the proposed Project, the Proponent is committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Safety and Health Act, 2007. In this regard, the Proponent is committed to provision of appropriate personal protective equipment, as well as ensuring a safe and healthy environment for workers as outlined in the Environmental Management Plan (EMP). Worker's accidents especially in deep curing operations and elevated areas shall be mitigated by enforcing adherence to safety procedures and preparing contingency plan for accident response in addition, safety education and training shall be emphasized.

Recommended measures to prevent, minimize, and control general physical hazards (e.g.

trips, falls, and materials handling hazards) include:

i. Install catch platforms under conveyors that cross passageways or roadways;

ii. Quickly clean up spills;

iii. Use non-skid walking surfaces that allow drainage;

iv. Install guard rails on walkways adjacent to production lines or at height, and clearly mark traffic lanes for vehicles and pedestrians;

v. Equip mobile equipment with roll-over protection.

vi. Establish routines to ensure that heavy loads are not moved by crane over personnel;

Community Health and Safety

Community health and safety impacts during the operation and all phases of sugar manufacturing plants are common to those of other industrial facilities.

Recommended measures for worker and public safety include the following:

i. Signage will be posted within the project site and outside along the transportation route to warn people of large vehicle movement and turning as well as on increased traffic. Such signage will be clear and easily visible

ii. ii. Workers at site will be adequately provided with Personal Protective Equipment (PPE). Equipment to be provided will include worker's boots, helmets, dust masks, gloves, safety harnesses, goggles and ear muffs

iii. There will be adequate first aid kits placed at easily accessible points

iv. The upper floors of the sugar mill must be fitted and equipped with chequered plate hand rails wherever possible

v. All pipes should be colour coded and steam pipes will be properly installed and indicated where necessary.

vi. OSHA Act and WIBA should be strictly adhered to by the management

vii. WEVAS should consider Public Liability Insurance in case of accidents to visitors

8.3.8 Minimization of transmission of HIV/AIDs

There is always a concern of moral decay in the society that would arise from sexual relationships between residents and new workers leading to cases of increased transmission of HIV/AIDs and STDs. These will be achieved through

- Sensitization of the workers to adhere to work ethics and awareness creation at the community level on safe sex.
- Collaborating with other entities to put up a VCT centers near West Valley Sugar Factory

8.3.9 Abatement of Social Conflicts

Operation of the project in its entirety life span will require workers and employees to do certain assigned operations. To abate conflicts resulting from employment in the community the proponent should follow the following mitigation measures:

- Both skilled and non-skilled labour to be accessed locally as much as possible
- Equal opportunities to people of all gender, youths and VMGs
- Engage local stakeholders in such employment issues

8.3.10 Security of the Premises

24 hours security should be provided within the premises and at the entrance to the facility by:

i. Installation of an entrance and exit security check. This requires a proper gate and gate house, and security system to check those entering and exiting;
ii. Procedures to leave items such as cigarettes, matchsticks, lighters, mobile phones, etc at the gate as a security measure to be put in place
iii. Well trained security officers from a reputable company to patrol the grounds
iv. The company should install an internal surveillance system that will monitor the plant at all times

8.3.10 Minimization of Gender Based Violence

- Ensure clear human resources policy against sexual harassment that is aligned with national law.
- Integrate provisions related to sexual harassment in the employee code of conduct.
- Ensure appointment of human resources personnel to manage reports of sexual harassment according to policy
- The proponent to ensure that gender-based violence at the workplace is not triggered by the Project, including:
    c) Effective and on-going engagement and consultation with female workers, particularly with women and also girls at the community.
    d) Review of specific project components that are known to heighten GBV risk at the community level, e.g. compensation schemes; employment schemes for women; etc.

8.3.11 Prevention of Sexual Exploitation and Abuse (SEA)

- Management and Coordination: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract

policies related to SEA, including whistle blower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points in the project and trained community liaison officers.

- Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of SEA awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their SEA-related rights;

8.4 MITIGATION OF NEGATIVE IMPACTS DURING DECOMMISSIONING PHASE

Just as in the construction and operational phase, the negative impacts of the proposed sugar factory complex during decommissioning phase can be mitigated as follows:

8.4.1 Minimization of noise and vibration

Significant impacts on the acoustic environment will be mitigated as described in Section 8.2.2.

8.4.2 Efficient solid waste management

Solid waste resulting from demolition works associated with the proposed Project during decommissioning phase will be managed as described in Section 8.2.5.

8.4.3 Minimization of occupational health and safety impacts

Risks of accidents and ill health as a result of demolition activities shall be mitigated by ensuring that appropriate health and safety measures are applied in all activities; fence all unsafe and dangerous areas; and continue to monitor environmental health at all main receptor points around the site until the site handover.

High levels of dust concentration resulting from demolition or dismantling works will be minimized as follows:

- Rehabilitating or stabilize all disturbed areas through tree planting and landscaping;
- Avoiding dusty activities for example loading and dumping on windy days; and
- Continuing to monitor dust emissions in the surrounding areas.

CHAPTER NINE

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

9.1 Significance of an ESMP

As a requirement in the Environmental Management and Coordination Act (EMCA), 1999 the report should provide for a detailed ESMP. This Chapter therefore complies with the requirements of EMCA, 1999 and Environmental (Impact Assessment and Audit) Regulations, 2003 and takes into consideration the applicable local and international standards and best practices.

It should be noted that there is no universally accepted standard format for ESMPs. However, the format needs to fit the circumstances in which the ESMP is being developed and the requirements which it is designed to meet. The ESMPs should contain the following which are in line with the NEMA requirements:

- **Summary of impacts:** The predicted negative environmental and social impacts for which mitigation is required should be summarized;
- **Description of mitigation measures:** The ESMP identifies feasible and cost-effective mitigation measures to reduce significant negative environmental impacts to acceptable and legal levels;
- **Description of monitoring programme:** Environmental performance monitoring should be designed to ensure that mitigation measures are implemented. The monitoring programme should clearly indicate the linkages between impacts, indicators to be measured, measurement methods and definition of thresholds that will signal the need for corrective actions;
- **Institutional arrangements:** Responsibilities for mitigation and monitoring actions should be clearly defined;
- **Legal enforceability:** The key legal considerations with respect to ESMPs are:
  - Legal framework for environmental protection; and
  - Legal basis for mitigation.
- **Implementation schedule and reporting procedures:** The timing, frequency, and duration of mitigation measures should be specified; and

- **Cost estimates:** Costs should be calculated for both the initial investment and recurring expenses for implementing the mitigation measures.

The benefits of including the ESMP as part of the ESIA are:

- Encouraging applicants to be more systematic and explicit in the design and development of mitigation measures and the intended means of implementation;
- Encouraging authorities to check the practicality and likelihood of implementation of mitigation and monitoring measures;
- Ensuring that the mitigation measures are properly incorporated into the project design and contract documentation after authorization is granted;
- Encouraging the project proponent to meet the requirements of the ESMP which now form the basis for the conditions attached to authorization of the project; and
- Forcing the project proponent to internalize environmental impacts that would otherwise become a social cost.

The EMPs presented in this Chapter therefore summarizes the key impact elements identified and the remedial measures, the actions to be taken by various parties and the monitoring activities. An indication of the time scale for implementation and cost involved is also provided. The ESMP tables can be further expanded with documented procedures and guidelines for work practices so as to be as responsive to the situations that various contract parties will encounter. The parties should formulate procedures and practices and maintain records as required by EMCA.

The implementation of the ESMP should be done within the provisions of the law and for the ultimate benefit of the stakeholders in the Project area. The effectiveness of the ESMP shall be monitored and assessed during spot checks, formal inspections and at the end of the Project when an overall audit of the works shall be carried out.

9.2 Types of environmental and social management plans

There are three broad categories of ESMPs in the project lifecycle: The construction ESMP, the operation ESMP and the decommissioning ESMP.

The objectives of these ESMPs are all the same, namely to:

- Identify the possible environmental impacts of the proposed activity; and
- Develop measures to minimize, mitigate and manage these impacts.

The difference between these ESMPs is related to the difference in mitigation actions required for the

A construction environmental and social management plan is a practical and different stages of the project cycle.

9.2.1 CONSTRUCTION ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Achievable plan of management to ensure that any environmental impact during construction phase is minimized. Construction environmental management plan provides specific environmental guidance for the implementation and construction phase of a project. It is intended to enable the management and mitigation of construction activities so that environmental impacts are avoided or reduced. These impacts range from those incurred during start up to construction activities. Table 9-1 below shows the construction environmental management plan for the West Valley Sugar Factory.

Table 9-1: Environmental and Social management plan during construction phase

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (Ksh)
Minimize extraction site impacts and ensure efficient use of raw materials in construction					
Demand for raw material	Building materials such as sand ballast, hard core are extracted from registered quarry and sand mining firms whose facilities have undergone satisfactory environmental impact assessment/audit and received NEMA approval.	Contractor	Inspection	Throughout construction period	No added cost
	Source building materials from local suppliers who use environmentally friendly processes in their operations.	Project Manager and Contractor	Inspection and Observation	Throughout construction period	No added cost
	Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered.	Project Manager and Contractor	Inspection and Calculation	Throughout construction period	No added cost
	Ensure that damage or loss of materials at the construction site is kept minimal through proper storage.	Project Manager and Contractor	Observation	Throughout construction period	No added cost
	Consider reuse of building materials and use of recycled building materials.	Proponent	Observation	Throughout construction period	No added cost
Minimization of construction traffic					

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (Ksh)
Minimization of local increase in construction traffic	Construction vehicles should enter and leave the site at appropriate times.	Contractor	Observation and Inspection	Throughout construction period	No added cost
	Using signs and barriers the Contractor will direct vehicles and pedestrian traffic as needed around the construction site.	Contractor	Observation and Inspection	Throughout construction period	-
	Some activities may be scheduled in off-peak traffic times to minimize impacts.	Contractor	Inspection	Throughout construction period	-
Minimize solid waste generation and ensure efficient solid waste management during construction					
Increased solid waste generation	Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction; 2. Recycling; 3. Reuse; and 4. Land filling.	Project Manager and Contractor	Observation	Throughout construction period	45,000
	Order materials in the sizes and quantities they will be needed, rather than cutting them to size, or having large quantities of residual materials.	Project Manager and Contractor	Inspection and Observation	One-off	No added cost

	Damaged or wasted construction materials to be recovered for refurbishing and used in other projects.	Project Manager and Contractor	Observation	One-off	No added cost
	Use of durable, long-lasting materials to reduce the amount of construction waste generated over time.	Project Manager and Contractor	Inspection	Throughout construction period	No added cost
	Provide facilities for proper handling and storage of construction materials.	Project Manager and Contractor	Inspection and Observation	One-off	50,000
	Use building materials that have minimal or no packaging.	Project Manager and Contractor	Inspection and Observation	Throughout construction period	No added cost
	Use construction materials containing recycled content where possible and in accordance with accepted standards.	Project Manager and Contractor	Inspection	Throughout construction period	No added cost
	Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers.	Project Manager, and Contractor	Observation	Throughout construction period	No added cost
	Dispose waste more responsibly by dumping at designated dumping sites or landfills only.	Project Manager, and Contractor	Inspection and Observation	Throughout construction period	20,000/month
	Waste collection bins to be provided at designated points on site.	Project Manager, and Contractor	Observation	Throughout construction period	40,000

Minimize impacts on air quality					
Dust emission	Downwash of trucks (especially tyres) prior to departure from site.	Contractor	Observation and Inspection	Throughout construction period	To be determined
	Cover stockpiles of sand, soil and similar materials or surround them with wind breaks.	Contractor	Inspection and Observation	Throughout construction period	No added cost
	Cover trucks hauling dirt and debris to reduce spillage on to paved roads surface or have adequate free board to prevent spillage.	Contractor	Inspection and Observation	Throughout construction period	No added cost
	Post signs that limit vehicles speed onto unpaved roads and over disturbed soils.	Contractor	Inspection	One-off	5,000
	Rapid onsite construction so as to reduce duration of traffic interference and therefore reduce emissions from traffic delays.	Contractor	Inspection	Throughout construction period	-
	Ensure strict enforcement of on-site speed limit regulations.	Project Manager and Contractor	Observation	Construction period	No added cost
	Avoid excavation works in extremely dry weathers.	Project Manager and Contractor	Inspection and Observation	Throughout construction period	
	Sprinkle water on access routes when necessary to reduce dust generation by construction vehicles.	Project Manager and Contractor	Inspection and Observation	Throughout construction period	60,000 per month

	Personal protective equipment to be worn.	Contractor	Observation	Throughout construction period	
Exhaust emission	The engine size of the construction equipment shall be the minimum practical size.	Contractor	Inspection	One-off	No added cost
	Construction equipment operating simultaneously to be minimized through efficient management practices.	Contractor	Inspection and Observation	Throughout construction period	No added cost
	Construction equipment to be maintained properly tuned and maintained as per the manufacturer's specifications.	Contractor	Inspection	One-off	To be determined
	Vehicle idling time shall be minimized.	Project Manager and Contractor	Observation	Construction period	No added cost
	Alternatively fueled construction equipment shall be used where feasible equipment shall be properly tuned and maintained.	Project Manager and Contractor	Inspection	Throughout construction period	No added cost
	Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas, and to switch off or keep vehicle engines at these points.	Project Manager and Contractor	Meeting	Throughout construction period	No added cost
Minimization of noise and vibration					
Noise and vibration	Install portable barriers to shield compressors and other small stationery equipment where necessary.	Contractor	Inspection	One-off	50,000

	Prescribe noise reduction measures if appropriate e.g. restricted working hours, transport hours and noise buffering.	Contractor	Inspection and Observation	One-off	No added cost
	Consult with the surrounding community on the permissible noise levels and best working hours.	Contractor and Proponent	Meeting	One-off	No added cost
	Use quiet equipment (i.e. equipment designed with noise control elements).	Contractor	Inspection	Throughout construction period	No added cost
	Provide workers with earmuffs and sensitize them on their use	Contractor and Proponent	Meeting	One-off	100,000
	Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.	Project Manager and Contractor	Meeting	Throughout construction period	No added cost
	Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, offices, hospitals, residential houses and schools.	Project Manager and Contractor	Meeting	Throughout construction period	No added cost
	Ensure that construction machinery is kept in serviced and maintained in good condition to reduce noise generation.	Project Manager and Contractor	Inspection	Throughout construction period	55,000
	The noisy construction works will be planned to be during the day only.	Project Manager and all site foreman	Observation	Throughout construction period	No added cost

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (Ksh)
Minimization of energy consumption					
Increased energy consumption	Ensure electrical equipment and appliances are switched off when not being used.	Contractor	Inspection and Observation	Throughout construction period	No added cost
	Install energy saving fluorescent tubes and bulbs at all lighting points instead of bulbs which consume higher electric energy.	Contractor	Observation	Throughout construction period	35,000
	Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts.	Contractor	Inspection and Observation	Throughout construction period	No added cost
	Development of energy management plan.	Contractor	Inspection	One-off	To be determined
	Monitor energy use during construction and set targets for reduction of energy use.	Contractor	Inspection	Throughout construction period	5,000
Minimize water consumption and ensure more efficient and safe water use					
Increased water demand	Harvest rainwater.	Contractor	Observation	Throughout construction period	15,000

	Install water conserving taps.	Contractor	Observation	One-off	120,000

	Promote recycling and reuse of water as much as possible.	Contractor	Inspection	Throughout construction period	No added cost
	Install a discharge meter to determine and monitor total water usage.	Project Manager and Contractor	Inspection	One-off	10,000
	Promptly detect and repair of water pipe and tank leaks.	Contractor	Inspection and Observation	Throughout construction period	50,000
	Sensitize construction workers to conserve water.	Contractor	Meeting	Throughout construction period	No added cost
Reduce storm-water from new impervious areas					
Surface runoff and roof water shall be harvested and stored for reuse.		Proponent	Inspection and Observation	During rainy season	-
Apply soil erosion control measures such as levelling of the project site to reduce run-off velocity and increase infiltration of storm		Proponent	Inspection	One-off	100,000
Design a storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structure.		Contractor	Inspection	One-off	To be determined

Minimization of oil spills

Expected Negative Impacts	**Recommended Mitigation Measures**	**Responsible Party**	**Monitoring Means**	**Time Frame**	**Cost (Ksh)**
Oil Spills	A designated garage section of the site fitted with oil trapping equipment to be planned for changes.	Contractor	Inspection	Throughout construction period	To be determined
	Prompt cleaning of oil and fuel spills.	Contractor	Inspection and Observation	When there is oil spills	200,000
	Proper disposal of clothing or rags contaminated with oil.	Contractor	Inspection and Observation	Periodically	50,000
Minimize occupational health and safety risks					
Registration of the premises	Registration of the Project as per Section 43 and 44 of the Occupational Safety and Health Act, 2007.	Developer	Observation	One-off	To be determined
General register	A general register should be kept within the facility as stipulated in Section 122 and 123 of the Occupational Safety and Health Act, 2007.	Project Manager and Contractor	Inspection	One-off	2,000

Incidents, accidents and dangerous occurrences.	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. Reporting should also be as stated in Section 21 of the Occupational Safety and Health Act, 2007.	Contractor	Inspection	Throughout construction phase	-

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (Ksh)
	Enforcing safety procedures and preparing contingency plan for accident response in addition safety training shall be emphasized.	Contractor	Meeting	Throughout construction period	50,000
Safety, health and environment (SHE) policy	Develop, document and display prominently an appropriate SHE policy for construction works.	Developer and Contractor	Observation	One-off	75,000
Health and safety committee	Provisions must be put in place for the formation of a Health and Safety Committee, in which the employer and the workers are represented as per Section 9 of the Occupational Safety and Health Act, 2007.	Contractor and Developer	Inspection and Meeting	One-off	-
Sanitary conveniences	Suitable, efficient, clean, well-lit and adequate sanitary conveniences should be provided for construction workers as per Section 52 of the Occupational Safety and Health Act, 2007.	Contractor	Inspection and Observation	One-off	To be determined

Machinery/equipment safety	Ensure that machinery, equipment, personal protective equipment, appliances and hand tools comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded as indicated in Part VII of the Occupational Safety and Health Act, 2007.	Contractor	Inspection and Observation	One-off	No added cost
	Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain.	Contractor	Inspection	Throughout construction period	120,000

Expected Negative Impacts	**Recommended Mitigation Measures**	**Responsible Party**	**Monitoring Means**	**Time Frame**	**Cost (Ksh)**
	All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury as stated in Section 56 of the Occupational Safety and Health Act, 2007.	Contractor	Inspection and Observation	One-off	40,000
	Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery use and other procedures/operations	Contractor	Meeting	Throughout construction period.	40,000
	Equipment such as fire extinguishers must be examined by a government authorised person as indicated in Section 72 of the Occupational Safety and Health Act, 2007. The equipment may only be used if a certificate of examination has been issued.	Contractor	Inspection and Observation	Once every 6 months	5,000 per examination

	Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register.	Contractor	inspection	Throughout construction period	
Storage of materials	Ensure that materials are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse.	Contractor	Inspection and Observation	Throughout construction period	No added value
	Ensure that items are not stored/ stacked against weak walls and partitions.	Contractor	Inspection and Observation	Throughout Construction period	No added cost

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (Ksh)
Safe means of access and safe place of employment	All floors, steps, stairs and passages of the rooms must be of sound construction and properly maintained.	Contractor	Observation and Inspection	One-off	To be determined
	Securely fence or cover all openings in floors.	Contractor	Observation	One-off	To be determined
	All ladders used in construction works must be of good construction and sound material of adequate strength and be properly maintained as indicated in Section 77 of the Occupational Safety and Health Act, 2007.	Contractor	Inspection and Observation	One-off	-
Emergency preparedness and	Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency.	Contractor	Inspection and Observation	One-off	-

evacuation procedures	Such procedures must be tested at regular intervals.	Project Manager and Contractor	Inspection	Every 3 months	No added cost
	Ensure that adequate provisions are in place to immediately stop any operations where there is an emergency.	Project Manager and Contractor	Inspection and Observation	One-off	-
	Provide measures to deal with emergencies and accidents including adequate first aid arrangements.	Contractor	Meeting, Inspection and Observation	Throughout construction period	To be determined

Expected Negative Impacts	**Recommended Mitigation Measures**	**Responsible Party**	**Monitoring Means**	**Time Frame**	**Cost (Ksh)**
First Aid	Well stocked first aid box which is easily available and accessible should be provided within the premises as stated in Section 95 of the Occupational Safety and Health Act, 2007.	Contractor	Inspection	One-off	15,000
	Provision must be made for persons to be trained in first aid, with a certificate issued by a recognised body.	Contractor	Inspection and Observation	One-off	To be determined
Fire protection	Firefighting equipment such as fire extinguishers and hydrant systems should be provided at strategic locations.	Contractor	Inspection and Observation	One-off	To be determined
	Regular inspection and servicing of the equipment must be undertaken and records of such inspections maintained.	Contractor	Inspection	Every 6 months	5,000

	Signs such as "NO SMOKING" must be prominently displayed within the construction site.	Contractor	Inspection and Observation	One-off	1,000
Ventilation	Enough space must be provided within the premises to allow for adequate natural ventilation through circulation of fresh air.	Project Manager and Contractor	Inspection and Observation	One-off	No added cost
Lighting	There must be adequate provision for artificial or natural lighting in all parts of the rooms in which persons are working or passing.	Project Manager and Contractor	Inspection and Observation	One-off	-
Electrical Safety	Distribution board switches must be clearly marked to indicate respective circuits and pumps.	Project Manager and Contractor	Inspection and Observation	One-off	-

Expected Negative Impacts	**Recommended Mitigation Measures**	**Responsible Party**	**Monitoring Means**	**Time Frame**	**Cost (Ksh)**
	There should be no live exposed connections.	Project Manager and Contractor	Inspection and Observation	Throughout construction period	No added cost
	Electrical fittings near all potential sources of ignition should be flame proof.	Project Manager and Contractor	Inspection and Observation	One-off	No added cost
	All electrical equipment must be earthed	Project Manager and Contractor	Inspection	One-off	No added cost

Chemical Safety	Collection, recycle and dispose chemical wastes, obsolete chemicals and empty chemical containers as per the Environmental Management and Coordination (Waste Management) Regulations, 2006.	Contractor	Inspection and Observation	One-off	To be determined
	Ensure that all chemicals used in construction are appropriately labelled or marked and that material safety data sheets are available.	Contractor	Inspection and Observation	One-off	-
	Keep a record of all hazardous chemicals used at the premises, cross-referenced to the appropriate chemical safety data sheets.	Contractor	Inspection and Observation	Throughout construction period	-
	There should be no eating or drinking in areas where chemicals are stored or used.	Contractor	Inspection and Observation	Throughout construction period	No added cost
	Provide workers in areas with elevated noise and vibration levels, with suitable ear protection equipment such as ear masks.	Contractor	Inspection and Observation	One-off	To be determined

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (Ksh)
Supply of clean drinking water	Ensure that construction workers are provided with an adequate supply of wholesome drinking water.	Contractor	Inspection and Observation	One-off	10,000/month
Washing facilities	Ensure that conveniently accessible, clean, orderly, adequate and suitable washing facilities are provided and maintained within the site.	Contractor	Inspection and Observation	One-off	90,000

Ergonomics	Provision for repairing and maintaining of hand tools must be in place.	Contractor	Inspection and Observation	One-off	85,000
	Hand tools must be of appropriate size and shape for easy and safe use.	Contractor	Inspection and Observation	One-off	-
	Height of equipment, controls or work surfaces should be positioned to reduce bending posture for standing.	Project Manager and Contractor	Inspection	One-off	-
Ensure the general safety and security of the proposed Project and surrounding areas					
Safety and security	Ensure the general safety and security at all times by providing day and night security and adequate lighting within and around the construction site.	Developer and Contractor	Observation	Throughout construction period	10,000/month
Labor risks including labor influx	• Local community members will be given priority in employment opportunities, in casual and unskilled labour. • Train the community on the project requirements and product.	Contractor	Register of workers engaged in the project.	Throughout construction period	-
Spread of COVID-19 amongst workers	The Contractor will develop a SOPs for managing the spread of Covid-19. The SOPs shall be in line with the Ministry of Health directives on COVID-19 prevention, and site-specific project conditions Install handwashing facilities with adequate running water and soap, or sanitizing facilities at	Developer and Contractor	Occurrence Registers	Throughout construction period	100,000

	entrance to work sites including consultation venues and meetings and ensure they are used.				

9.2.2 Operational phase ESMP

An operational environmental management plan provides specific guidance related to the operational activities associated with a particular project. It is focused on sound environmental management practices that will be undertaken to minimize adverse impacts on the environment through normal operation of a facility. The operational management plan further identifies what measures should be taken in the event of emergencies or incidents during the operation of the proposed Project. The roles and responsibilities for mitigation, monitoring and performance assessment for the operational life of the development are specified in the EMP. Table **9-2** below shows the operation phase of the proposed West Valley Sugar Factory.

Table 9-2: Environmental and Social management plan for the operational phase

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (Ksh)
Minimization of solid waste generation	**and ensuring more efficient solid waste management**				
Solid waste generation	Use of an integrated solid waste waste management system i.e. through a hierarchy of options: • Source reduction; • Recycling; • reuse; • Combustion; and • Sanitary land filling.	Contracted Private Solid Waste Management Company	Inspection and Observation	Throughout operational phase	500,000
	Provide solid waste handling facilities/cubicles.	Proponent	Observation	One-off	250,000

	Ensure that solid wastes generated at the proposed West Valley Sugar factory are regularly disposed of appropriately at authorized dumping sites.	Proponent/Contracted Private Solid Waste Management Company	Inspection	monthly	100,000
Discharge of solid wastes; bagasse, sediments from various tanks/plants and distillery effluent, boiler ash	Use of bagasse as fuel in boilers for steam and power production; making mechanical paper, drying of sediments for use as fertilizers	Factory manager	Input and output of various materials in production process.	Through ought	-
Minimize energy consumption					
High demand for energy	Select the most efficient lighting system design and minimum lighting level appropriate for the required application in various rooms.	Proponent	Inspection	One-off	300,000
	Adopt the most effective lighting programmable time switches.	Proponent	Inspection	One-off	No added cost
	Maximize the contribution of daylight to reduce the use of artificial lighting.	operators	Observation and Inspection	Throughout operation period	No added cost
	Switch off electrical equipment, appliances and lights when not being used.	operators	Inspection and Observation	Throughout operation phase	-

	Install occupation sensing lighting at various locations such as storage areas which are not in use all the time.	Proponent	Observation	One-off	10-40 % higher than ordinary lighting
	Install energy saving fluorescent tubes and bulbs at all lighting points within the apartments instead of bulbs which consume higher electric energy.	Proponent	Observation	One-off	200,000

Expected Negative Impacts	**Recommended Mitigation Measures**	**Responsible Party**	**Monitoring Means**	**Time Frame**	**Cost (Ksh)**
	Monitor energy use during the operation of the Project and set targets for efficient energy use.	operators	Observation	monthly	50,000
Storm water management					
drains **Increased storm water flow**	Provision of slit traps in stormwater Good housekeeping to avoid contamination of storm water. Regular inspection and cleaning of storm drains.	Proponent	Inspection	One-off	200,000
		Operators/ employees	Inspection	monthly	500,000
		operators	Inspection	monthly	50,000
Minimize water consumption and ensure more efficient and safe water use					
High water demand	Reduce toilet cistern in single flash models.	Proponent	Inspection	One-off	No added cost

	Sweep with a broom and pan where possible, rather than hose down external areas.	operators	Inspection	Throughout operation phase	No added cost
	Quick fixing of licking pipes and toilet cistern.	Proponent	Inspection and Observation	Once broken and monthly	50,000
	Reduce water delivery in taps, through the installation of low flow devices or aerators on taps.	Proponent	Inspection and Observation	One-off	-

Expected Negative Impacts	**Recommended Mitigation Measures**	**Responsible Party**	**Monitoring Means**	**Time Frame**	**Cost (Ksh)**
	Install a manually pressed button flush valve which stops on release of button.	Proponent	Inspection	One-off	10-40% higher than ordinary taps
	Install a discharge meter at water outlets to determine and monitor total water usage.	Proponent	Inspection and Observation	One-off	500,000
	Promote awareness on water conservation and reducing water wastage.	Proponent	Meeting	Throughout operation phase	To be determined
	Consider water efficient plumbing fixtures to save water and energy.	Proponent	Inspection	One-off	To be determined

Management of waste water disposal					
Sewage treatment and Effluent disposal	Monitor the efficiency of the effluent treatment plant to ensure that the sewage released from the facility do not pollute the environment and affect the general public during operation of the proposed Project.	Proponent	Inspection and Observation	monthly	200,000
	Waste water treatment at Effluent Treatment Plant Ensure constant monitoring of the quality of the treated water to ensure it meets water quality standards of NEMA				
	Conduct quarterly sampling and effluent analysis and apply for Effluent Discharge License from NEMA	Proponent	Analysis results EDL Licence	Qurterly and annually	150,000
Discharge of waste oil	Minimization of oil spillage, burning of waste oil in boilers, installation of waste oil separator	Factory manager	Receipts of waste oil separator, reports of waste oil collected	Monthly	100,000
Ensure the general safety and security of the proposed Project and surrounding areas					
Increased general safety and security impacts	Ensure the general safety and security at all times by providing day and night security and adequate lighting within and around the proposed West Valley Sugar Factory.	Proponent	Inspection and Observation	Throughout operation phase	To be determined

Minimization of occupational health and safety impacts					
Increased occupational health and Safety Risks	Ensure the general safety and security at all times	Health and Safety Manager	Inspection, Meeting and Observation	Throughout operation phase	To be determined
	Provide PPEs to all workers, establish and mark all emergency exits and provide a first aid kit. Enforce use of PPE Adhere to Factory Act rules Adhere to OSHA 2007 Activate WIBA provisions Ensure workers are trained in ESH	Project manager	Observation Records of distributed equipment Accident records	monthly	200,000
Traffic Increase	Ensuring clear roads without vegetation to obstruct view ahead Install signs Improve on the class of road Regular maintenance and grading Ensure the road is regularly watered to reduce dust	Proponent and County Roads Engineer	Observation	Regularly	Tendered sum
Fire Safety	Smoke detectors installed Install fire extinguishers at strategic points Engage services of a safety officer	Project Manager	Detectors Firefighting equipment installed Safety officer on board	Monthly	100,000

Security	Fencing off the project site and limiting movement and attraction of unwanted characters. Ensure the sugar mill surrounding is fully lit during the nigh	Site manager	Fence and restricted entry Strict monitoring on movement of personnel and materials to and from site	monthly	80,000
Minimization of air emissions impacts					
Increased air emissions	Use and monitor the efficiency of the equipment in trapping and neutralizing air emissions	Health and Safety Manager	Inspection, Meeting and Observation	Throughout operation phase	100,000 quarterly
	Conduct routine air quality sampling for analysis to comply with the set standards.	Health and Safety Manager	Analysis reports	Quarterly	200,000
	Distillation and CO2 scrubber of world class technology installed to reduce odour to bare minimum	Project manager	smell	Once-off	Provided with equipment
Discharge of waste heat	Use spray ponds for increased ambient temperatures and increased river water temperatures	Factory manager	Daily report of volumes pumped	400,000	
Air Discharge from flue duct/distillery	Install wet scrubbers for flue duct and carbon dioxide scrubber for distillery	Production manager/Chief chemists	Daily check for optimal performance	Once off	3000000
Risk of social conflict	Develop and implement local hiring rules in consultation and partnership with the local community	• Human Resource manager	• Minutes • Reports Attendance registers	During Hiring	-

Increased risk of illicit behavior and crime	Involve local administration and other social groups like the church in social mediation and moderation, Establish a grievance redress mechanism where all conflicts related to the project are addressed	• Human Resource manager • Village elders and local administration	Incident Register GRMs policy	Throughout operation phase	-
Theft, vandalism and destruction of infrastructure	• Ensure the general safety and security of the facility at all times by providing day and night security guards • Ensure only authorized personnel get access to the site facility. • Install CCTV cameras	• proponent	Incident Register	Through ought	100,000 (monthly)
Spread of COVID-19	• Mandatory provision PPEs • Maintaining social distancing at least 2 meters. • All workers and visitors accessing facility every day shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs. • Install hand washing facilities with adequate running water and soap.	• Proponent	• SOPs, • Project assessment reports, • Purchase orders/receipts, • Photos	Through ought	70,000 (monthly)

9.2.3 Decommissioning phase EMP

Decommissioning refers to the formal process of removing something from the operational status. As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased. This ESMP should be treated as a guiding document that will be employed in the initial stages of the decommissioning. Detailed procedures will be developed with the cause of decommissioning in mind by competent persons and agencies. Table 9-3 below shows the ESMP of the decommissioning phase for the proposed project.

Table 9-3: Environmental management plan for the decommissioning phase

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (Ksh)
Demolition waste management					
Demolition waste	Use of an integrated solid waste management system i.e. through a hierarchy of options: Source reduction; Recycling; Reuse; Sanitary land filling.	Project Manager and Contractor	Inspection and Observation	One-off	200,000
	All structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible.	Project Manager and Contractor	Inspection and Observation	One-off	200,000
	All foundations must be removed and recycled, reused or disposed of at a licensed disposal site.	Project Manager and Contractor	Inspection and Observation	One-off	500,000
	Where recycling/reuse is not possible, the materials should be taken to a licensed waste disposal site.	Project Manager and Contractor	Inspection and Observation	One-off	150,000
Rehabilitation of project site					

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (Ksh)
Vegetation disturbance	Implement an appropriate re-vegetation programme to restore the site to its original status.	Project Manager and Contractor	Observation	One-off	300,000
	Consider use of indigenous plant species in re-vegetation.	Project Manager and Contractor	Observation	One-off	-
Minimization of occupational health and safety impacts					
Increased occupational safety risks	Adherence to the Occupational Health and Safety Rules and Regulations stipulated in the Occupational Safety and Health Act, 2007.	Health and Safety Manager	Inspection, Meeting and Observation	Throughout decommissioning period	120,00
	Provision of appropriate personal protective **health and** equipment as well as ensuring a safe and healthy environment for demolition workers.	Proponent	Inspection and Observation	Throughout decommissioning period	-
	Mitigate demolition workers accidents by enforcing adherence to safety procedures and preparing contingency plan for accident response.	Health and Safety Manager	Meeting and Observation	Throughout decommissioning period	-
Minimization of demolition noise and vibration					

Noise and vibration	Sensitize demolition vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.	Project Manager and Contractor	Meeting	Throughout demolition period	No added cost
Expected Negative Impacts	**Recommended Mitigation Measures**	**Responsible Party**	**Monitoring Means**	**Time Frame**	**Cost (Ksh)**
	Sensitize demolition drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, offices, hospitals, residential houses and schools.	Project Manager and Contractor	Meeting	Throughout demolition period	No added cost
	Ensure that demolition machinery is kept in good condition to reduce noise and vibration generation.	Project Manager and Contractor	Inspection	Throughout demolition period	80,000
	Ensure that all generators and other equipment used are insulated or placed in enclosures.	Project Manager and Contractor	Inspection	Throughout demolition period	To be determined
	The noisy construction works will be planned to be during the day.	Project Manager and all site foreman	Observation	Throughout demolition period	No added cost
Water Pollution	• Waste to be disposed off should be through a NEMA registered waste disposal company and in a designated site only. • Exhaust the septic tank, and ETP fully through a licensed exhauster • Scoop and remediate the site from any oil spills immediately and seek	Contractor	• Receipts, • Reports, • Copies of licenses, • MoU, • Photos	3 months	550,000

	advice from NEMA on how to dispose				

CHAPTER TEN
CONCLUSION AND RECOMMENDATIONS

Conclusion

The proposed project shall have several positive impacts emanating from both the construction and operational phases. These positive impacts include creation of employment; provision of an outlet for sugar cane, increase in earnings for sugar cane farmers in Soin and Kericho County at large.

The proposed project will also have some negative impacts which in turn need to be minimized and mitigated during the construction and the operational phases. Based on the proposed mitigation measures, several of these negative impacts have lowered their rating to low and short-term thus, have minimal impacts.

With implementation of the ESMP, it is unlikely that the proposed West Valley Sugar Factory will have any significant adverse social and environmental impacts. Most of the impacts noted will be of a temporary nature especially during the construction phase. These impacts can be effectively managed to acceptable levels with implementation by implementation of the proposed mitigation measures. Accordingly, the overall benefits from the project far outweigh the possible adverse impacts.

The proponent to be committed to putting in place several measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the project.

Recommendations

Given that the proponent has committed to implementing the recommendations made and put mitigation to identified impacts, the Experts hereby recommends the project for consideration and licensing. It is recommended that the proponent shall focus on implementing the measures outlined in the ESMP as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects. It is also recommended that the positive impacts that emanate from such activities shall be maximized as much as possible. It is expected that these measures will go a long way in ensuring the best possible environmental compliance and performance standards.

Other specific recommendations that the proponent should implement include:

- Consult all relevant service providers and authorities (i.e. County Government of Kericho, WRA, KPLC, Kericho Water and Sewerage Company, Sugar Board of Kenya amongst others) so as to ensure compliance and harmonize the projects infrastructural and socio-economic developments with existing facilities.
- Adhere to all relevant construction, occupational, health and safety regulations and any other relevant law through ought the project.
- Ensure Water and Energy Management Systems are put in place as outlined within the report and incorporate rain water harvesting facilities.
- Ensure solid waste management during construction and operational phases of the project adhere to the Environmental Management and Coordination (Waste Management) Regulations, 2006.
- Ensure strict adherence to provisions of Environmental Management and Coordination (Noise and Excessive Vibrations Pollution) Regulations, 2009 during all phases of the project.
- Ensure waste water is disposed off as per standards set in the Environmental Management and Coordination (Water Quality) Regulations, 2006 and annually apply for EDL licence alongside conducting quarterly effluent analysis.
- Ensure strict adherence to Occupational Health and Safety Act, 2007
- Ensure an elaborate landscaping program is put in place as the construction phase is being concluded so as to replenish vegetation around the project site by planting trees, flowers and lawns where applicable.

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