FINAL ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED EXPANSION AND MODERNISATION OF THE HUSSENI SISAL ESTATE LOCATED AT KISANGARA VILLAGE, LEMBENI WARD, MWANGA DISTRICT, KILIMANJARO REGION

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In particular, we wish to thank Mwanga District Council Officers and Leaders at the Local Community Level (Ward and Mtaa), and all other stakeholders for their valuable views and comments.

STUDY TEAM

This Environmental and Social Impact Statement has been prepared by the team of experts as tabulated in Table 1.0 below.

Table 1.0; Lead consultant information (Team leader)

SN	NAME	TITLE	SIGNATURE
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3	Miss. Mary Ngajilo	Sociologist EC/EE-EIA/2021/0113	

EXECUTIVE SUMMARY

E1. PROJECT INFORMATION

E1.1 Project Title

Environmental and Social Impact Assessment for the Proposed Expansion and Modernisation of the Husseni Sisal Estate located at Kisangara village, Lembeni Ward, Mwanga District, Kilimanjaro Region.

E1.2 Name of the Project Proponent and Contact Address

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E1.3 Name of the Lead Consultant and Contact Address

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E2.0 INTRODUCTION

Sisal is an endemic tropical crop whose leaves provide the world's most important hard natural fibre. The fibre are then used to produce twine, cordage for hay, packaging, baling, building and many other uses including carpets, wall covering, doormats, car mats, buffing cloth used for polishing of metal and furniture, fine yarn, bag cloth, padding, mattresses and handicrafts. New products developed from the sisal plant include pulp and paper mainly for making boxes for packaging.

Products obtained from sisal waste include biogas used in engine-generator sets to produce electricity. Sisal waste can also be used directly as animal feed.

Mohammed Enterprises (Tanzania) Ltd (abbreviated, "METL") has been involved in large-scale sisal farming in four regions: Tanga, Kilimanjaro, Morogoro and Coast regions of Tanzania. The company is registered under the Companies Act (Cap. 212) with certificate of incorporation No. 14879 provided on February 8, 1988. The company has been registered by Tanzania Revenue Authority (TRA) with tax payer identification number 100-181-762 and assigned VAT registration number (VRN) 10-005298-Y.

Currently, the company is one of the major sisal producers in the country contributing about 25% of the country's sisal production. The company has ten sisal estates covering a total land area of 34,669 Ha. The sisal plantations include, Alavi Sisal Estate, Fatemi Sisal Estate, Mjesani Sisal Estate, Bamba Sisal Estate, Lanzoni Sisal Estate, Mazinde Sisal Estate, Mabogo Sisal Estate, Kwalukonge Sisal Estate, Hassani Sisal Estate and Husseni Sisal Estate. Group farms produce approximately 10,000 metric tons of sisal fibre per annum, contributing 35% to Tanzania's total sisal production. The company aim to double land capacity and produce between 18,000 – 20,000 metric tons of sisal fibre per annum to meet growing domestic and export demands. METL sisal fibre are sold in both local and international markets. The company is estimating to export about 80% of the sisal fibre produced. Export markets include Japan, India, Israel, Spain, Italy, Belgium, Poland, Greece, France, Ethiopia, Germany, and other East African Community states. The balance of the produce (about 20%) is locally sold, specifically to METL Group of companies involved in the sisal spinning and sisal bags manufacturing (https://METL.net/what-we-do/agribusiness/sisal-farming/).

METL through funding from the African Development Bank (AfDB) is intending to increase sisal fibre production through improvement of the HUSSENI Sisal Estate by increasing the area for planting sisals, undertake crop rotation, improving sisal processing machineries and other support facilities. The project is set to take five consecutive years of sisal planting and field maintenance. The minimum lifespan of the proposed project might be more than fifty years with the investment cost of about TZS 9,905,804,288.

The Husseni Sisal Estate is located at Kisangara village, Lembeni Ward, Mwanga District, Kilimanjaro Region. The estate covers a total area of approximately 3247acres; 200acres of fallow land and 2528acres land under sisal. The estate is intending to uprooting 339acres of old sisals and consistently plant a total of 539 acres within a period of five consecutive years. The proposed expansion and modernization of the Husseni Sisal Estate strategically aim to position METL in the competitive environment in the sisal sub-sector in Tanzania by increasing sisal outputs to meet the growing demand for sisal products both in the local and international market. The project will also increase the rural employment from about 300 people to over 500 people involved in direct employment.

The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulation of 2018), formulated after the Environmental Management Act No. 20 of 2004 requires project developers to carry out an Environmental and Social Impact assessment (ESIA) prior to project implementation. Being aware of the aforementioned legal requirement, the proponent (Mohammed Enterprises Tanzania Limited) commissioned ARMS on Environment Limited to conduct ESIA for the proposed Expansion and Modernisation of the Husseni Sisal Estate.

E3.0 OBJECTIVE OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

The objective of the ESIA study was to ensure that environmental concerns are integrated in all project activities in order to contribute to sustainable development. The specific objectives of conducting the Environment and Social Impact Assessment study with respect to the project was:

i. To identify and evaluate the significant environmental impacts of the project
ii. To evaluate the impacts of the various alternatives on the project
iii. To propose mitigation measures for the significant negative impacts of the project on the environment.
iv. To generate baseline data for monitoring and evaluating impacts, including mitigation measures during the project cycle.
v. To seek the views and concerns of all stakeholders in regards to the proposed project.
vi. Develop an Environmental and Social Management Plan with mechanisms for monitoring and evaluating compliance and environmental performance.

E4.0 BRIEF DESCRIPTION OF PROJECT COMPONENTS

The proposed project will involve the following:

i. Farm Expansion and Rotation Program
ii. Buildings and civil works
iii. Installation of new plant, machinery and equipment's
iv. Improvement in electricity and water infrastructure of the estates
v. Improvement on transport facilities

E4.1 EXPECTED OUTPUTS

Currently, production capacity is approximately 800MT per year, after the project implementation 3400MT per year of sisal fibre are expected to be produced per annum in the next 10-years.

E5.0 PROJECT LOCATION, ACCESSIBILITY AND SIZE

The proposed project area is located at Kisangara village, Lembeni Ward, Mwanga District, Kilimanjaro Region. The estate can be accessed through the main road Dar es Salaam-Arusha road then cross to the rough road. The site is about 1km from the main road. The estate has the total area of 2175Ha. Both roads are in good condition and can be accessed throughout the year.

E6.0 EXISTING ENVIRONMENT AND SURROUNDING

The proposed estate area is borderd with Kiruru village in the Northern, Kilongaya village in Eastern, village farms in the western and Mangara and Kisangara village in the Southern village.

There are several facilities within the project site;

a) **Buildings and civil works** – The estate has office blocks, residential houses for management staff, worker's quarters, factory buildings and stores buildings. The estate has well maintained access roads linking the estates and surrounding villages and farm roads for transporting sisal.

b) **Plant and Machinery -** The estate has plant and machinery and farm equipment. The plant and machinery include coronas, press and brush equipment, water pumps and other equipment. Farm equipment includes crawler tractors, harrows, agro-tractors, rotary slashes and other equipment.

c) **Motor vehicles** – The estate has motor vehicles which include tractors, trucks, pick-ups and motorcycles. The motor vehicles are used for farm operation such as transport of sisal leaf and fibre, workers and other services.

d) **Utilities** – The factory has water infrastructure including water tanks and water pipes connected to the factory sites. Some of the worker's houses are not connected to the water infrastructure and they fetch water via a water centers at different point within the worker's camps. The factory site is connected to power supply using high-capacity electric generator and/or electricity from the national grid supplied by the Tanzania Electric Supply Company (TANESCO).

E7.0 PROJECT ACTIVITIES

The development of the proposed project will involve various phases, including the design (planning) phase, construction phase, operation phase and decommissioning phase. The planning phase will involve surveying the proposed sites for construction of the facilities at the Husseni Sisal Estate. A survey, in this case, refers to land investigations, drilling, measurements and pre-works examination of the site. The actual construction phase of the project will involve standard construction activities such as construction management, site preparation and levelling, excavation, compaction, setting the foundation, installation of electrical and machine, water and wastewater infrastructure, erection of superstructures, etc. The operation phase will involve running of the estate while decommissioning phase will involve shutting down the estate and/or removing it from operation or use, followed by re-commissioning, repurposing or demolition.

E8.0 POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK

Tanzania is committed to attaining sustainable development goal. Some of the National laws, policies, plans, strategies and legislation relevant to this project have been discussed in this report. These include; National Environmental Policy 2021, National Land Policy 1995, Natural Water Policy 2002, National Gender Development Policy 2000, Environmental Management Act 2004 – Cap 191, Occupational Health and Safety Act No. 5 of 2003, The Fire and Rescue Army Act 2007, Environmental Impact Assessment and Audit Regulations as amended on 2018, Environmental Management (Water Quality Standard) Regulation, 2007, The environment management (Hazardous Waste Control and Management) Regulation, 2021, The

Environment Management (Quality Standard for Control of Noise and Vibration pollution) Regulations, 2015, The Environment (Registration of Environment Experts) Regulations 2021 etc.,

E9.0 STAKEHOLDER CONSULTATION

Various stakeholders were consulted to obtain their views and concerns. The information from the stakeholders was obtained through interviews and meetings.

The stakeholders identified included;

- ✓ Mwanga District Council staff; (Environmental Management Officer (EMO), District Agriculture, Irrigation and Cooperative Officer (DAICO), District Land Officer
- ✓ Tanzania Sisal Board
- ✓ Pangani Basin Water Board
- ✓ Village Executive Officer – Kisangara Village,
- ✓ Ward Executive Officer – Lembeni Ward
- ✓ Local community surrounding the estate
- ✓ Workers
- ✓ Project Proponent.

Some of the noted underlying issues are related to the;

- ✓ Improvement in Occupational health and Safety
- ✓ Waste management
- ✓ Salary review
- ✓ Potential for Infrastructure upgrades

E10.0 PROJECT ALTERNATIVES

Several project alternatives were considered for this project based on the techno-economic, environmental and social criteria.

i. "No Project Alternative"; VS "Project Alternative"-The Project Alternative was selected in favor of the: No Project Alternative" due to its long-term social and economic benefits.
ii. Alternative Source of water: Borehole, recycled water from decortications, rain water harvesting were the preferred options.
iii. Alternative Source of Energy: The proposed site will use electricity from TANESCO and standby generator to serve during the power cut. Also, for cooking the use of LPG shall be considered.
iv. Solid Waste Management Alternatives: By adopting the principles of reduce, reuse, recycle and recover resources, Integrated solid waste management system offers significant environmental and financial benefits compared to landfilling and open waste burning.

v. Liquid Waste Management Alternatives: Septic tank and soak away pit will be used to manage domestic waste water. Wastewater from decortication process will be managed by waste stabilization ponds. However later the proponent might opt the use of treatment plant.

E11.0 IMPACT IDENTIFICATION AND ASSESSMENT

Impact identification was done by analyzing the project activities and determining their influence on the baseline environmental and social characteristics of the project area. The environmental characteristics of the project include biophysical (topography, soils, climate, rainfall, water resources, flora and fauna) and social characteristics (demography, settlement, land administration and tenure, economic activities, infrastructures and services, water supply and sanitation, healthy and HIV and AIDS). Public consultation complemented the field investigations and literature review. Identification of potential impacts and physical assessment of the following environmental components likely to be impacted was also conducted: a) physical /chemical; b) biological /ecological; c) social /cultural; and d) economic /operational.

E12.0 POTENTIAL SIGNIFICANT ENVIRONMENTAL AND SOCIAL IMPACTS

The development of the proposed project will lead to a number of potential impacts in each project cycle. The impacts were identified, predicted and assessed. These were done through checklists together with professional judgment of the consultant and basing other similar projects.

E12.1 SUMMARY OF KEY POSITIVE IMPACTS

A summary of the key positive impacts identified in the ESIA study are indicated below:

i. Creation of employment
ii. Creation of a market for local construction materials
iii. Increase in Sisal fibre production
iv. Increase in revenue to the National and District Government
v. Income generation to local communities/ villagers
vi. Corporate Social responsibility benefits from the Estate

E12.2 SUMMARY OF KEY NEGATIVE IMPACTS

A summary of the key negative impacts identified in the ESIA study are indicated below:

i. Impact from exhaust emission
ii. Noise Pollution
iii. Impact from Vibration
iv. Soil erosion
v. Impact from solid waste generation
vi. Soil contamination

vii. Increase in accident incidences
viii. HIV/AIDS and other sexually transmitted diseases
ix. Potential in criminal activities
x. Room of improvement in waste management
xi. Risks of fire hazards
xii. GBV/SEA/SH impacts

E13.0 MITIGATION MEASURES

Many of the mitigation measures put forward are largely good engineering practice that shall be adhered to during all the project phases. The major mitigation measures to be observed include;

i. Ensure to set up a formal compliant register system which responds to complaints about nuisances in a timely manner
ii. Adopt policies for recruiting locally and hiring local sub-contractors
iii. Purchasing materials from as many local suppliers; and
iv. Hiring trucks to transport construction materials like sand, quarry and cement to the project site
v. Promote recycling and reuse of general refuse
vi. Ensure that disposal of hazardous and non-hazardous waste is carried out in line with relevant national legislative and regulatory requirements; any hazardous waste generated on construction sites must be collected, transported and further management by competent and licensed contractors
vii. Servicing machinery so that they can be in good condition at all times; and
viii. Providing ear protection materials for the workers in noisy areas.
ix. Working hours for significant noise generating construction work (including works
x. Conduct regular vibration monitoring tests to assess the frequency and scale of the vibrations on site, and make more informed decisions about the preventive or corrective actions they can take to better protect their people, other stakeholder and the environment.
xi. The design of the internal sewerage system should consider the estimate discharges from individual sources and the cumulative discharge of the entire project i.e., it should have the capacity to consistently handle the loads even during peak volumes;
xii. All drain pipes passing under building, driveway or parking should be of heavy-duty PVC pipe tube encased in concrete surround.
xiii. Contractor should ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents
xiv. Contractor should establish HIV/AIDS programmes to raise awareness

E14.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The options to minimize or prevent the identified social and environmental impacts as well as a monitoring plan have been suggested in this report and are contained in the project's ESMP in which the majority of them are based on good engineering practices. The Environmental and Social Management Plan (ESMP) presents the implementation schedule for the proposed mitigation measures to both environmental and social impacts as well as planning for long-term monitoring activities. The project's ESMP also includes the associated environmental costs needed to implement the recommended mitigation measures. The engineering designs shall include the mitigation measures recommended in this report.

E15.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

The ESIA report presents an outline of the Environmental and Social Monitoring Plan (ESMoP) to record parameters to be monitored and frequency of monitoring.

E16.0 COST-BENEFIT ANALYSIS OF THE PROJECT

The ESIA report presents an assessment of the project, in terms of negative impacts, compared to the socio-economic benefits that will not happen if the project is not implemented. Environmental cost benefit analysis has been assessed in terms of the negative versus positive impacts. The potential benefits of the project, in terms of financial and social benefit are substantial. Similarly, the environmental impacts can be reasonably mitigated and the financial resources needed to mitigate negative impacts, when compared to the required investment, are relatively small.

E.17.0 DECOMMISSIONING

A preliminary decommissioning plan has been developed. Should the decommission become inevitable the plan provides a general description of decommissioning methods considered feasible for the proposed project. The description is intended to demonstrate that the methods considered are practical and that they protect the health and safety of the public and decommissioning personnel. Project decommissioning has five phases: (1) pre-removal monitoring; (2) permitting; (3) interim protective measures; (4) Project removal and associated protective actions; and (5) post-removal activities, including monitoring of environment and socio-economic activities. However, the proposed project will have a long-life span of more than fifty years.

E18.0 SUMMARY AND CONCLUSION OF THE ESIA STUDY

The ESIA was undertaken at all levels by following guidelines, laws and regulation related with environmental and social issues at a high level of care and due diligence. The assessment has also considered important stakeholders who are in one way of the other being impacted by the project. The ESIA study has scrutinized the environmental and social implications of the proposed Expansion and

Modernisation of the Husseni Sisal Estate and it was conducted to comply with relevant Acts, Laws and Regulations.

From the ESIA study that has been conducted, it has been concluded that the construction of the proposed project will generate significant socio-economic benefits to the people in the project area and the country. The study has also identified negative environmental and social impacts and risks that will arise as a result of the project. However, if the mitigation measures that have been proposed in this ESIA report will be properly implemented, the negative impacts will be mitigated by avoiding, minimizing or even eliminating some of the negative impacts.

LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immunity Deficiency Syndrome
COVID – 19	Corona Virus Disease-19
CSR	Corporate Social Responsibility
CBOs	Community Based Organizations
CPA	Core Project Area
CO	Carbon monoxide
CO_2	Carbon dioxide
dB	Decibel
DOE	Division of Environment
DAICO	District Agriculture, Irrigation and Cooperative Officer
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FAO	Food and Agriculture Organization
GBV	Gender-Based Violence
HIV	Human Immune Virus
KVA	Kilo Volt Amperes
NSRGP	National Strategy for Growth and Reduction of Poverty
NEMC	National Environment Management Council
NEP	National Environment Policy
NGOs	Non-Governmental Organizations
OHS:	Occupational Health and Safety
OSHA	Occupational Safety and Health Authority
PPE	Personal Protective Equipment
SO_2	Sulfur dioxide
SLDW	Sisal Leaf Decortications Waste
STDs	Sexually Transmitted Diseases
TANESCO	Tanzania Electricity Supply Company Limited
TANROADS	Tanzania National Roads Agency
TBS	Tanzania Bureau of Standards
TSB	Tanzania Sisal Board
METL	Mohammed Enterprises (Tanzania) Ltd

TIN	Taxpayer Identification Number
TOR	Terms of Reference
TRA	Tanzania Revenue Authority
URT	United Republic of Tanzania
VAT	Value Added Tax
VEO	Village Executive Officer
WEO	Ward Executive Officer
WHO	World Health Organization

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CHAPTER ONE

1.0 Introduction

1.1 Project Background

Sisal is an endemic tropical crop whose leaves provide the world's most important hard natural fibre. The fibre are then used to produce twine, cordage for hay, packaging, baling, building and many other uses including carpets, wall covering, doormats, car mats, buffing cloth used for polishing of metal and furniture, fine yarn, bag cloth, padding, mattresses and handicrafts. New products developed from the sisal plant include pulp and paper mainly for making boxes for packaging.

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set to take five consecutive years of sisal planting and field maintenance. The minimum lifespan of the proposed project might be more than fifty years with the investment cost of about TZS 9,905,804,288.

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The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulation of 2018), formulated after the Environmental Management Act No. 20 of 2004 requires project developers to carry out an Environmental and Social Impact assessment (ESIA) prior to project implementation. Being aware of the aforementioned legal requirement, the proponent (Mohammed Enterprises Tanzania Limited) commissioned ARMS on Environment Limited to conduct ESIA for the proposed Expansion and Modernisation of the Husseni Sisal Estate.

1.2 Project Objective

The proposed project has been planned for the purposes of increasing sisal production by expanding the acreage under sisal crop through new planting in the fallow land and implement crop rotation in a total of within 5-years period, and additional investment in the sisal fibre processing machines and other infrastructure.

1.3 Objective of Environmental and Social Impact Assessment Study

The objective of the ESIA study was to ensure that environmental concerns are integrated in all project activities in order to contribute to sustainable development. The specific objectives of conducting the Environment and Social Impact Assessment study with respect to the project was:

i. To identify and evaluate the significant environmental impacts of the project
ii. To evaluate the impacts of the various alternatives on the project
iii. To propose mitigation measures for the significant negative impacts of the project on the environment.
iv. To generate baseline data for monitoring and evaluating impacts, including mitigation measures during the project cycle.
v. To seek the views and concerns of all stakeholders in regards to the proposed project.

vi. Develop an Environmental and Social Management Plan with mechanisms for monitoring and evaluating compliance and environmental performance.

1.4 Scope of work

This study entailed the following: -

i. To provide description of the relevant parts of the project including project location, design, components and activities;
ii. To review of policies, legislation, standards and regulations governing Environment at International, Regional and Local levels;
iii. To assemble, evaluate, and present baseline data on the relevant environmental and social characteristics of the project area;
iv. To make consultation with Government agencies, local communities and the private sector operating near the project area;
v. To assess and quantify the potential environmental impacts resulting from the building development, especially within the zone of influence of the project;
vi. Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives, which would achieve the same objectives;
vii. To develop an Environmental Management Plan (EMP) detailing actions and responsibilities for impacts mitigation and monitoring.

1.5 ESIA Approach and Methodology

1.5.1 Approach

Several approaches and study methods to be used in carrying out this assignment with the view of obtaining quantitative and qualitative data (baseline data) in order to prepare the report. Main approaches used were;

i. Follow Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulation of 2018.)
ii. Follow broad ecological examinations such as transect walk and detail analysis of the project area.
iii. The scoping is being undertaken as initial stakeholder identification through identification of issues, problems and concerns, summary of results and ToR for EIA.

1.5.2 Methodology

The ESIA study for the project was carried out in accordance with the approved Terms of Reference. The study included the following methodologies:

i. Meeting and Interview;
ii. Review of Documents;

iii. Transect Walk
iv. Site visits;
v. Measurement of environmental parameters

i. Meeting and Interview

Key stakeholders were identified and specific meetings and interviews schedules to gather their views and perceptions on the project. Some of the key Stakeholders consulted in this process include the following; Mwanga District Council Officers (District Agriculture, Irrigation and Cooperative Officer (DAICO) and District Land Office), Kisangara Village and Plant Manager. Specific results of the interview and meeting is presented in subsequent chapters in this report.

ii. Review of Document

Reviews involved acquisition and review of project documents, reports, maps and drawings relevant to the project. Other documents reviewed included different pieces of national legislation, policies, guidelines and regulations as well as international policies and guidelines and procedures.

iii. Site visits

The objectives of site visits were to observe and capture baseline data on the existing biophysical and socio-economic environment of the project area. In addition, the visits provided an opportunity to consult stakeholders and senior government officials on their views regarding the project and its potential impacts.

iv. Transect Walk

The EIA team undertook a transect walk around the project site. This exercise was carried out in order to observe physical features existing in the project site to establish relationships with the project building that pose environmental and social issues worth noting for studies and identify the major environmental and socially sensitive receptors. The transect walk was undertaken in sub wards in the vicinity of the project to consult members living near the project site.

v. Measurement of environmental parameters

The ESIA team collected and analyzed baseline air quality and noise level at the proposed project site. Four (4) sampling locations were selected based on relative distance to the proposed project sites, and existing multiple sources of air pollution in the campus. The ESIA team considered the four corners of the project site and the standby generator to be the main sources of air pollution at the area. The collection of data was done around 1420hrs to 1800hrs) so as to predict the level of air quality during the renovation phase.

a) Measurement of ambient dust levels (PM2.5 and PM10)

Dust levels from the sampling points were determined using the Air quality detector (HT-9600). The equipment is capable to sample dust in the range from 0.01 to 2500 mg/m^3 with a resolution of 0.001

mg/m^3 or (1µg/m^3). The Air quality detector (HT-9600) measures particulate concentrations using a near forward angle light scattering technique. Infrared light of 880 nm wavelength is projected through the sampling volume where contact with particles causes the light to scatter. The amount of scatter is proportional to the mass concentration and is measured by the photo detector. Samples were collected at a breathing height of approximately 1.5 meters above the ground.

b) Ambient Gaseous Assessment

The ambient air quality (gases emission) to the sampling locations was assessed using Portable Multi Gas Detector BH-4S model. The instrument operates using a heated metal oxide semiconductor. The gas molecules adsorb onto the heated surface where an oxidation-reduction reaction occurs causing a change in the electrical conductivity of the metal oxide. This change is proportional to the concentration of the gas of interest.

The gas detectors established the air composition characteristics by recording the proportions of Oxygen (O2) [%], Methane (CH4) [%], Carbon monoxide (CO) [mg/m^3], Carbon dioxide (CO2) [%], Nitrogen oxide (NO) [mg/m^3], Nitrogen dioxides (NO2) [mg/m^3], Sulphur dioxide (SO2) [mg/m^3], and Hydrogen sulphide (H2S) [%]. At the sites, the equipment was mounted at 1.5m above the ground. Three reading were collected at each sampling point, and the mean value was used as a representative value of that particular point. Results were compared with local and international standards.

c) Ambient Noise Levels

Noise levels assessment was carried out using a Digital Sound Level Meter at a range of 30dB – 180dB (A). On taking measurement, the meter was set to the "A" weighed measurement scale, which enables the meter to respond in the same manner as the human ear. The "A" scale is applicable for workplace compliance testing, environmental measurement, and workplace design and law enforcement. The meter was held approximately 1.5 m above the floor and at least 0.5 m away from hard reflecting surfaces such as walls.

1.6 Report Structure

The ESIA study was prepared as per the guidelines provided under the Environmental Management Act No. 20 of 2004 (Cap 191) (Amendment 2018) and its subsequent EIA and Audits Regulations GN 349 of 2005. Thus, EIS is comprised of the following;

i. Executive Summary
ii. Introduction, objectives, rationale and methodology
iii. Project description, location and relevant components of the project and project activities
iv. Policy, Legal and Administrative Framework
v. Baseline Information
vi. Public Participation and Stakeholder's Consultations

vii. Assessment of Impacts and Identification of Alternatives
viii. Environmental Mitigation measures
ix. Environmental and Social Management Plan
x. Environmental and Social Monitoring Plan
xi. Cost Benefit Analysis
xii. Decommissioning
xiii. Summary and Conclusions
xiv. List of References

CHAPTER TWO

2.0 Project Description

2.1 Introduction

In this chapter an attempt has been made to describe the location and accessibility of the project site, project boundaries, existing situation, project components, project utilities, and project activities to be undertaken.

2.2 Nature of the project

The project will entail the following activities; planting of new sisals, uprooting of old sisal plants, construction of new worker's house and renovation of factory buildings, workers house, farm roads and bridges, and other civil works, installation of new decortication machines, brushing and pressing machines, and improvement of infrastructures such as buying of new generator, drilling of boreholes and addition of water storage tanks.

2.3 Project Location, Accessibility and size

The proposed project area is located at Kisangara village, Lembeni Ward, Mwanga District, Kilimanjaro Region. The estate can be accessed through the main road Dar es Salaam-Arusha road then cross to the rough road. The site is about 1km from the main road. The estate has the total area of 2175Ha. Both roads are in good condition and can be accessed throughout the year.

The proposed estate area is boarded with Kiruru village in the Northern, Kilongaya village in Eastern, village farms in the western and Mangara and Kisangara village in the Southern village.

Table 2.1: Location/Coordinates of the Husseni Sisal Estate by Google Earth in WGS84 Datum

Sn	Latitude	Longitude	Description
1	-3.72688	37.59190	Main gate entrance
2	-4.34066	37.84309	Factory

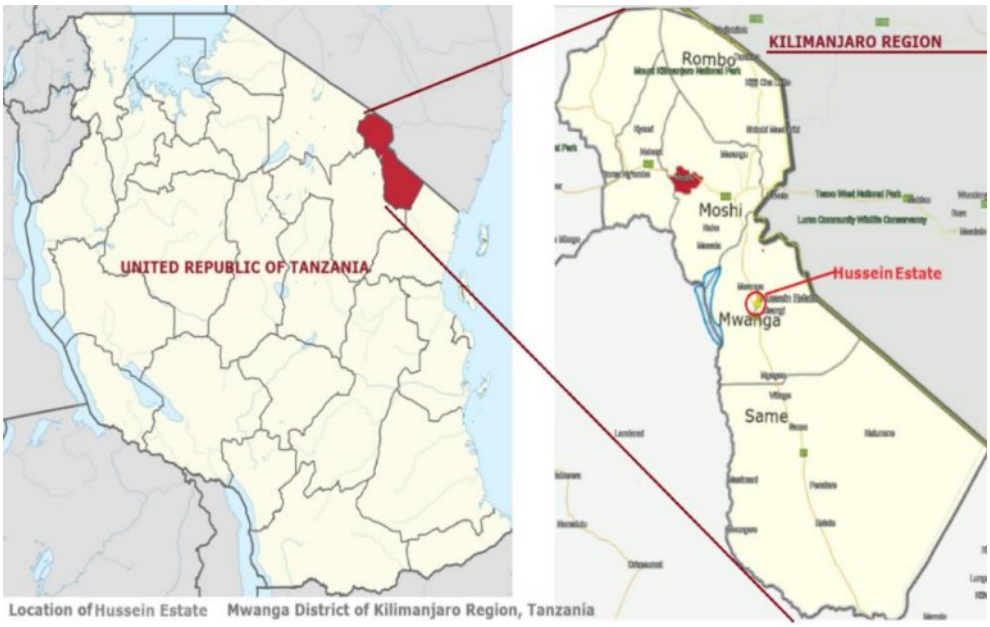

Figure 2:1: Location Map of Husseni Estate at Mwanga District, Kilimanjaro Region, Tanzania

2.4 Land tenure, use, ownership and management

The parcel of land is legally owned by METL with the certificate of Occupancy No.12709, occupies the total area of 3247 acres. The proposed expansion and modernization will occupy a total area of 539acres.

The land shall be used for agricultural purpose only; Use Group 'R' Use Classes (d) as defined in the Urban Planning (Use groups and Classes) Regulation of 1960 amended in 1993. See attached copy of the ownership document. Hence the development in the area is compatible with the designed land use of the title.

2.5 Existing Environment and Surrounding

i. Buildings

There is office block, six (6) residential houses for management staff, seventy-five (75) worker's quarters, factory building, workshop building, store building, generator room, diesel and petrol oil storage area (with capacity 2600ltrs), mosque, drying area, dispensary and primary school which are private owned. The estate has well maintained access roads linking the estate and surrounding villages and farm roads for transporting sisal leaf.

ii. Plant and Machinery

The estate has plant and machinery and farm equipment's. The plant and machinery include two (2) coronas, one under operation and the old one which is currently not working, press and brush equipment and other equipment's. Farm equipment include trailers, harrows, agro-tractors, rotary slashes and other equipment.

The existing coronas have a total sisal decortication capacity of 140 meters per shift of 8-hours a day. The existing brush and press machines are supportive of the corona capacity.

iii. Motor vehicles

The estate has motor vehicles which include tractors, trucks, pick-ups and motorcycles. The motor vehicles are used for farm operation such as transport of sisal leaf and fibre, workers and other services.

iv. Utilities

The estate has water infrastructure including water tanks and water pipes connected to the factory sites. The estate is supplied with electricity from the national grid supplied by the Tanzania Electric Supply Company (TANESCO) and there is a standby generator with capacity of 550kVA which is used when power cut off.

2.6 Current Waste Management

i. Sisal processing wastes

Waste generated from processing include; sisal leaf decortications waste (SLDW), short fibre (flume tow) and sisal dust. Flume tow generated are collected, dried and later used for making sacks. Sisal leaf decortications waste (SLDW) are later used as fertilizer in the nearby village farms.

ii. Domestic waste

These include wastes like food waste, paper, glass, ropes, dried leaves etc. These wastes are collected in the dustbins positioned in different location and then decomposed. There is waste segregation.

iii. Liquid waste

Waste water is from decortication process, kitchen and other sanitary facilities. Sisal is harvested and processed using a decorticator machine which crushes sisal leaves into fibre, resulting in generation of sisal juice or liquid waste. Liquid waste from decortication is managed by using three treatment ponds which are situated within the estate at a distance of 150m,170m and 180m from the decortication area. Water from the third pond is used for irrigation by villagers who grows maize and green pepper and recycled for further re-processing

Liquid waste from kitchen and sanitary facilities are managed by using septic tanks and soak away pits.

iv. Hazardous wastes

Hazardous wastes include scrap metal, waste oil from servicing of vehicles/machines and generators and plastic bottles. These are collected and stored within the project site waiting to be given licensed dealers.

Old/un used vehicles are placed in one location and used as spare parts when needed.

2.7 Description of the Project Components

The proposed project will involve the following:

i. **Farm Expansion and Rotation Program**

Husseni Sisal Estate is envisaging increasing sisal production by expanding the acreage under sisal crop through new planting in the fallow land and implement crop rotation in a total of 519-Ha within 5-years period. Each year, 104Ha of land will be planted with new sisals. Also, there will be uprooting of old sisal plants.

ii. **Buildings and civil works**

This will involve construction of new worker's house and renovation of factory buildings, workers house, farm roads and bridges, and other civil works.

iii. **Installation of new plant, machinery and equipment's**

This will include installation of new corona, brushing machine, press machine, workshop equipment and other equipment's.

iv. **Improvement in electricity and water infrastructure of the estates**

This will entail procurement connection and installation of Transformer (500kVA), High-Tension lines, electric generators (550KVA), and other accessories.

The project will make improvement on the water infrastructure by drilling new boreholes (8'at 100mtr), adding water storage tanks (200,000 liters), water pump-10HP.

v. **Improvement on transport facilities**

This include buying new motor vehicles such as tractors, trucks, pick-ups and motorcycles. The motor vehicles are used for farm operation such as transport of sisal leaf and fibre, workers and other services. About eight (8) tractor and trailer, one (1) lorry with capacity of eight (8) tones and two (2) pickups with capacity of one (1) tone will be parked at fully capacity at the parking lot.

vi. **Expected Outputs**

Currently, the production capacity is approximately 800-MT per year, after the project implementation 3400-MT of sisal fibre are expected to be produced per annum in the next 10-years.

2.8 Project Activities

The project activities are as follows;

2.8.1 Planning Phase

The activities to be involved are as follows;

i. Land preparation
ii. Planning and seeking of the appropriate approvals from the relevant authorities such as building permit obtained from the district council, construction site registration from OSHA, water use permit from Pangani Basin Water Board while during operation phase the proponent should obtain water discharge permit from Pangani Basin Water Board, workplace registration etc.
iii. EIA Project Report preparation

2.8.2 Project Construction Phase

Project construction activities will involve land clearance, cultivation, plantation, field maintenance, construction/renovation activities, installation of new machines and improvement of various infrastructure. The project construction period is expected to be six (6) months.

2.8.2.1 Project Construction Activities

i. Land Clearance

In 5-years consecutively, the project will undertake land clearance of around 519-Ha/year for sisal planting. This will involve the use of heavy-duty crawler tractors with suitable equipment such as dozer blades and Marden rollers used to clear bush and old sisal plants. The brush cut area is usually given rest of about two months to allow rotting of the brush cut plant materials. This land clearing operation also involves heaping, stumping and allowing decomposition of the dead vegetative materials in order to prepare the land for ploughing.

ii. Land Cultivation

Manual and tractor machine are techniques used for land cultivation to ensure optimal seedbed preparation and minimize soil disturbance. The use of heavy-duty crawler tractors with appropriate rome harrows / ploughs are required for carrying out first and second ploughing for the purpose of establishing the best seedbed with the required ploughed depth. The land preparation for new sisal planting is carried out in conjunction with the planting of sisal nursery.

The ratio of sisal nursery to planted field is a hectare of sisal nursery to 14 hectares of new sisal planted in double rows. Single row planting will require less hectare of nursery but in this project document it has been assumed that double row planting will be carried out in each Estate. An average of 220 ha of nursery are expected to be planted every year.

iii. **Planting**

Activities involved in this operation include measuring, holing, digging planting materials from mature nurseries, transport of the planting materials, actual planting, refilling of dead planted sisal and application of fertilizers.

iv. Other overheads

The project will entail estates maintenance of the physical infrastructure and the sisal crop, harvesting and processing of sisal products as well as marketing of the final products.

v. Buildings and Civil Works

This will involve the following activities;

- Site clearance; including removal of natural vegetation and trees and any buildings in the construction site
- Earthwork activities such as clearing of site access road, excavation for the preparation of construction of building infrastructure, and drainage system;
- Construction/renovation of yard and fence, generator room, corona shed, corona waste canal and oxidation ponds, roofing of tow collection area, workers house etc.
- Construction of borehole and rainwater harvesting system for the building;
- Construction of parking facilities for loading / off-loading trucks and other vehicles. There will be enough room for vehicles (either motorized or man- powered) to turn around in a loading /off-loading. About 10 motor vehicles at full capacity that will be parked at the parking lot.
- Site clean-up and rehabilitation of cleared areas

vi. Utilities

The project will undertake to improve the infrastructure for utilities including electricity and water by procuring new generator, drilling boreholes, water tanks, pumps and others.

<u>Criteria for borehole locations</u>

Choosing the right location for your borehole is critical to its success. Generally proper borehole sites should be:

- Free from pollution of animal and human waste;
- Protected from the risk of flooding;
- Protected from erosion that may be causes by surface runoff after precipitation;
- Within easy access (and for the drilling rig);
- Have minimized hydraulic interference with boreholes located nearby.

2.8.2.2 Project Construction Materials

- **Sourcing and transportation of Building Materials**

Building materials will be transported to the project site from their extraction, manufacture, or storage sites using transport trucks. Materials such as sand, gravel and quarry stone will be obtained from approved sources in Mwanga District. Water for construction activities will be obtained from the boreholes present within the site.

Concrete blocks will be used for construction. Use of concrete block is more environmentally friendly than use of burnt bricks, which contribute to deforestation. The concrete blocks are stronger and long lasting, do not lead to deforestation as burnt bricks do and that procurement of large quantities of cement for making the concrete blocks will contribute to increased growth of the local economy.

Other materials such as cement, paints, timber, roofing materials, windows, doors and other joinery, tilt and roller doors, wallboard and plasterboard, light fittings, fuel and oil, electricity, water, ceramic tiles, polythene, steel, steel pipes, PVC pipes, adhesives, copper wires, gas (acetlylene and oxygen), cardboard will also be sourced for the project. Construction materials will be sourced depending on the construction stage.

Majority of the materials will be procured within the country, however, due to demand for quantity and quality, some of the materials/machines will be imported.

- **Electrical Work**

Construction phase will involve use of electricity for welding, metal cutting etc., Electricity will be supplied by TANESCO and there will be a standby generator with capacity of 550KVA to be used when power cut off.

Electrical works such as installation of electrical gadgets, devices and appliances including electrical cables, lighting apparatus, sockets etc. will be carried out by a licensed electrician to the satisfaction of the TANESCO.

- **Storage of Materials**

Building materials will be stored on site. Bulky materials will be carefully piled on site. To avoid piling large quantities of materials on site, the proponent will order bulky materials such as sand, gravel and stones in bits. Materials such as cement, paints and glasses among others will be stored in temporary storage structures, which will be constructed within the project site for this purpose.

2.8.2.3 Construction Equipment

The project activities will involve the use of different machinery/equipment as follows;

i. Land preparation machines and equipment's

The project will use include bulldozer, Motor Grader, Crawler tractor, Rome harrow.

ii. Field maintenance and leaf transport equipment

The project will use the following equipment's; Tractors, Disc-Inter Harrows, 4-disc plough, rotary slashes, Sisal Harvesting Knife and other equipment's.

iii. Build and civil works machines/ equipment's

Different equipment/machinery will be used during construction/renovation phase. These will include:

a) Bulldozers for clearing the site, removal of top soil and vegetation materials, and pushing out stumps;
b) Motor graders for grading and levelling land for buildings and access road formation;
c) Tippers/lorries for transporting construction materials;
d) Light machinery like pedestrian rollers for access road compaction;
e) Heavy rollers for access roads compaction;
f) Front end loader for loading materials onto tippers and lorries;
g) Several light equipment like wheel burrows, shovels, picks;
h) Concrete mixers;
i) Earth mover;
j) Compactor;
k) Wheelbarrow; and Hammers and bolt and nut fasteners, hand saw, electric and gas welders, electric saws and grinders, load roller, trucks, hand drills and drill bits, wire cutters, concrete mixer trucks, wheel loader, fork lift, excavator

2.8.2.4 Project construction workers

A construction work force of both skilled and non-skilled workers will be employed. About 50 workers are expected to be employed for renovation of factory buildings and construction of worker's camp. About 600 workers will be employed for land clearance, cultivation, and planting. The number of workers will be added depending on the nature of the activity. Gender will be considered during employment. For the semiskilled and unskilled workers, people from the nearby communities will be employed. Some project workers will be coming from their home to the project site while others will be staying in workers' camp/quarters.

Construction workers will be employed on fixed term contract basis and will be operating eight (8) hours a day.

2.8.2.5 Project Construction/Renovation Wastes

It is anticipated that the project will generate a variety of wastes during its construction phase. The characteristics of the wastes are discussed in this section.

a) **Soil:** The soil generated during excavation will be stockpiled along the foundation trenches and used for re-establishment of site at the end of the project.
b) **Pieces of timber/wood, empty cement bags and pieces of iron steel:** Large pieces of timber/wood generated during the construction phase will be transported back to the contractor's

yard for reuse in future while the small pieces of timber/wood will be disposed-off. Empty cement bags will be collected and disposed to the dumpsite/ sold to local vendors.

c) **Empty paint buckets:** The empty paint buckets will be disposed-off to registered plastic waste dealers.

d) **Excess sand and stock piles:** These can be used for future construction activities e.g. renovations. Upon completion of the project, these will be moved by the contractor to a suitable yard.

e) Domestic wastes such as Food remains, plastic bottles etc.: The proponent will provide dust bins for temporarily storage of waste within the premises before final disposal to the designated dumping site.

f) Old sisal plants/grasses/shrubs: will be collected in one place and left to decompose.

2.8.3 Project Operation Phase

The operation phase will involve production of sisal fibres. Sisal fibre production starts with nursey preparation to obtain the seedlings. Sisal field maintenance include sisal planting, weeding, de-suckering, de-bushing, sisal harvest and soil preparation. Sisal fibre production entails decortication, drying of sisal fibre from the corona, fibre brushing, pressing and balling.

2.8.3.1 Project Operation Activities

Sisal Processing entails the following;

i. Harvesting mature sisal leaves

This is the preliminary stage for fibre processing soon after cutting of sisal leaves and transporting from the farms by the use of trails. It is always achieved by unloading the trails and loading feeding plate directly by throwing the bundles of sisal leaves where the bundles are untied ready for the next stage.

ii. Shaking

After feeding the sisal leaves are then allowed to pass on the shaker wheel specifically for removing the dust on the leaves and separating the leaves from them being bundled to an arrangement that will allow the next stage to be possible and simple.

iii. Decortications

Decorticators (corona) are used to extract sisal fibre. Leafs are crushed and beaten by a rotating wheel set with blunt knives, so that only fibres remain. The other parts of the leaf are washed away by water. Decorticated fibres are washed before drying by sun or by hot air. This wet process requires water (about 40,000 litres per shift). No chemical substances are applied at this stage. Before squeezing, sisal fibres are rinsed to ensure the requisite quality is achieved (about 2,000 litres of water per day). Wastewater is

produced and discharged through designated channels. From the drums the sisal fibre is conveyed to a squeezing part ready for transportation to drying lines.

iv. Drying

After decortication the fibre is taken to the drying ground where it is spread over galvanized wires. Lines of three parallel wires, with the central one slightly raised, are used to prevent kinking of the fibre. Sun-drying is done for 6-8 hours. Drying for longer hours lowers the quality of the fibre. Proper drying is important, as fibre quality depends largely on moisture content. Moisture damage will cause discoloration and cause the fibre to turn black and give off a musty smell. The dried fibre represents only 4% of the total weight of the leaf. This process also combs out the shorter fibre strands/strings of 7.5 to 12.5 cm in length. Once it is dried the fibre is mechanically brushed.

Alternatively, mechanical or solar-powered dryers may be used instead of sun drying. However, the method is expensive.

v. Brushing

Brushing takes place after drying. The short and long fibre from the drying lines are separately fed manually onto the brushing machine which contain of revolving metal beakers; hanks of fibre are fed by hand, one end first and then the other. Brushing frees individual fibre from each other and removes the short fibre, which are called tow. It also straightens and frees individual fibre from each other. To reduce friction and loss of fibre, it is recommended that oil is applied on the fibre before brushing.

Records on quantities of fibre before and after brushing for each batch, date and identification of the operators shall be maintained.

vi. Grading

Grading is done for marketing purposes as different grades attract different prices. This is the process of separating the brushed fibre into various categories according to length, color and presence of impurities, length being the predominant character. Grading is a continuous process that starts from leaf cutting, when leaves are sorted into similar sizes.

Sisal fibres are always graded according to quality for marketing purposes. The following are the recommended sisal grades by the Tanzania Sisal Board.

- GRADE 1 - Length of fibre is from 90cm upwards. The colour of fibre is creamy white to cream. It is free from defective decortications and properly brushed. Free of un-decorticated barks, harshness, knots, tousled and bunchy ends and free of tows.

- GRADE A - Length of fibre is from 90cm upwards. Colour of fibre is yellowish caused by over drying. It is free of defective decortications and properly brushed. Free of un-decorticated barks, harshness, knots, tousled and bunchy ends and free of tows.

- GRADE 2 - Length of fibre is from 75cm to 89cm. Colour of fibre is creamy white to cream. It is free of defective decortications and be properly brushed. Free of un-decorticated barks, harshness, knots, tousled and bunchy ends and free of tows.

- GRADE 3L - Length of fibre is from 90cm upwards. Colour of fibre is a mixture of whitish and yellowish. It is free of defective decortications and properly brushed. Free of un-decorticated barks, harshness, knots, tousled and bunchy ends and free of tows.

- GRADE 3 (or 3SHORT) - Length of fibre is from 60cm to 89cm. Colour of fibre is a mixture of whitish and yellowish. It is free of defective decortications and properly brushed. Free of un-decorticated barks, harshness, knots, tousled and bunchy ends and free of tows.

- GRADE UG (OR R) - Length of fibre is from 60cm upwards. Colour of fibre may be brownish and spotted due to damaged leaf or greenish due to insufficient water during decortications. Fibre is properly brushed, free of un-decorticated barks, harshness, knots, tousled and bunchy ends and free of tows.

- GRADE S.S.U.G. (SUB STANDARD UNDER GRADE) - This is the fibre that does not conform to standard UG grade but can be exported as line fibre. Length of fibre is not less than 60cm. Colour of fibre may vary from yellowish to darker and more blemished. Spots in a higher proportion are acceptable. But it is free of un-decorticated barks, harshness, knots, tousled and bunchy ends, rotten fibre and tows.

- GRADE TOW 1 (TOW NO. 1) - This is fibre which has been cut and thrown behind the brushing machines during the process of brushing. Colour of fibre should be creamy white to cream. It is free of un-decorticated barks, knots, dusts, and sweepings and should not contain fibre of other mentioned grades.

- GRADE TOW 2 (TOW NO. 2) - This is fibre which has been cut and thrown behind the brushing machines during the process of brushing. Colour of fibre may be brownish, spotted, yellowish or greenish. Fibre is free of un-decorticated barks, knots, dusts, and sweepings and does not contain fibre of other mentioned grades.

- GRADE UF (UNSPINNABLE OR UNEXPORTABLE FIBRE) - Fibre of this grade can be of any length and colour. Fibre normally contains a lot of un-decorticated barks, harshness, knots and heavily spotted. Generally, this is fibre which can't be put in any of the above-mentioned grades.

- UNCARDED FLUME TOW - It is uniform in colour of creamy white to light brown, devoid of un-decorticated strips of sisal leaf, rotten fibre and foreign materials. It is dried properly with moisture content similar to other grades. Dust content not to exceed 15 percent when extracted by hand. The bales are pressed to standard size weighing 200kgs per bale.

- CARDED FLUME TOW - It is the same as uncarded flume tow except the total dust content not to exceed 10 percent.

METL- Sisal Division is grading its sisal fibre in the following grading system:

Grade		Remarks
1	3L	The prime grade, well brushed, white with no blemishes, with minimum length of 90cm.
2	UG	Common grade in all estates, well brushed with blemishes and with minimum length of 60cm.
3	TOW 1	Mixed fibre obtained after brushing and grading. This grade is used for bag manufacturing.
4	UF/SSUG	Poorly decorticated fibre used for bag manufacture.
5	F/TOW	Fibre recovered from the flume channel used for bag manufacture.

vii. Baling and packaging

Sisal baling is the process of pressing the sisal fibre into the prescribed weights and volume. The pressed fibre is secured using preferably natural materials such as sisal ropes. During pressing, each grade shall be baled separately into standard weights of 100, 200, and 250 kilogram bales. Other bale weights can be considered depending on the consumer preference and subject to approval by the Authority.

The weighing machines used should be calibrated in line with Weights and Measures Act. Records on calibration status, number of bales produced, weight per grade, identification of the bale operator and date of baling shall be maintained.

viii. Labelling

The bales are labelled legibly and indelibly with the following information. a) product name; b) grade; c) trade mark of the producer; d) country of origin; e) bale number; f) date of production (baling); and g) bale net weight in kilograms.

Note: The label should preferably be made from a natural fibre fabric. Where ink is used for labelling, it should not penetrate to the fibre to avoid contamination

ix. Storage

Storage of sisal should be carried out in a facility approved by the Authority. Storage area should be sufficient to store fibre awaiting brushing and for storage of bales waiting for transportation to the market.

-To preserve the quality of sisal fibre (color, moisture content, and physical fibre properties), the storage area should be:

- ✓ Dry and well ventilated;
- ✓ Fumigated before storage of the sisal fibre and proofed against rodents, water leakage and direct sunlight;
- ✓ Equipped with a fire detection and fighting system in accordance with the OSHA;
- ✓ Monitored at specified intervals (daily, weekly or monthly) to reduce risks of color deterioration, rot, contamination among others based on prevailing environment

-The bales should be stacked on pallets and avoid direct contact with the walls

- ✓ Stacking should be done in a manner that ensures stability of the bales and prevent any fall or collapse of the stacks.
- ✓ It should allow easy access for human and machinery and not to interfere with the lighting, ventilation and safety equipment in accordance with OSHA.
- ✓ Bales of different grades should be stacked and stored separately to avoid mix up
- ✓ Records on number of bales in the store, weight per grade, bale number, date of receipt and dispatch shall be maintained.

x. Transportation

Sisal fibres are transported to ports and to local consumption (local and international markets). There is a sisal bag manufacturing plant located in Morogoro with a sisal spinning plant. Transportation department include plant operators, small vehicle drivers and heavy truck drivers.

Below shows Sisal Processing flow chart.

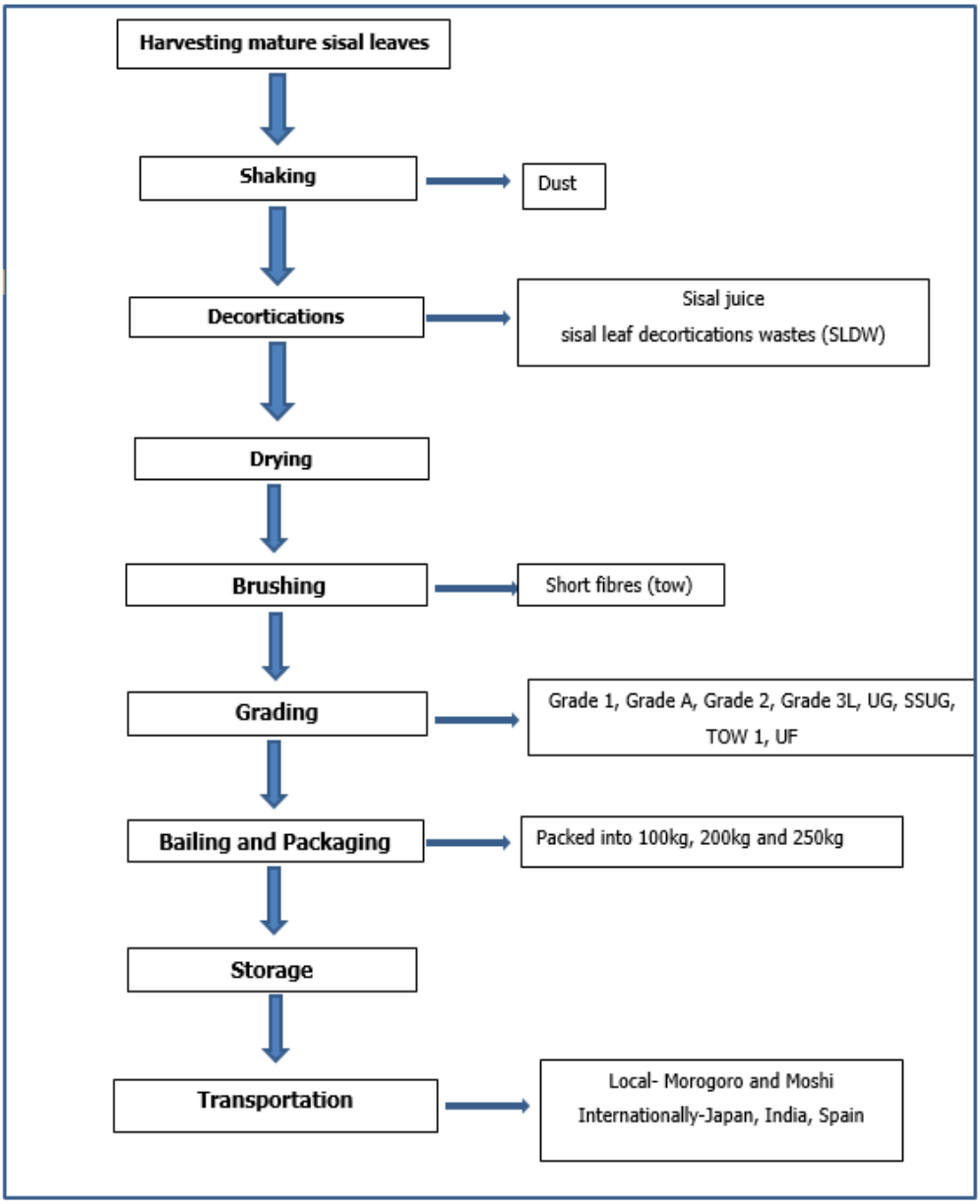

Figure 2.2: Production Process flow chart

2.8.3.1.1 Inspection for Quality Assurance

Inspection of sisal fibre shall take place at the owner's premises before marketing. An authorized Inspector from Tanzania Bureau of Standards (TBS) shall take samples. Samples shall be tested to ensure conformity to grades as defined by Tanzania Sisal Board.

The Inspector shall verify that bales are labelled as per clause 10.6 on labelling). The weight and moisture content are important parameters in sisal fibre trade and must be recorded during inspection. An inspection report detailing all the above parameters and any important observation shall be maintained.

2.8.3.2 Project Operation Materials

i. Production equipment

The sisal fibre production equipment's including;

a) Corona
b) Brushing machine
c) Press machine
d) Workshop equipment and other equipment

ii. Materials

- **Water**

The estate is well supplied with water from the three (3) boreholes located within the site. The Pangani Basin Water Board grant water use permit to abstract one point one (1.1) litres of water per second by pump from Borehole for Industrial purposes. There are also two (2) water storage tanks with 500,000ltrs and 900,000ltrs. Large amounts of water are used in decortication process. About 40,000 litres of water are used per shift of 8-hours a day.

- **Electrical Supply**

The estate is supplied with electricity from TANESCO. There is also a standby generator with a capacity of 550KVA to serve during power cuts. The estate uses electricity for running machines, lighting, computers and office equipment, and equipment for facility heating, cooling, and ventilation. After expansion one generator will be added. Current, about 18053 units of electricity are used per month, after expansion, about 25053 units of electricity are expected to be used per month.

- **Sanitary facilities**

At the estate, there are sanitary facilities for male and female. More sanitary facilities will be constructed based on the number of people.

- **Motor vehicles**

The project will use the following motor vehicles for transporting sisals and staff to work places.

i. Trucks
ii. Dump truck
iii. Bus
iv. Pickups
v. Tractors and Trailers

2.8.3.3 Project Operation wastes

i. Sisal processing wastes

Waste such as sisal leaf decortications wastes (SLDW), short fibre (flume tow) and sisal dust are expected to be generated. Flume tow generated will be collected, dried and later used for making sacks. Sisal leaf decortications waste (SLDW) will be used as fertilizer in the sisal farms.

ii. Domestic waste

These include wastes like food waste, paper, glass, ropes, dried leaves etc. These wastes will be collected in the dustbins positioned in different location and then decomposed within the project site. The management has to ensure waste segregation.

iii. Liquid waste

Waste water is from decortication process, kitchen and other sanitary facilities. Sisal is harvested and processed using a decorticated machine which crushes sisal leaves into fibre, resulting in generation of sisal juice or liquid waste. Liquid waste from decortication will be managed by using waste water stabilization ponds which are situated within the estate.

Liquid waste from kitchen and sanitary facilities will be managed by using septic tanks and soak away pits.

iv. Hazardous wastes

Types of hazardous waste to be generated include fuel, oil, lubricants, scrap metals and plastics. Fuel, oil, lubricants, scrap metals and plastics will be temporary collected and stored at a designated area before sold to recyclers.

2.8.3.4 Project Resources

- **Project Operation workers**

Currently the project has employed over 600-700workers depending on the season this include skilled workers, technical staff, slashers, cutters, loaders, drivers, security man, brushers, drying, balers, staking, headmen etc. After expansion about 600 workers are expected to be added. Some workers will be staying in workers' camp/quarters and others will be coming from their homes.

2.8.4 Decommissioning Phase

Decommissioning is the last phase in the lifetime of such facilities, following their design, construction, operation and permanent shutdown. It comprises different administrative and technical activities whose purpose is to remove or to minimize the residual hazards in the facility after it is shut down.

2.8.4.1 Decommissioning activities

These will involve;

i. Removal of structures on or beneath the ground;

ii. Disposal or secure isolation and/or treatment of contaminated equipment in-situ or offsite
iii. Remediation of aesthetics (back-fillings, stained soil removal, waste disposals, etc.) and containment control of contaminant and general site clean-up.
iv. Access controls for physical structures remaining on- site that are unsafe or hazardous to humans or animals
v. Remediation of aesthetically unacceptable portions of the site (filling of pits, removal of stained soil and odorous material, levelling of mounds, disposal of waste rock) etc.
vi. Clean-up of the site to a level which will provide long-term environmental protection and will be safe for the intended future use
vii. Re-vegetation

2.8.4.2 Project demolition wastes

Demolition waste is waste debris from destruction of buildings, roads, bridges, or other structures.

i. **Concrete and Brick:** Concrete and brick can be recycled by crushing it into rubble. Once sorted, screened and contaminants are removed, reclaimed concrete or brick can be used in concrete aggregate, fill, road base, or riprap. Mobile concrete crushers also allow for recycling of concrete on-site.
ii. **Wood:** Wood can be reused, repurposed, recycled. Reused wood can eliminate the need for full-size new lumber if used for smaller building components. Repurposed or recycled wood can be used in pathways, coverings, mulches, compost, animal bedding, or particleboard.
iii. **Drywall:** Drywall is made primarily of gypsum. Once the gypsum is depapered, it can be added in cement production, as a soil amendment, used in aerated composting, or recycled into new drywall. Gypsum recycling can be particularly beneficial because in landfill conditions gypsum will release hydrogen sulfide.
iv. **Asphalt:** Asphalt, from shingles or asphalt concrete, is typically recycled and used in pavement.
v. **Metal:** Scrap metal is an established industry focused on the collection, buying, selling, and recycling of salvaged materials.
vi. **Sisal Waste:** Will be collected in one place and left to decompose.

2.9 Health and Safety Measures

The project site should registered to the Occupational Safety and Health Authority (OSHA) before commencement of any business operation as per section 16(2) of the Occupational Health and Safety Act, 2003.

2.9.1 OHS during construction phase

Occupational health and safety in construction involves the identification, assessment, and control of hazards to minimize the risk of injury and illness to workers. It is essential to ensure that all workers have the necessary training, knowledge, and equipment to work safely.

Before the work starts, competent Environment Health and Safety personnel should:

- Identify and devise risks and their management strategy
- Ensure training – site specific and job-specific
- See that the workforce has access to PPEs and know how to use them
- Observe, inspect and report that agreed safe work methods are implemented, site-wide

Upon arrival at the site, employees, contractors and visitors should receive information about the site hazards and steps taken to control those risks. Also, briefing them about the hazards, PPEs, welfare facilities and site rules can ensure that the work in progress is smooth and efficient.

Moreover, it is important to promote a safety culture in the construction industry, where workers are encouraged to report hazards and near-misses, and where safety is given priority over productivity.

Preventive measures

Much of the construction works include scaffolds, and collective fall prevention becomes a necessity. They must be equipped with toe boards and brick guards. Personal prevention such as podium steps, can be used to prevent falls while working at height. If the weather seems inappropriate, emergency and rescue procedures should be well-defined in advance to avoid adverse effect on workers. All working platforms must be checked for safe conditions and should be inspected for slip and trip hazards.

Other preventive measures that make safe conditions certain are:

i. Regular inspections of the site and the machineries to detect hazards in the first place
ii. Selection of the right PPE (respirators, helmets) to avoid inhalation of asbestos, dust and fibre with provision for appropriate trainings.
iii. Avoid repetitive motions and use long-handled tools to reduce the need of bending down.
iv. Make sure that workers are protected from wet concrete (provide PPE and proper washing facilities)
v. Ensure safe dismantling procedures are in place
vi. Site traffic (for vehicles or moving equipment) should be planned and managed to avoid fatalities onsite
vii. Forklifts should be used carefully in material handling
viii. Pneumatic silencers should be used to reduce noise; electrical hazards (faulty wiring) must be checked and firefighting equipment should be in place.

2.9.2 OHS during operation phase

To comply with safety standards, the project will be operated following all procedures provided by OSHA. Here are different OHS procedures;

i. **Risk Assessment:** A systematic process of evaluating potential hazards before they can cause harm. Once these risks are clearly understood, appropriate measures are taken to mitigate (reduce the potential impact or likelihood) or eliminate the risks. For some hazards, elimination might be possible, like replacing a toxic substance with a non-toxic one. For others, mitigation measures might be more appropriate, like using protective gear or improving ventilation.

ii. **Emergency Response Planning:** Essential components of this plan include marked evacuation routes, designated assembly points outside the danger zone, and a list of emergency contact numbers, including local authorities and medical facilities. Regular drills are pivotal in familiarizing all employees with the plan, ensuring that panic doesn't set in in the face of a real emergency and everyone knows their roles and responsibilities.

iii. **Chemical Handling and Storage:** Some workplaces use chemicals. A designated storage area ensures that chemicals are stored in controlled conditions, minimizing the risk of spillage or unwanted reactions. Employees, especially those directly handling these chemicals, need rigorous training on safe handling procedures, which includes the correct method of transferring chemicals between containers, the importance of using fume hoods, and steps to take in case of accidental exposure.

iv. **Ergonomics:** Ergonomics involves designing and arranging a workplace to optimize it for human use, ensuring that tasks, equipment, and the environment support the user's ability to work efficiently and safely. Ergonomic keyboards and mice can reduce the risk of repetitive strain injuries like carpal tunnel syndrome. Moreover, the arrangement of daily tasks plays a role too. Intermittently changing tasks or taking short breaks can prevent muscle fatigue and cognitive burnout, ensuring the employee's well-being.

v. **First Aid:** The immediate care given to an injured person before professional medical care is available. A crucial element of first aid preparedness is having a kit with essentials like bandages, antiseptics, and pain relievers, which can address minor injuries or stabilize more severe ones. Workers should have basic knowledge of first aid practices. There is a trained first aider in each section.

vi. **Housekeeping:** A clean and organized workplace is not just aesthetically pleasing but also critical for safety. Regular cleaning ensures that potential hazards, like spills that can cause slips, are immediately addressed. Organized walkways without obstructions can prevent tripping hazards and are especially vital during emergencies for swift evacuations.

vii. **Fire Safety:** Fires are among the most common and destructive hazards. Preparedness for such an eventuality begins with having fire extinguishers readily available. But it's equally important for

employees to know how to use them. Different fires (electrical, chemical, or paper-based) require specific types of extinguishers, and using the wrong one can exacerbate the situation. Modern buildings also use smoke detectors and sprinkler systems as early warning and response systems. These devices need regular testing to ensure they are always functional. The objective is to detect a fire early, suppress it if possible, and allow safe evacuation.

viii. **Training and Education:** Specific training sessions should be conducted whenever new staffs are introduced. This holistic approach to training ensures that the entire workforce is prepared, aware, and actively participating in maintaining a safe work environment.

ix. **Changing rooms:** Changing rooms will be provided to prevent workers own clothing being contaminated. The changing facilities should be fitted with adequate seating and contain, or connect directly with, clothing accommodation and showering/bathing facilities. Four (4) changing rooms with lockers will be available, two (2) for females and two (2) for males.

x. **Security:** Security guards have been employed to protect company part's assets and to protect animals from destroying sisals. The company has employed about 100 security guard's from NK Security Company.

xi. **Assembly points:** a place where people in an office, etc. should go if there is an emergency, for example, a fire: Assembly point signs are essential for identifying areas of safety where persons should assemble in the event of an emergency. At the project site there is fire assembly point is a which is located outside of the building, in a safe area away from the fire.

xii. **Health checkup for the new employees:** Employee health screenings at the workplace can identify various health problems that are asymptomatic. Sudden health emergencies can lead to absenteeism and impact the growth of the company. Routine health checkup can detect diseases in time and provide a better chance for treating complications.

xiii. **Regular health checkup for all employees after every six months:** Employers are required to provide regular medical examinations of their regular workers once every year or less by a physician. The employer is responsible for the cost.

2.10 Market Analysis

METL sisal fibre are sold in both local and international markets. The company is estimating to export about 80% of the sisal fibre produced. The balance of the produce (about 20%) are locally sold, specifically to METL Group of companies involved in the sisal spinning and sisal bags manufacturing. The export markets include Japan, India, Yemen, Spain, Italy, Belgium, Holland, France, Ethiopia, Germany and the EAC states.

2.11 Project Boundaries

We can identify three types of boundaries that are considered in conducting EIA. The boundaries are Institutional, Temporal and Spatial boundaries.

2.11.1 Institutional Boundaries

Institutional boundaries refer to those institutions and sectoral boundaries in which the project lies or interacts. These can be determined from political boundaries, Acts, regulations and institutional mandates and administrative structures. This proposed development touches the interest of a number of people and administrative units in relation to several policies, laws and plans, and the overall land and settlements acts. The institutional framework includes; Minister responsible for environment in the Vice President's office, Division of Environment NEMC, District Council and Ward and sub-ward (with committees for environment).

2.11.2 Temporal Boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. The impact of the proposed project will have implications that stretch very far into the future until decommissioning is undertaken. Also, consideration needs to be given to what happens when the project ends, where there is need for site restoration and decommissioning of the project.

2.11.3 Spatial Boundaries

Spatial boundaries are crucial to decide on whether impacts are likely to occur at Local, Regional, National or International Level. The proposed project will have wide ranging implications that could be felt Locally, Regionally, Nationally and probably outside the country thus, causing impacts as far as those areas. In this study, spatial impacts will be determined from the core project area (the area within the proposed project development). The Area of Impact and Area of Influence.

a) Core Project Area

In determining the spatial dimension of the project, it is important to consider impact in a contour layout, starting with the Core Project Area (CPA). This is the area where the project is located and, which will bear most impacts than the rest. In this case the Kisangara village, Lembeni Ward, Mwanga District is the Core Project Area (CPA).

b) Area of Impact (AoI)

This is the area which surrounds the Core Project Area (CPA). This is an area that borders the proposed project area. This area plays an important role and bears some positive or negative impacts. The area of Impact in the case of the proposed project would include, Kiruru village, Kilongaya village, Mangara and Kisangara village. These areas will be linked with the proposed development through road transport, supply of services and goods as well as labor force.

c) Area of Influence (AoI)

The area beyond the area of impact is further away from the proposed project. It consists of the centers of decision making that can influence the development of the industry. This center of decision making includes National Environment Management Council and the Ministry responsible for Environment. The proposed project may attract contractors and consultants beyond Tanzania.

CHAPTER THREE

3.0 Policy, Legal and Administrative Framework

3.1 Overview

This project needs to comply with the Tanzania's national environmental policy and legislation because it is going to be implemented in Tanzania. Tanzania currently aims at achieving sustainable development through rational use of natural resources and incorporating measures in any development activities in order to safeguard the environment. The main legal document which drives towards achieving this goal is the National Environmental Policy (NEP), which was approved by the GOT in 1997. The NEP advocates the adoption of Environmental Impact Assessment (EIA) tool for screening development projects, which are likely to cause adverse environmental impacts.

3.2 National Policies Framework

Relevant policies and legislation pertaining to ground water and surface water pollution, pollution of soil, land and land use, air pollution health and safety were examined, among others in order to ensure that the proposed establishment meets and abide to the existing regulations. These are described below.

Various national policies relevant to this project have been considered. The summary of policies reviewed and their relevance is provided below.

1) National Environmental Policy 2021

The Policy highlights sustainable development as its core concept. It states that Tanzania is committed to sustainable development in the short, medium and long-term and adopts key principles of sustainable development. It is the main policy document governing environmental management in Tanzania by addressing environmental issues as both natural and social concerns. The policy has also proposed framework environmental legislation to take account of the numerous agencies of Government involved in regulating various sectors. Thus, the NEP defines strategic plans for environmental management at various levels and provides approach for mainstreaming environmental issues for decision-making and defining sector policy action plans. In regards to environmental management and protection the policy identifies six key problem areas as; Land degradation; Lack of access to good quality water; Environmental pollution; Loss of wildlife habitat and biodiversity; Deterioration of aquatic ecosystems; and Deforestation.

In order to achieve the above policy objectives; the following measures shall be put in place; Planning and implementation of water resources and other development programmes in an integrated manner and in ways that protect water catchment areas and their vegetation cover; and improved management and conservation of wetlands.

Relevance to the Project: The project will be required to address policy objectives by ensuring that damage to the biophysical and social environment is avoided or minimized during implementation of the project activities which are expected to have impacts.

2) National Land Policy 1995

The National Land Policy of 1995 (Revised in 1997) recognizes the need for protecting environmentally sensitive area such as catchment areas, rivers, fragile waterways, game reserves, etc. The policy stresses that these sensitive areas should not be allocated to individuals. Additionally, the policy promotes land tenure system to encourage the optimal use of land resources, and to facilitate transport-based social-economic development. The Land Policy provides for "full fair and prompt compensation" when land is acquired. Similarly, the project implementation will keenly observe the policy requirements.

The National Land Policy set in motion a land reform giving respect to customary and common rights. In addition, roles of government in land tenure and management have been devolved to the local level and establishment of supporting systems for land registration and entitlement to the sub ward level.

Furthermore, the policy emphasizes on the protection of environment and natural ecosystems from pollution, degradation and physical destruction. In addition, the policy recognizes the importance of social services such as water, roads, energy and solid waste management for environmental protection. It also identifies the need for conservation and preservation of prehistoric/historic sites and buildings.

Relevance to the Project: This policy is relevant to the proposed project and the project design will ensure protection of existing land ownership patterns, social services, proper disposal of solid wastes and suitable landscape works to protect sensitive areas in the project area.

3) Natural Water Policy 2002

NAWAPO's objective is to develop a comprehensive framework for sustainable management of the national water resources. In this case the policy recognizes the need to protect water sources against pollution and environmental degradation. The Water Policy reflects the shift in approach towards comprehensiveness and economics. In addition, the Policy aims at ensuring that beneficiaries participate fully in all states of water resource developments and recognizes the fundamental but intricate linkages between water and socio-economic development, including environmental requirements. The Policy expounds on the importance of water for domestic use, agriculture, livestock keeping, mining energy, fisheries, environment, human health, wildlife and tourism, forestry, navigation and trans-boundary requirements. The policy states that "a holistic water (river) basin approach, integrating multi-sector and multi-objective planning and management, should be taken in order to ensure sustainability and protection of the resource."

With these basic shifts in approach and the attempt to co-ordinate and harmonize the sectoral policies, it is in line with though guidance from the Convention of Wetlands and the vision of the National Environmental Policy.

Relevance to the Project - The proposed project could result into pollution for ground and surface water in the area. In this case project designs will ensure water sources (including streams which ultimately flow into the water sources) are suitably protected to minimize impacts during the renovation and operational phases of the project.

4) National Gender Development Policy 2000

Main objective of this policy is to provide guidelines to ensure gender sensitive plans, programs and strategies in all sectors and institutions. The policy gives emphasis on gender equality with it aims at establishing strategies on poverty eradication through ensuring that both women and men get access to existing resources for their development. It values the role played by women in bringing about development in the society.

Construction sector is also committed to ensuring gender mainstreaming at all levels, through provision of equal opportunities to both men and women in road works and related activities.

Relevance to the Project: The policy requires the project management ensure that gender issues are given emphasis. It also requires that women and men are given equal employment opportunities in the project, whenever possible. Therefore, this project will ensure that women, will be adequately involved at all levels of the project planning to implementation.

5) National Employment Policy 1997

The major aim of this policy is to promote mainly of Tanzania Nationals. Relevant sections of this policy are (i) Section 10, which lays down strategies for promoting employment and section 10.1 is particularly focusing on industry and trade sectors (ii) Section 10.6 which deals with employment of special groups. It identifies women, youth, and persons with disabilities and (iii) Section 10.8 which deals with the tendencies of private industries to employ expatriates even where there are equally competent nationals.

It therefore aims at preparing conducive environment for the unemployed to employ themselves by directing more resources to the self-employment sector, identifying potential areas for employment and lay down strategies of how to utilize areas in promoting employment industry, identify and elaborate on the status and roles of various stakeholders in promoting and sustaining employment, and to develop the self-employment sector in the rural areas as to reduce the rate of migration to urban areas.

Relevance to the Project: The EIA study will fully abide by the provisions of this policy. The Management will abide to the relevant provisions of the policy to ensure that local residents, especially the youth, women

and other vulnerable groups, are given priority in all employment opportunities that will arise during the expansion and operational phases of the project.

6) National Health Policy 2003

The Health Policy is a vital guide towards health development of any country. It is particularly, important in a country like ours where resources and technology are more limited than in other countries, which are relatively better off in both technology and resources The National Health Policy is aimed at providing direction towards improvement and sustainability of the health status of all the people, by reducing disability, morbidity and mortality, improving nutritional status and raising life expectancy. The policy recognizes that, good health is a major resource essential for poverty eradication and economic development. The main objectives of the policy are:

- Sensitize the community on common preventable health problems, and improve the capabilities at all levels of society to assess and analyse problems and design appropriate action through genuine community involvement.
- Promote awareness among Government employees and the community at large that, health problems can only be adequately solved through multi sectoral cooperation involving such sectors as Education, Agriculture, Water, Private Sector including Non-Governmental Organization, Civil Society and Central Ministries, as Regional Administration and Local Government, and Community Development, Gender and Children.
- Promote and sustain public-private partnership in the delivery of health services.

Relevance to the Project: The implementation of this project will ensure that all the staff, workers at the project site will have necessary personal protective equipment, such as gloves, dust mask and the local communities will be informed and protected against all health risks, including awareness on health problem so as to attain poverty reduction hence to achieve economic development.

7) National Policy on HIV/AIDS 2003

The policy provides a framework, direction and general principles in the national response to interventions in the prevention, care and support of the infected and affected by the HIV/AIDS epidemics and mitigation of its impacts. Tanzania is facing major threats to the survival of its people and the development chances of the nation from a concentrated and a generalized HIV /AIDS epidemic. The National Multi-Sectoral Strategic Framework (NMSF) on HIV / AIDS will translate the National Policy of HIV/AIDS by providing strategic guidance to the planning of programmes, projects and interventions by various stakeholders in the fight against HIV/AIDS. In order to make sure that NMSF meets its objectives, the following goals were set

GOAL 1: Reduce the spread of HIV in the country.

GOAL 2: Reduce HIV transmission to infants.
GOAL 3: Political and government leaders consistently give high visibility to HIV /AIDS in their proceedings and public appearances.
GOAL 4: Political leaders, public and private programmes, projects and interventions address stigma and discrimination and take Human Rights of persons living with HIV /AIDS into account.
GOAL 5: HIV /AIDS concerns are fully integrated and prioritized in the National Poverty Reduction Strategy and Tanzania Assistance Strategy.
GOAL 6: Reduce the prevalence of STIs in the population.
GOAL 7: Increase the knowledge of HIV transmission in the population.
GOAL 8: Increase the number of Persons living with HIV /AIDS who have access to a continuum of Care and Support from Home / Community to Hospital levels.
GOAL 9: Reduce the adverse effects of HIV /AIDS on orphans

Relevance to the Project*:* The Estate Management and the District Council is required to make sure that there are no any discrimination and stigma and also take Human rights of person living with HIV/AIDS into account.

8) The National Investment Promotion Policy, 1996

The Policy is promoting investment opportunities that private sector can take up and increase economic growth. The Investment Promotion Policy outlines areas and conditions for investment and comes as a result of the economic liberalization program that promotes the role of the private sector in economic activities in Tanzania. The Policy encourages private sector investments whilst also taking into accounts environmental consideration so as to ensure investments yield the expected benefits.

Relevance to project: The proposed project came into being as a result of this policy that promotes the role of the private sector in economic development. This Environmental Impact Statement will assess the contribution of the proposed development to improvement of social welfare through employment and economic growth as well as an increase in availability of sisal fibre in Tanzania.

9) The Tanzania Development Vision 2025

Composite Development Goal for the Tanzania Development Vision 2025 (URT, 2000) foresees the alleviation of poverty through improved socio-economic opportunities, good governance, transparency and improved public sector performance. These objectives, not only deal with economic issues, but also include social challenges such as education, health, the environment and increasing involvement of the people in working for their own development. The thrust of these objectives is to attain a sustainable development of the people. The Vision 2025 seeks to mobilize the people, the private sector and public resources towards achieving shared goals and achieve sustainable semi-industrialized middle market economy by year 2025.

Relevance to the Project: The establishment of the estate aims at improving commercial and business status for development and improvement of livelihoods of the people in the region and national wide.

10)The National Five Years Development Plan 2021/22-2025/26

The National Strategy for Growth and Reduction of Poverty (NSGRP) or Mkakati wa Kukuza Uchumi na Kuondoa Umaskini Tanzania (MKUKUTA) is focusing on promoting economic growth and reducing poverty in Tanzania. The NSGRP is a five years' program from 2005/06 to 2009/10, which addresses the Tanzania Development Vision 2025 for high and shared growth, high quality livelihoods, peace, stability and unity, good governance, high quality education and international competitiveness. In addition, NSGRP is contributing to implementation of the Millennium Development Goals.

The main objective of the NSGRP is to stimulate economic growth and reduce poverty, improve quality of life and social well-being and improve good governance and accountability. The strategy recognizes the close linkages between economic growth, good governance and improved quality of life and social well-being, and poverty reduction. Among the various factors that have been identified to stimulate growth is the improvement of industrial sector in order to stimulate economic growth.

Relevance to the Project: Project implementation is consistent with the relevant provisions of the NSGRP, as it seeks to improve living standard of people.

3.3 National Legal Framework

This section addresses the legal (Laws, Regulation and Guidelines) and regulatory framework, which is relevant to the proposed project. The legal and regulatory framework provides the various legal aspects that must be adhered to as the project in designed, implemented and later when it is decommissioned.

1) The National Environmental Management Act, 191

Environmental Management Act No.20 of 2004 is the principle legislation governing environmental management in the country. The Act recognizes the right of every citizen to clean, safe and heath environment, and the right of access to environmental resources for recreational, educational, health, spiritual, cultural and economic purposes. Part IX provides for Waste Management. The section makes separate provisions on governing the management of solid waste; litter; disposal and transportation of liquid waste and sewerage; management of gaseous waste and management of hazardous waste. Local government authorities are given specific obligation to minimize solid, liquid, gaseous and hazardous wastes falling under their respective jurisdictions. The proponent has to observe environmental quality standards in respect of air water and soil as stated in 2007 Regulation. Also Carrying out self-Monitoring and environmental Audit and submit the reports to NEMC.

In order to ensure there is effective implementation of national environmental policy objectives, the Act has identified and outlined specific roles, responsibilities and functions of various key players and provides a comprehensive administrative and institutional arrangement which consists of: National Advisory committee; Minister responsible for environment; Director of environment; National Environmental Management Council (NEMC); Sector ministries; Regional secretariat; and Local government authorities (City, Municipal, District and Town Councils).

Relevance to the Project: The Act is relevant because the project is expected to have some adverse impacts to the environment (such as noise, vibration, and dust during renovation stage). Thus, monitoring of the mentioned parameters would require adherence to the developed environmental standards (international and national) and Environmental Management Plan (EMP) and Monitoring Plan (MP) to be prepared as part of design for the proposed project.

2) **Occupational Health and Safety Act, Cap.297**

Part IV of this Act make provisions for safety, health and welfare for persons at work in factories and other places of work; to provide for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities for persons at work. Proposed expansion and modernization of the Estate will entail the employment of both skilled and unskilled laborers, and as such will comply with this Act. Part 111 of the Act calls for the registration of the market or workplaces to obtain compliance certificate as well as submission of drawings in blue prints which depict vital sections to the OSHA's Chief Inspector for approval. Occupational health and safety are key aspects in the operations. First aid equipment, sanitary facilities and effective Personal Protective gears will be provided to employees and maintained by the contractor during the period of renovation.

Relevance to the Project: The proponent shall observe the provision of this Act during all stages of the project development and operation.

3) Local Government (District Authority) Act, Cap. 287

This Act provides for detailed responsibility for Urban and District Councils in the administration of their day-to-day activities. EIA and waste management are pointed out as one of the activities to be managed by both district and urban authorities.

Relevance to the Project: The project activities including this EIA study will seek to liaise closely with Mwanga District Council and other stakeholders in the project area will be required to fully abide the provisions of this law in order to ensure effective management of waste to be generated.

4) The Land Act, Cap.113

The Land Act seeks to control land use and clarify issues pertaining to ownership of land and land-based resources, transactions on land and land administration. This Act identifies three categories of land – village,

public and general, and distinguishes protected or restricted land (e.g. National parks, forest reserves, etc.) and ensures that tenure and rights of legitimate land users are considered and respected. Land sensitivity and potential environment impact of the proposed establishment of shall be considered in order to ensure that the land is not polluted and to allow for natural and rapid restoration of cleared vegetation or disturbed land.

Relevance to the Project: The design and implementation of this EIA process is consistent with this legislation. The proposed project will be carried out within the limits of the site earmarked for the activity.

5) The Fire and Rescue Army Act, Cap 427

The Fire Fighting and Rescue Act of 2007 stipulate that every building with more than one storey should be installed with a number of facilities for firefighting. Buildings have to be provided with adequate means of escape and firefighting facilities. Also, buildings as infrastructure require fire protection to facilitate their regular functioning and service delivery. Protection of buildings is not only necessary for such purposes, but also for the safety of the users.

Relevance to the project: The proposed development under the Act requires the installation of firefighting equipment's. Also, the proponent will employ skilled and knowledgeable personal to use the equipment and means against fire hazards could render attempts to contain fire outbreaks.

6) Water Resource Management Act, Cap.331

The water resources management Act of 2009 principally seeks to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways that take into account ten (10) fundamental principles including:

- Protecting biological diversity especially the aquatic ecosystems;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Providing for systems for managing the growing demand for water use through integrated planning and management of surface and groundwater resources, in ways that incorporate economic, environmental and social dimension in the planning process;
- Proving implementation of international obligations stipulated under international legal instruments to which Tanzania is party and
- Facilitating social economic development.

Apart from incorporating sustainable water use principles and having pollution prevention conditionality in the water permits, the Act goes a step further by putting in place a regime for water resource protection, abstraction (surface and groundwater) and use. Under Section 33(1) of the Act, for the whole or part of a water source, a determination of the ecological reserve shall ensure that adequate allowance is made for each aspect of a reserve.

Relevance to the Project: This EIA study will ensure that all relevant potential impacts from the proposed expansion, rehabilitation and modernization are properly mitigated to avoid any potential social and environmental problems. The discharge of waste water will be restricted as stated in the law, that waste water should be treated before discharged to the environment. Operation activities of the estate will ensure sustainable and efficient use of water.

7) The Water Supply and Sanitation Act, Cap 272

This legislation provides for sustainable management and adequate operation and transparent regulation of water supply and sanitation services; provides for establishment of water supply and sanitation authorities as well as community owned water supply organizations; and provides for appointment for service providers. The main aim of this law is to ensure the right of every Tanzanian to have access to efficient, effective and sustainable water supply and sanitation services for all purposes by taking into account among others protection and conservation of water resources and development and promotion of public health and sanitation; and protection of the interest of customers.

Under this law, the Minister responsible for water affairs shall establish water authority and cluster water authorities in order to achieve commercial viabilities.

Relevance to the Project: The project proponent will ensure that no any kind of waste to be discharged in water sources so as to ensure water conservation and protection is well managed.

8) The Public Health Act, Cap. 99

Part IV of the Act provides for need to maintain cleanness and hygiene and prevent nuisance during renovation works. It calls for effective management of solid, liquid, gaseous, and hazardous wastes. Section 76 of the Act specifically requires every authority to undertake periodic studies to determine the type of solid and liquid wastes generated from markets, institutions and industries; and determine appropriate methods for sorting and storage of the wastes.

Relevance to the Project*:* This project will involve a level of waste generation and therefore the EIA study will design waste management activities to be implemented during the implementation of the project.

9) HIV and AIDS (Prevention and Control) Act, Cap.431

The Act provides for prevention, treatment, care, support and control of HIV and AIDS, for promotion of public health in relation to HIV and AIDS. HIV and AIDS education in workplace, the Act requires that every employer in consultation with the ministry shall establish and coordinate a workplace programme on HIV and AIDS for employee under his control and such a program shall include provision of gender response HIV and AIDS education, distribution of condoms and support to people living with HIV and AIDS.

Relevance to the Project: The project Proponent will observe the requirement of this Act during project implementation by promoting awareness and education concerning the prevention and control of the spread of the disease.

10)The Workers Compensation Act, Cap.263

The law provides for compensation to employees for disablement of death caused by or resulting from injuries or diseases sustained or contracted in the course of employment to establish the Fund for administration and regulation of works compensation and to provide for related matter.

Relevance to the Project: This Act is very relevant to this project as workers will be exposed to various hazards during expansion, rehabilitation and modernization of the estate. The developer and the contractor will have to ensure safety and health of workers at the project environment.

11)The Urban Planning Act No. 8 of 2007

The law provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities; to provide for the grant of consent to develop land and powers of control over the use of land and to provide for other related matters. Expropriation of land for water infrastructure development and associated activities in urban areas shall comply with the provisions for this law. Under Section 3 among other things the law seeks to improve level of the provision of infrastructure and social services for sustainable human settlement development.

Relevance to the Project*:* The provision of the requirement by this project is in full compliance with the Urban Planning Act.

12)The Engineers Registration Act, Cap.63

There is hereby established Board known as the Engineers Registration Board which has responsibility of regulating the activities and conduct of engineers and of engineering consulting firms in accordance with the functions and powers conferred upon it by this Act. Qualification for registration of Engineers as stated in part iii section 10(1) of this act that "subject to the provisions of this Act, a person shall be entitled, on making an application to the Board in the prescribed manner and on payment to the Board of the prescribed fee, to be registered under this Act and to have his name entered in the register as a registered engineer".

Relevance to the project: This project has an engineering works which involves various designs for the renovation of the estate. Example design for Building, Installation facilities such electricity, sewerage systems, waste management (waste water treatment plant, solid waste management system). All required engineering part will be done by a registered engineer to ensure compliances of the Act.

13) The Contractors Registration Act, Cap.235

There is hereby established Board known as the Contractors Registration Board. The purpose of contractor's registration Board is stated under this act in part ii section 3(2a-d). As explained in this act a contractor is "any person who himself as a developer or investor, undertakes the renovation, erection, installation or alteration of any structure, for public use or otherwise, situate below, on or above the ground or other work connected therewith or the execution of any alteration or otherwise to any structure, for public use or otherwise, or other work connected therewith, where such person undertaking to do any such work."

Part iii section 7(1) of this act states the registration of the contractors. "The Registrar shall keep and maintain registers of contractors of different types, categories and classes, in which the name of every person entitled to have his name in them as a registered contractor, shall be entered as soon as it is practicable after being accepted by the Board for registration".

Relevance to project: The proposed project contractors to be involved will be a registered member of the board as already being explained in part iii section 7(1) of the contractor's registration Act of 1997.

14) Environmental Impact Assessment and Audit Regulations as amended on 2018

The Environmental Impact Assessment and Audit regulations are made under Environmental Management Act. No 20 of 2004. The regulations provide basis for undertaking Environmental Impact Assessment and Environmental Audit for various development projects with significant environmental impacts in the country. This section gives a brief description of some provisions in the regulations that are relevant to this study.

Part 111 of the Environmental Impact Assessment and Audit Regulation, formed under G.N. No. 349 of 2005 deals with project registration and screening procedures. Section 5 requires the registration applicant for Environmental Impact Assessment Certificate to submit a project brief report in the format shown in the THIRD SCHEDULE of the EMA (2005) and FIRST SCHEDULE of the regulation. According to the provision, the applicant is required to submit a project brief report to the National Environmental Management Council (NEMC). Section 6 (1) requires a developer/project proponent to register the project in accordance with format specified in the THIRD SCHEDULE of the regulations. The section also, specifies issues to be covered by the proponent in the project brief report. Section 6 (3) requires a project brief to be prepared by a registered environmental impact assessment expert.

According to Section 11 (1) project proponent is required to undertake an environmental impact assessment especially if the project brief has no sufficient mitigation measures, or undertake a preliminary assessment if more information is required to determine a screening decision.

Further details and guidance for the conducting of EIA is provided; these include relevant steps for undertaking Preliminary Environmental Assessment (PEA -Section 11 (2)). Part IV Section 13(1) requires

the proponent to conduct EIA in accordance with general environmental impact assessment guidelines and in accordance with the steps outlined in the FOURTH SCHEDULE of the regulations. Whereas Section 16 specifies EIA study should examine environmental, social, cultural economic and legal issues, The FIRST SCHEDULE gives list of projects subjected to EIA and those that do not requiring EIA and it categorizes the projects into two types namely: Type A (projects requiring a mandatory EIA) and Type B (project requiring PEA).

According to the schedule, Type B Projects are those projects that are likely to have some significant adverse impacts but the magnitude of impacts is not well known. Thus, a PEA is required to determine whether the project should proceed without a full EIA.

Part X Section 44 (1 and 2) outlines the objectives of Environmental Audits and its principal functions. Section 45 outlines the basic principles under which the environmental audit is conducted and Section 46 (1) specifies the type of projects requiring environmental audits as specified in the THIRD SCHEDULE to EMA (2005) and FIRST SCHEDULE of the regulations.

Relevance to the Project: A project of this categorization is likely to have some social and environmental impacts. Following the review of the project brief submitted to NEMC, the decision was made to undertake Environmental Impact Assessment. Based on this, all phases of the EIA study will abide by the provisions of this Act.

15) Environmental Management (Air Quality Standards) Regulation, 2007

The object of these regulations is to set baseline parameters on air quality and emissions and enforce minimum air quality standards. They are also meant to help developers including industrialists to keep abreast with environmentally friendly technologies and ensure that the public health as well as the environment is protected from various air pollution emissions sources. These Regulations stipulates the role and powers of the National Environmental Standards Committee. According to the regulations, the approval of a permit for emission of air pollutants shall be guided by ambient, receptor, emission and specification standards approved by the Minister. Offences and penalties for contraveners are also provided for in the regulations.

Emission and emission limits of sulphur and nitrogen dioxides, carbon monoxide, lead, ozone, black smoke and suspended particulate matter together with their test methods are specified. Tolerance limits and test methods for dust, sulphur dioxide and nitrogen oxides from cement factories into the air as well as from motor vehicles are also given. These pollutants are not expected to be generated from the project activities in significant amounts since special measures will be implemented to avoid emissions during operation.

Relevance to project: The proponent will ensure that mitigation measures on dust and gaseous emission are enforced on implementation of the project throughout the life cycle.

16) Environmental Management (Soil Quality Standards) Regulation, 2007

These regulations set limits for soil contaminants in agriculture and habitat, enforce minimum soil quality standards, prescribe measures designated to maintain, restore and enhance the sustainable productivity of the soil and prescribe minimum soil quality standards for sustaining ecological integrity and productivity of the soil. According to the regulations, among others, the National Environmental Standards Committee has the powers to set pollutant limits and specify procedures for determination of the quality of soil for protection of the soil from degradation as a result of anthropogenic activities such as agricultural and mining activities and waste disposal. Owners and operators of a main polluting activity are required to voluntarily register with NEMC and obtain a soil pollutants discharge permit. Obligations of polluters are also given. According to the regulations, the NEMC plays a crucial role in soil quality compliance and enforcement. Recording and reporting requirements, Offences and penalties for non-compliance as well as how appeals against aggrieved decisions should be handled are stipulated. Contaminant limits for selected soil pollutants mainly halogenated hydrocarbons (example, trichloethylene, dichloromethane, tetrachloroethylene, carbon tetrachloride, etc.), fuel hydrocarbons (benzene, ethylbenzene, total xylenes, toluene, etc.), organic and inorganic pesticides (lindane, Atrazine, DDT, sulphur, Hexachlorobenzene, Aldrin, etc.) and their respective test methods are specified. The Regulations also cover contaminant limits for some heavy metals (e.g. arsenic, cadmium, nickel, copper, zinc, etc.) together with their test methods. Most of the pollutants covered in these regulations will not be produced from the project activities in appreciable concentrations. However, there is a potential for soil pollution from petroleum hydrocarbons due to the use of fossil fuels for running machineries, plants and vehicles during the renovation phase. Fossil fuels will be applied in a rational manner to minimize residues and consequently soil and water pollution.

Relevance to project: The proponent will manage well all solid and liquid wastes to be generated and oil spills at each project phase to avoid the soil contamination.

17) Environmental Management (Water Quality Standard) Regulation, 2007

Among others, the object of the regulations is to enforce minimum water quality standards prescribed by the National Environmental Standards Committee, enable the National Environmental Standards Committee to determine water usages for purposes of establishing environmental quality standards and values for each usage and ensure all discharges of pollutants take into considerations the ability of the receiving water to accommodate contaminants for protection of human health and conservation of marine and aquatic environments. The Regulations elucidate the role of the National Environmental Standards Committee of Tanzania Bureau of Standards in setting minimum quality standards for water, sewerage, etc. They also give prohibitions and prescribed minimum water quality standards. The applicant of water right is obliged to indicate the likely impact on the environment and comply with prescribed effluent or receiving water standards, which are not below the standards specified in these regulations if the water right or permit is granted. The regulations give NEMC the power to designate main water polluting activities for which prior

grant of permit must be obtain from the Council. It can be observed from the regulations that, the NEMC plays a crucial role in water quality compliance and enforcement. Recording and reporting requirements, Offences and penalties for non-compliance as well as how appeals against aggrieved decisions should be handled are stipulated.

The Regulations specify permissible limits for selected physical, inorganic, organic and microbiological components of Municipal and industrial effluents and the respective test methods of the pollutants. Specific tolerances and methods of testing for effluents of chrome and vegetable tanning industries and fertilizer industries are given. Regarding drinking water, the regulations specify microbiological requirements and classification of non-chlorinated piped water sources, chemical and physical limits as well as radioactive materials limits for quality of drinking water supplies. Also specified in the regulations are minimum distances from sources of water contamination and sampling frequency for water quality monitoring of various sources.

Relevance to project: The developer will minimize the impacts of the project activities to groundwater and nearby surface water sources and river ecosystems.

18) The Local Government (Urban Development Control) Regulations, 2008, (GN No. 242/2008)

These regulations were made by the Prime Minister under powers conferred upon him by the Local Government (Urban Authorities) Act Cap 288. The Regulations provide for a mechanism for control of insanitary premises, management of night soil including its disposal. It prohibits depositing refuse on streets, pollution of water, fire in buildings or houses, straying animals, and construction of drainage.

19) The Environment (Registration of Environment Experts) Regulations, 2021

These Regulations make provision with respect to Environmental Experts and establish the Environmental Expert Committee. The Regulations provide for the certification and registration of Environmental Experts and contain rules relative to the practice and discipline of Environmental Experts and define functions, powers and internal organization of the Committee.

Relevance to project; The proponent complies with the requirements of this Act as it has engaged a registered and experienced Firm to conduct the Environmental Impact Assessment for the proposed project.

20) The urban planning (Use Group and Use Classes) Regulations, 2018

The law provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities; to provide for the grant of consent to develop land and powers of control over the use of land and to provide for other related matters. Expropriation of land for water infrastructure development and associated activities in urban areas shall comply with the provisions for this law. Under Section 3 among

other things the law seeks to improve level of the provision of infrastructure and social services for sustainable human settlement development.

Relevance to project*:* The proponent shall abide to the requirements of this Act by promoting proper use of land and protecting land.

21) The environment management (Hazardous Waste Control and Management) Regulation, 2021

These Regulations may be cited as the Environmental Management (Hazardous Waste Control and Management) Regulations, 2021. These Regulations shall apply to all categories of hazardous waste and to the generation, collection, storage, transportation, treatment, recycling, reuse, recovery and disposal of hazardous waste and their movements in, into and out of Mainland Tanzania. The regulation requires that any person dealing with hazardous waste in Tanzania be guided by following principles of environment and sustainable development:

i. The precautionary principle
ii. Polluter pays principle, and
iii. The producer extended responsibility

Relevance to project: The management shall abide by the provision of this regulation through proper management of hazardous waste.

22) The Environment Management (Quality Standard for Control of Noise and Vibration pollution) Regulations, 2015

These Regulations shall apply to the control of noise and environmental vibrations in Mainland Tanzania. The objectives of these Regulations shall be to- (a) ensure the maintenance of a healthy environment for all the people in Mainland Tanzania, the tranquility of their surrounding and their psychological wellbeing by regulating noise and vibration levels; (b) prescribe the maximum permissible noise and vibration levels from a facility or activity to which a person may be exposed; (c) provide for the control of noise and vibration and mitigating measures for the reduction of noise and vibration; (d) set baseline parameters on noise and vibration permissible levels based on a number of practical considerations and acceptable limits; (e) enforce minimum noise and vibration limits prescribed by the National Environmental Standards Committee; (f) help

developers such as industrialists to keep abreast with environmentally friendly technologies; and (g) ensure protection of human health and the environment from various sources of noise and vibration pollution.

Relevance to project: the management shall abide by this regulation and shall not make or cause to excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others

and the environment; also the workers within the plant shall be provided with protective equipment's such as ear plugs to prevent the noises from the machines from affecting them.

23)The Environmental (Solid Waste Management) Regulations. 2009 as amended in 2016

The regulation has been made under section 114, 115, 116,117, 118, 119, 120,121, 122 and 230 of Environmental Management Act, 2004. These regulations apply to all matter pertaining to solid waste management. They aimed among other things at setting standard for permit to operate solid waste disposal sites, permit to transport solid waste, permit to dispose solid waste and license to own or operate solid waste disposal site.

Relevance to project: The solid wastes generated during all the project phases shall be separated at the point of generation and stored in the dustbins and collected by special vehicles to the designated dumpsite.

24) The Fire rescue force (safety inspection, certificates and levy) regulation, 2008 as amended in 2022

The Act stipulate that the Certificate issued shall be valid for a period of one year from the date of issue, there after the property owner shall apply for it to be renewed. Any owner of the property, premises, vehicle, vessel who fails to renew his Fire Safety Certificate within one month after its expiry will be required to pay the principal amount payable in respect of that property plus penalty of twenty-five per centum (25%) for late payment.

Relevance to project: The estate management shall by the provision of this Act consulting fire and rescue force for inspection and renewal of certificate annually.

25) Fire and rescue force (precautions in building) regulation,2015

The provisions of this Part shall apply in determining the design, renovation, protection, location, arrangement and maintenance of exit facilities to provide safe means of escape for occupants from all buildings hereafter erected, altered or changed in occupancy.

4.-(1) The areas which are designated as means of escape shall include- (a) exit staircase; (b) firefighting lobby; (c) smoke stop lobby; (d) exit passageway; and (e) escape corridors. (2) The areas which are designated as means of escape shall not be turned into other usage.

Relevance to project: The contractor shall abide by the provision of this Act by designating proper exit routes to be used during fire emergencies.

26) The Companies Act, Cap.212

An Act to repeal and replace a law relating to companies and other associations, to provide for more comprehensive provisions for regulation and control of companies, associations and related matters. 3.-(I) Any two or more persons, associated for any lawful purpose may, by subscribing their names to a

memorandum of association and otherwise complying with the requirements of this Act in respect of registration, form an incorporated company, with or without limited liability. 15.-(I) On the registration of the memorandum of a company the Registrar shall certify under his hand that the company is incorporated and, in the case of a limited company, that the company is limited, and, in the case of a public company, that the company is a public company. Effect of registration (2) From the date of incorporation mentioned in the certificate of incorporation, the subscribers to the memorandum, together with such other persons as may from time to time become members of the company, shall be a body corporate by the name contained in the memorandum, capable of exercising all the functions of an incorporated company, but with such liability on the part of the members to contribute to the assets of the company in the event of its being wound up as provided for in this Act. 16.-(I) A certificate of incorporation given by the Registrar in respect of any association shall be conclusive evidence that all the requirements of this Act in respect of registration and of matters precedent and incidental thereto have been complied with and that the association. is a company authorized to be registered and duly registered un-Conclusiveness of certificate of incorporation der this Act.

Relevance to project: The proponent complies by the provision of this Act.

27) The Tanzania Investment Act, Cap. 38

An Act to make provision for investment in Tanzania, to provide for more favorable conditions for investors, and for related matters. All investors whether or not this Act applies to them to obtain necessary permits, authorizations, approvals, registrations, consents, licenses and any other matter required by law for a person to set up and operate an investment.

Relevance to project: The proponent shall abide by the provision of this Act by seeking proper permits, authorizations, approvals, registrations, consents required by law to operate the Sisal Estate.

28) The Income Tax Act, Cap.332

An Act to make provisions for the charge, assessment and collection of Income Tax, for the ascertainment of the income to be charged and for matters incidental thereto. 4.-(1) Income tax shall be charged and is payable for each year of income in accordance with the procedure in Part VII by every person - (a) who has total income for the year of income or is a corporation which has a perpetual unrelieved loss determined under section 19 for the year of income and the previous two consecutive years of income; (b) who has a domestic permanent establishment that has repatriated income for the year of income; or (c) who receives a final withholding payment during the year of income. (2) The amount of income tax payable by a person for a year of income shall be equal to the sum of the income tax payable with respect to subsection (1).

Relevance to project: The Act is relevant because the project is expected to have income due to the operations of sisal estate. The proponent shall adhere to the provision of the Act and pay the required tax imposed by the Government.

29) The village land Act, Cap.114

An Act to provide for the management and administration of land in villages, and for related matters. The village council shall, subject to the provisions of this Act, be responsible for the management of all village land. (2) The village council shall exercise the functions of management in accordance with the principles applicable to a trustee managing property on behalf of a beneficiary as if the council were a trustee of, and the villagers and other person's resident in the village were beneficiaries under a trust of the village land. (3) In the management of village land, a village council shall have regard to— (a) the principle of sustainable development in the management of village land and the relationship between land use, other natural resources and the environment in and contiguous to the village and village land; (b) the need to consult with and take account of the views and, where it is so provided, comply with any decisions or orders, any public officer or public authority having jurisdiction over any matter in the area where the village land is; (c) the need to consult with and take account of the views of other local authorities having jurisdiction in the area where the village land is. (4) A village council may establish a committee to advise and make recommendations to it on the exercise of any of the functions of the management of village land but, notwithstanding the provisions of section 110 of the Local Government (District Authorities) Act such committee shall have no power to take any decisions concerning the management of village land.

Relevance to project: The proponent shall abide by the provision of this Act by cooperating with the village council on different matters.

30) The Business Activities Registration Act, Cap.208

An Act to repeal and re-enact Trades Licensing Ordinance. (5) Any building or part of a building (including any out-house, shed or other structure, and also any part of land enclosed by a fence, howsoever constructed), which is used as an office, Shop, godown, store or warehouse or otherwise as a place where any business is normally carried on, or which is normally used by a person carrying on business for any purpose connected with his business shall, for the purposes of this Act be deemed to be a place where such business is being carried on: Provided that- (a) any place only temporarily used by a person carrying on business for any specific purpose connected with the business shall be deemed not to be a place where such business is normally carried on; (b) where two or more separate portions of a building or two or more separate Places on the land comprised in the same right of occupancy granted, or deemed by any written law to have been granted, under the Land ordinance, are used by the same person for the purpose of, or -in connection with, the business carried on by him, such portions or, as the case May be, places shall, in relation to such business, be deemed to be One Place of business.

3..-(l) No person shall carry on m Tanganyika, whether as a principal or agent, any business unless- (a) he is the holder of a valid business license issued to him in relation to such business; and (b) such business is being carried on at the place specified m the licence. (2) No person shall carry on business at two or more places, unless he is the holder of a separate business licence issued to him M' relation to such business for each of such place: provided that, m any such case, if a valid business licence exists m respect of any of the places of business (hereinafter referred to as -the principal place of business") the holder shall be deemed not to have contravened the provisions of this subsection-

Relevance to project: The proponent abides by the provisions of this Act and has a valid business license for the proposed project.

31) The Workers Compensation CAP 263 R.E 2015

The law provides for compensation to employees for disablement of death caused by or resulting from injuries or diseases sustained or contracted in the course of employment to establish the Fund for administration and regulation of works compensation and to provide for related matter.

Relevance to project: This Act is very relevant to this project as workers will be exposed to various hazards during expansion, rehabilitation and modernization of the estate. The developer and the contractor will ensure safety and health of workers at the project environment through provision of compensation to employees for disablement of death caused by or resulting from injuries or diseases sustained or contracted in the course of employment.

32) The urban planning(building) regulations,2018

Use Class: Individual dwelling houses designed for use as dwellings by single families, together with such outbuildings as are normally used therewith, but not including dwelling houses designed for occupation by more than one family, and not including dwelling accommodation built over or attached to commercial, office or industrial buildings of Groups E to M inclusive. Terraced dwelling houses (in blocks of two or more) each dwelling designed for use by a single family, together with such outbuildings as are normally used therewith, but not including dwelling accommodation attached to commercial, industrial or office buildings of Groups E to M inclusive. Dwelling houses occupied principally as dwellings, but also used by the occupiers or tenants for professions and occupations and not used in any way as industrial buildings or for the public display or sale of goods or for the storage of bulky equipment or materials used in the occupier's profession or occupation.

Relevance to project*:* The proponent shall abide to the requirements of this Act by adhering to the use as designated by the law.

33) The Government Chemist Laboratory Authority Act, Cap.177

This Act establishes the Government Chemistry Laboratory Authority and provides with respect to its functions, powers and administration. The authority shall be the supreme and referral laboratory of the Government of Tanzania. It shall carry out, among other things, testing of food and drugs. it shall also carry out functions under the Environmental Management Act. The Act also requires other laboratories to register with the Chief Government Chemist. The authority shall conduct research activities, laboratory analysis and advise the Government on matters relating to forensic toxicology, forensic biology, DNA, illicit drugs, forensic chemistry, food, drugs, occupational health, industrial and consumer chemicals and products and environmental samples for executing health, legal, social wellbeing and environmental interventions.

Relevance to project*:* The proponent shall abide to the requirements of this Act by adhering to standards in the products they produce (sisal).

34) The industries and consumer chemicals (management and control) Act, Cap.182

5.-(1) Any person who imports or exports a chemical shall- (a) be registered and be issued a certificate; (b) register the premises and chemicals; (c) create awareness to the public on the inherent risks of indiscriminate use and misuse of chemicals; (d) set and adhere to the code of practice and guidelines on the safe use and handling of chemicals; (e) apply for chemical importation or exportation permit for every chemical consignment prior to importation or exportation; and (f) submit to the Registrar, in writing, the name of an authorized agent.

Relevance to project*:* The proponent shall abide to the requirements of this Act by registering as the importer and user of chemicals, as well as proper usage of chemicals to control risks.

35) The industrial and consumer's chemicals (management and control) Act, 2003

An Act to provide for the management and control of the production, importation, transportation, exportation, storage, dealing, and disposal of chemicals and for matters connected therewith. This Act introduces measures for the control of production, importation, exportation, transportation, storage, handling and placing on the market of industrial or consumer chemicals or chemical products and provides for the carrying out of such control.

Sections 3 to 10 provide for administration of this Act and establish for this purpose a Technical Committee and define the functions of the Government Chemist Laboratory Agency, the Chief Government Chemist, the Ministerial Advisory Board for the Government Chemist Laboratory Agency and the Emergency Response Committee. The Chief Government Chemist shall act as the Registrar of Chemicals, the functions of which are set out in section 10. Sections 11 to 47 contain provisions relative to the control of the production, importation, transportation, exportation, storage, handling, placing on the market and disposal

of chemicals. Measures of control include registration of chemicals, certification, use restrictions, inspection, packing labelling requirements and precautionary measures. Other provisions of this Act concern financial arrangements, liability and regulation making powers of the Minister. Offences are defining and penalties prescribed

Relevance to project*:* The proponent shall abide to the requirements of this Act by providing proper management and control of the production, importation, transportation, exportation, storage, dealing, and disposal of chemicals to be used in the project.

36) Plant Health Act, Cap.133

The Plant Health Act came into operation on February 1, 2021. It intended to consolidate the Plant Protection Act and the Tropical Pesticides Research Institute Act and put in place a consolidated legal framework for plant health and pesticides. This led to the establishment of the Tanzania Plant Health and Pesticides Authority which shall be the main regulatory body for plant health and pesticides. It introduced a legal framework to facilitate competition and efficiency in plants and plant products trade in Tanzania and internationally whilst safeguarding human health and the environment/ecosystem by ensuring sustainable and efficient management of pesticides.

Relevance to project; The proponent shall abide to the requirements of this Act by safeguarding human health and the environment/ecosystem by ensuring sustainable and efficient management of pesticides.

37) The Forest Act Cap, 323

The Forest Act Cap 323 of Tanzania serves as a pivotal legal instrument for the sustainable management, conservation, and utilization of forest resources. By establishing clear governance structures, promoting community participation, regulating forest activities, and enforcing environmental safeguards, the Act aims to preserve Tanzania's diverse forests for future generations while supporting socio-economic development and environmental resilience. It underscores Tanzania's commitment to environmental stewardship, biodiversity conservation, and the pursuit of sustainable development goals in the forestry sector.

Relevance to the project: The Forest Act Cap 323 of Tanzania is highly relevant to the sisal estate project due to its provisions on environmental impact assessments (EIAs) and sustainable resource management. Under this Act, any significant project, including agricultural ventures like sisal estates, must undergo rigorous EIAs to assess potential environmental impacts. This ensures that the project complies with environmental standards, minimizes ecological harm, and promotes sustainable land use practices. Moreover, the Act mandates responsible forest management, which includes protecting biodiversity and preventing deforestation, thereby aligning with the sustainable development goals of the sisal estate project in Tanzania. Compliance with the Forest Act Cap 323 is essential for securing permits and licenses,

demonstrating commitment to environmental stewardship, and fostering community acceptance and support for the sisal estate project.

38) The Architects and Quantity Surveyors Act, Cap.133

The act provides institutional machinery for the regulation of activities and conducts of architect's quantity surveyors and their firms under the Architect and Quantity Registration Board; to provide for qualification for registration, rights and privileges of registered architect and quantity surveyors and to provide for related matters.

Relevance to the project: Only registered architects and quantity surveyors shall be involved in the implementation of the proposed project.

39) The Weight and Measure Act, Cap.340

The Weights and Measures Act, Chapter 340 of the Laws of Tanzania, is legislation that governs the regulation and administration of weights and measures within the country. This Act ensures that there is a standardized system of measurement that promotes fairness and accuracy in trade and commerce. The Act sets out the standards for weights and measures used in trade and commerce It regulates the use of weighing and measuring instruments to ensure they are accurate and reliable. There are provisions for inspection and verification of weights, measures, and weighing instruments to enforce compliance. It aims to protect consumers from unfair practices by ensuring they receive goods and services as specified in terms of quantity and quality.

Authorities are empowered to enforce the provisions of the Act through inspections, testing, and legal measures against violators. Chapter II of the act states that "Without prejudice to the powers of the Tanzania Bureau of Standards to set standards, the International System of Units (SI) shall be a system of measurement by reference to which any measurement in trade shall be made in the United Republic".

Relevance to the Project: The proponent must be Operating within the provisions of the Weights and Measures Act is a legal requirement. Compliance helps the project avoid legal issues, fines, and disruptions in operations due to non-compliance. Adhering to accurate measurements builds trust among consumers and business partners. It demonstrates the Project's commitment to quality assurance and fair-trade practices, enhancing its reputation in the market.

40) The Standards Act, Cap. 130

This Act aims at the promotion of specifications of commodities and services, re-establish the Tanzania Bureau of Standards (TBS), the designated national standards authority established under the TBS Act

1975 and repealed by this act. TBS is responsible for developing all kinds of national standards, including environmental standards.

The Standards Act has established National Environmental Standards Compendium (NESC) which is a collection of various standards prepared at different times and recognized by EMA 2004. NESC is divided into three parts. Part 1 comprises of standards that require compulsory compliance. Compulsory standards are categorized as generic or specific. Specific standards cover those industries with peculiar effects to the environment while other industries without a specific standard for Tolerance Limits of Emissions discharge including water quality, discharge of effluent into water, air quality, control of noise and vibration pollution, sub-sonic vibrations, soil quality, control of noxious smells, light pollution, and electromagnetic waves and microwaves

Part 2 of NESC contains those standards that may be implemented on voluntary basis. These include guideline standards, codes of practice, and other such standards that may not necessarily be directly enforced, but whose results are implied in some legal requirements. One of such standards include the Environmental Management Systems (EMS) standards, like TZS 701/ISO 14001 whose compliance specifications include the relevant legal requirements. Part 2 thus has important requirements for companies and developers who wish to demonstrate their commitment to sustainable development by way of self-regulation mechanism. On the other hand, some companies or developers may be compelled to follow these standards because of requirements from mother companies and for other various reasons like certification requirements by environment friendly banks or tenders. Part 2 also includes standards used in evaluating environmental performance.

Part 3 has the requisite test methods that should be followed when testing for compliance. The test methods included are referred to in at least one of the specification standards appearing under Part 1. Although it is not stated in the Act, in the absence of national standards, project proponents are encouraged to use international standards such as those of the World Health Organisation (WHO), World Bank, British Standards (BS), European Union (EU), American Public Health Association (APHA), United States Environmental Protection Agency (US EPA) etc. Standards set by the relevant sectors, which also make use of the international standards, are also applicable. Such standards include the environmental standards set under the Mining (Environmental Management and Control) Regulations, 1999. Relevant national environmental standards include:

- TZS 860: 2005 Municipal and Industrial Wastewaters – General Tolerance Limits for Municipal and Industrial Wastewaters: This standard provides permissible limits of important environmental parameters such as BOD, COD, pH, color, temperature range, total suspended solids and turbidity. It also gives permissible limits of a range of inorganic and organic components. All effluents

discharged from the project activities during all phases shall comply with these specifications. Special attention will be paid to treatment of effluents from laboratories as some are hazardous in nature.

- TZS 845:2005 Air Quality – Specification: This standard gives permissible emission limits of sulphur oxides, carbon monoxide, hydrocarbons (as total organic carbon), dust, nitrogen oxides and lead. The emissions from earth moving equipment, power generation plant and other will include SO_2, CO, dust and NO_X; as such the project will have to observe these limits.

- TZS 983:2007 Air Quality - Vehicular Exhaust Emissions Limits: This standard is mainly derived from EU Directives 96/69/EC, 91/542/EEC and 97/24/EC. This Tanzania Standard gives permissible limits of some common substances found in exhaust emissions of motor vehicles, namely carbon monoxides, suspended particulate matter (PM), oxides of nitrogen, and hydrocarbons. The standard covers all types of vehicles namely, passenger cars, light commercial vehicles, heavy-duty vehicles, and two and four strokes motorcycles and scooters. In order to carry out quarrying activities and processing operations, the project will operate a fleet of heavy duty and light vehicles in addition to hiring other vehicular equipment. As such, the project will need to observe the provisions of these standards.

- TZS 932:2006: Acoustics - General Tolerance Limits for Environmental Noise: This standard focuses on urban environmental noise, and does not cover occupation environment. In the absence of other standards, it may be used to give indication of permissible noise levels in factory/workshop environment.

- TZS 789:2003 - Drinking (potable) water – Specification: This standard prescribes the quality requirements for drinking water other than packaged drinking water. It does not cover the requirements for natural mineral water. It prescribes the quality requirements for drinking water distributed in the food industry, domestic and catering purposes. It applies to bacteriological, biological, virological, physical, chemical and radiological quality criteria. It is intended also to community piped water supplies i.e. those water systems serving cities, municipalities and townships, community standpipes and wells and drinking water distributed by tankers. For protecting the health of consumers, portable water during all the project phases shall comply with these standards.

- TZS 931:2006 Protection against ionising radiation - Limits for occupational exposure: This standard aims at protecting workers, whose practices expose them to ionising radiation, namely; gamma- and X-rays, alpha, beta and other particles that can induce ionisation. The Standard does not apply to non-ionising radiation such as microwave, ultraviolet, visible light and infrared radiation. It applies

to all workplaces in which employees are occupationally exposed or in which there is a potential for occupational exposure to ionising radiation, unless exempted by the Regulatory Authority.

Relevance to the Project: The proposed project will be adhered to this Act requirement, during the implementation.

41) The National Social Security Fund (NSSF) Act of 2022

The National Social Security Fund (NSSF) Act of 2022 is a legislative framework aimed at establishing and regulating a national social security fund in Tanzania. It typically outlines provisions related to the management, contributions, benefits, and governance of the fund. Key aspects often include eligibility criteria for membership, conditions for entitlement to benefits such as retirement pensions, disability benefits, and survivor benefits, as well as mechanisms for fund administration and oversight. The Act is designed to provide social security coverage to eligible individuals and ensure the sustainability and effective operation of the fund.

The principal Act is amended in section 7-

a) by substituting for subsection (1), the following-
    1) Every eligible employee shall register as a member of the fund and shall make regular contributions to the fund in accordance with this Act and regulations made under this Act.";
b) by substituting for subsection (2), the following-
    2) Every employer, irrespective of the number of employees, shall register with the fund as a contributing employer and shall make regular contributions for his or her employees in accordance with this Act and regulations made under this Act.

Relevance to the project: The proponent will be adhered to this Act requirement by ensuring that all workers have joined the security fund.

42) The Private Hospital Regulation Act, Cap 151

The Private Hospitals (Regulation) Act, Cap. 151, in Tanzania, is legislation designed to regulate the establishment, operation, and standards of private healthcare facilities. The Act mandates that private hospitals must obtain licenses to operate. It sets out criteria and procedures for registration, ensuring that facilities meet minimum standards for healthcare delivery. The Act emphasizes standards for medical care, facilities, and services provided by private hospitals. It includes requirements for staffing, medical equipment, hygiene, and patient safety. Regulatory authorities conduct regular inspections to monitor compliance with the Act. They assess facilities' adherence to standards and take corrective actions when necessary. The Act protects patient rights and ensures confidentiality, informed consent, and fair treatment within private hospitals. It outlines penalties and disciplinary actions for non-compliance with regulations, aiming to uphold standards and protect public health.

Relevance to the project: The Act ensure that there is health care provision often have medical facilities or clinics to provide healthcare services to workers and local communities. The Act ensures that these facilities meet standards for quality healthcare delivery, safeguarding the health of employees and residents. Sisal estates are workplaces that require adherence to health and safety standards. Compliance with the Act helps ensure that healthcare facilities on the estate meet regulatory requirements, promoting a safe working environment.

43) The Private Health Laboratories Regulation Act, Cap. 136

The Act regulate the registration and management of private health laboratories managed by approved persons and in respect of private health laboratory services to be rendered by private health laboratories and for related matters.

Relevance to the project: The proponent adhered to this Act requirement by ensuring the dispensary is registered and is managed by approved personnel.

44) The Environment Management (Prohibition of Plastic Carrier Bags and Plastic Bottle Cap Seals) Regulations, 2022

These Regulations shall apply to the import, export, manufacturing, sale, supply, storage and use of plastic carrier bags within Mainland Tanzania. The objectives of these Regulations are to- (a) impose a total ban on the import, export, manufacturing, sale, and use of plastic carrier bags regardless of their thickness; (b) protect human and animal health as well as the environment from the likely adverse effects of utilization of plastic carrier bags; and (c) provide economic and financial incentives for the production and importation of alternative carrier bags.

Relevance to the Project: The proponent abides by these regulations and shall not import, export, manufacturing, sale, supply, storage and use of plastic carrier bags instead they shall use alternative carrier bags.

45) The Environmental Management (Control and Management of Electrical and Electronic Equipment Waste) Regulations, 2021

The main objective of these Regulations is to provide for and promote proper management of e-waste to protect human health, and environment while ensuring sustainable development. The Regulations apply to all categories of electrical and electronic equipment wastes with respect to generation, collection, storage, transportation, importation, exportation, distribution, selling, purchasing, recycling, refurbishing, assembling, dismantling and disposal of electrical and electronic equipment waste or components, and their movement into or outside Mainland Tanzania.

Relevance to the Project: The proponent shall put proper measures for the collection, storage and transportation of e-wastes in all phases of the project.

46) The Industrial and Consumer Chemicals (Management and Control) Regulations, 2015 as amended in 2019

The Act aims to provide for the management and control of the production, importation, transportation, exportation, storage, dealing, and disposal of chemicals and for matters connected therewith. Compliance with the regulation is essential for minimizing risks associated with chemical hazards and promoting responsible chemical management practices. The regulation provides a comprehensive framework for the safe management of chemicals throughout their lifecycle.

Relevance to the Project: The proponent shall abide by these regulations by ensuring safe, compliant, and environmentally responsible practices in the management of chemicals used in agricultural operations and product manufacturing.

47)The Sisal Industry Regulations, 2011

These Regulations, made under section 20 of the Sisal Industry Act, implement provisions of the Act with respect to, among other things: registration by the Tanzania Sisal Board of sisal growers, traders, manufacturers and processors of sisal; observation by a sisal grower of recommended practices of good crop husbandry as prescribed under the First Schedule to these Regulations; issuing of licences by the Board; quality control of sisal; rules for contract farming; rules for marketing and sales of sisal; rules for the annual stakeholders meeting composed of key stakeholders from the sisal industry; and administrative matters regarding the Board.

Relevance to the Project: The proponent has complied to the regulation by following all the requirements outlined in the regulation.

48) The Fertilizer Regulations, 2011 as amended in 2017

This Act establishes the Tanzania Fertilizer Regulatory Authority as a body corporate and provides rules relative to the manufacturing, importation and use of and trade in fertilizers, or fertilizer supplements, e.g. growth stimulators and regulators and similar products. It also provides for fertilizer quality control.

The Authority shall be the regulatory body in the fertilizer industry and shall, among other things, register all fertilizer and fertilizer supplements dealers and their premises; license fertilizer dealers; issue permits for importation and exportation of fertilizer and fertilizers supplements; and implement policies, strategies and programmes relating to fertilizer industry development. The Act requires fertilizer dealer to ensure that fertilizer or fertilizer supplements are packed and labelled in the manner prescribed in the Regulations and

prohibits the sale or distribution of adulterated or substandard fertilizer or fertilizer supplements. It also places restrictions on the manufacture and use of fertilizer substances made of (diseased) animals.

Relevance to the Project: The adhere to these regulations by using fertilizers which shows the trade name of fertilizer, nutrient content, registration number, year of registration and common use.

3.4 Relevant International Agreements, Conventions and Treaties

1) The International Plant Protection Convention, 1951

The International Plant Protection Convention (IPPC) is a 1951 multilateral treaty overseen by the United Nations Food and Agriculture Organization that aims to secure coordinated, effective action to prevent and to control the introduction and spread of pests of plants and plant products. The Convention extends beyond the protection of cultivated plants to the protection of natural flora and plant products. It also takes into consideration both direct and indirect damage by pests, so it includes weeds. IPPC promulgates International Standards for Phytosanitary Measures (ISPMs).

The Convention created a governing body consisting of each party, known as the Commission on Phytosanitary Measures, which oversees the implementation of the convention. As of August 2017, the convention has 183 parties, being 180 United Nations member states and the Cook Islands, Niue, and the Union. The convention is recognized by the World Trade Organization's (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) as the only international standard setting body for plant health.

2) United Nations Framework Convention on Climate Change (1992)

The objective of the United Nations Framework Convention on Climatic Change (UNFCCC) is to stabilise the concentration of greenhouse gas (GHG) in the atmosphere, at a level that allows ecosystems to adapt naturally and protects food production and economic development. Article 4 commits parties to develop, periodically update, publish and make available national inventories of anthropogenic emissions of all GHGs not controlled by the Montreal Protocol (by source) and inventories of their removal by sinks, using agreed methodologies. It commits parties to mitigate GHG as far as practicable.

Since Tanzania is a Party to the Convention, will have to account for all sources of GHG in the future National Communications. Undertaking of this ESIA study will enable the country to identify some of the GHG that will be emitted by the project activities. The proponent will abide with the requirements on control and prevention of greenhouse gases by emphasizing use of modern machines.

3) The United Nations Conventions on Biological Diversity, 1992

The Convention on Biological Diversity (CBD) is the international legal instrument for "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources" that has been ratified by 196 nations.

Its overall objective is to encourage actions, which will lead to a sustainable future.

The conservation of biodiversity is a common concern of humankind. The Convention on Biological Diversity covers biodiversity at all levels: ecosystems, species and genetic resources. It also covers biotechnology, including through the Cartagena Protocol on Biosafety. In fact, it covers all possible domains that are directly or indirectly related to biodiversity and its role in development, ranging from science, politics and education to agriculture, business, culture and much more.

4) The Convention on Protecting of Workers Against Occupational Hazards in the Working Environment due to Air Pollution, Noise and Vibration, 1974

The main objective of the convention is to protect workers against occupational hazards in the working environment.

Summary of provisions: (a) Applies to all branches of economic activity, except where special problems of a substantial nature exist (art. 1); (b) Parties may accept the obligations of this Convention separately in respect of air pollution, noise and vibration (art. 2); (c) Measures to be taken for the prevention and control of, and protection against, occupational hazards in the working environment due to air pollution, noise and vibration shall be prescribed by national laws and regulations (art. 4); (d) Criteria for determining the hazards of exposure to air pollution, noise and vibration in the working environment and exposure limits on the basis of these criteria shall be established by the competent authority (art. 8).

The proponent will abide with the requirements on protecting workers against occupational by providing enough PPE's, conducting regular machines repair and maintenance and ensuring work rotation especially to those working decortications area.

3.5 Administrative Framework / Institutional Arrangement

The administrative and institutional arrangements for environmental management for all sectors in Tanzania are stipulated in the environmental Management Act No. 20 of 2004 (Cap 191). The Act mentions the Minister Responsible for Environment as the overall in-charge for the administration of all matters related to the environment. Part 111 of EMA, 2004 provides details of administrative and institutional framework for environmental management in Tanzania. The Act also mentions seven (7) institutions which are involved in environmental management in Tanzania. The administrative authority for environmental assessment and monitoring at national level is vested in the office of the Vice-President, where the Minister Responsible for Environment is seated. Other legal institutions for environmental management in the

country include: National Environmental Advisory Committee, Director of Environment, National Environment Management Council (NEMC), Sector Ministries, Regional Secretariat and Local Government Authorities (Township, Ward, Sub wars "Mtaa and Kitongoji").

The Minister Responsible for Environment - has overall responsibility of matters related to environment, including the approval of the EIA reports.

The National Environmental Advisory Committee (NEAC) - is comprised of members with experience in various fields of environmental management in the public and private sector and in civil society. The committee advises the Minister on any matter related to environmental management.

The Division of Environment (DoE) - headed by the Director of Environment deals with the development of Environmental policy and co-ordination of its implementation. It's also plays an advisory role to the Government on all matters pertaining to environmental management including overarching mandate on the functions of the National Environmental Management Council (NEMC).

National Environmental Management Council (NEMC) – headed by the Director General has the overall responsibility of undertaking enforcement, compliance, review and monitoring of Environmental Impact Assessment, and in this regard facilitates public participation in environmental decision making. Other functions of NEMC include recommendations to the Minister to approve, reject or approve with conditions, specific EIS and to make recommendations on whether to revoke EIA Certificates in cases of non-compliance.

The Sector Ministries- are required to establish Sector Environmental Sections headed by the Sector Environmental Coordinator which, among other things, have the responsibility to ensure environmental compliance by the Sector Ministry and to oversee the preparation of, and implementation of, all EIA's required for investments in the sector.

The Regional Secretariat -headed by the Regional Environmental Management Expert (REME), is responsible for the co-ordination of all environmental management programs in their respective regions. The regional administrative Act No. 9 of 1997 provide for Regional Commissioners to oversee regional secretariat Councils, with district commissioner directly supervising the district councils.

Table 3.1; Institutional framework

Level	Institution	Roles
National	The Vice President's Office (Division of Environment, NEMC)	- Co-ordinate Environmental Management Policy, Environmental Management Act and EIA guidelines - Approval of ToR, Review of EIA - Issuing an Environmental Certificate - Environmental Monitoring and Compliance Auditing - Advise Government on all environmental matters
	Ministry of Land, Housing and Human Settlements development	- Land use planning, - Issuing of Right of Occupancy, - Valuation and compensation.
Regional	Regional commissioner's Office	- Oversee and advice on implementation of national policies at regional level - Oversee enforcement of laws & regulations - Advice on implementation of development projects and activities at regional level
District	Mwanga District Commissioner's Office	- Oversee and advice on implementation of national policies at District level - Oversee enforcement of laws & regulations - Advice on implementation of development projects and activities at District level
	Mwanga District Council (District Executive Director Office)	- Overseeing all development activities in the district
Ward	Ward Development Committees (Ward Executive Officer, Ward Extension officers), Ward Environment committee	- Oversee general development plans for the Ward - Provide information on local situation and Extension services - Technical support & advice - Project Monitoring

Village (community)	Councils (Chairman /VEO, Environment Committee): and other leaders	- View on socio-economic and cultural value of the sites and project operations. - Rendering assistance and advice on the implementation of the project - Project Monitoring (watchdog for the environment, ensure wellbeing of residents and participate in project activities
Project proponent	Mohammed Enterprises Tanzania Limited	- Project design and planning and facilities renovation - EIA study - Project implementation (operation) - Project monitoring and internal auditing - Project decommissioning

CHAPTER FOUR

4.0 Environmental and Social Baseline Conditions

4.1 Introduction

This section describes the baseline condition as they relate to physical environment, biological environment, the socio-economic environment within the core project area and the marginal zones. The sub sections of physical, economic, social characteristics and Infrastructure and demographic characteristics are based on secondary data observation, while the last sub section including biological environment are based on the primary survey obtained during field work.

4.2 Geographic location

a) Physical Environment

Mwanga District is one of the six (6) districts of Kilimanjaro Region. The District lies between latitude 3025" and Latitude 3055" South of the Equator and between longitudes 37025" and 37058" East of the Greenwich. It Shares borders with Simanjiro District to the West, Moshi Rural District to the North, The Republic of Kenya to the East and Same District to the South.

b) Administrative subdivisions

It has 5 administrative divisions, 20 wards and 72 villages divided into 273 Subvillages with population of 131,442 people (2012 census); a growth rate of 2.7%.

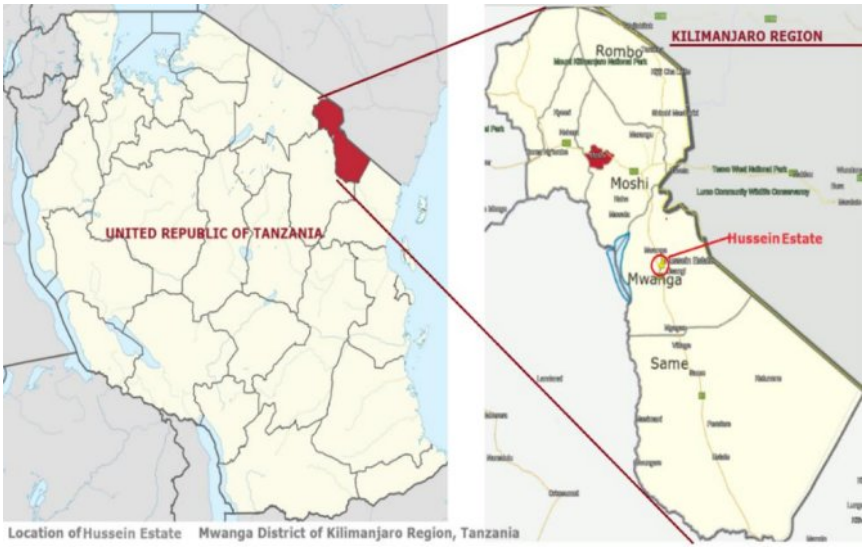

Figure 2:1: Location Map of Husseni Estate at Mwanga District, Kilimanjaro Region, Tanzania

4.3 Geography

The district has a total surface area of 2,641 Sq km. Land area is 2,558.6 km^2 and water area is 82.4 km^2 of which 56 km^2 is covered with waters of Nyumba ya Mungu Dam and 26.4 km^2 is covered with waters of Lake Jipe. Pangani River passes through Mwanga District; the stretch of the river which passes in the district is 32 Kms long.

4.3.1 Climate

Mwanga District is one among dryland areas in Tanzania, situated in Kilimanjaro region of the mainland Tanzania. It is located between latitude 3◦ 45′ and 4◦ 36′ south and between longitude 37◦ 24′ and 38◦ 24′ East (Infobridge, 2013). The district has highlands, midlands and lowlands. Mwanga has different types of soils such as clay and loamy and vegetative cover such as bush lands, grasslands, and woodlands.

Seventy-five percent (75%) of Mwanga District has a semiarid climate with low unpredictable rainfall. The annual maximum average temperature of Mwanga is 28.6°C and minimum is 17.8°C and the mean evapotranspiration rate of Mwanga is 6 mm per day. The district has a significant degree of meteorological and background data on impacts of climate variability. The observed impacts of climate variability such a shortening of the growing season leading to increased frequency of dry spells during the rainy season and more frequent heavy rainstorms resulting to floods and landslides in the midland and lowland areas.

4.3.2 Agro-economic zone

Coffee and banana are grown in the highland area, irrigation in the Eastern, Northern and Western lowlands is popular for maize, beans, and paddy production, there is a special type of irrigation in the highlands popularly known as "Ndiva" (water catchments across the rivers and valleys) in order to get water for irrigation. Food crops grown in the district include; maize, leguminous crops, paddy, bananas, fruits and vegetables while cash crops include; coffee and sisal.

4.3.3 Soils

The soils of the district vary from red clay soil, to sandy loams. The soil should be deep, well drained, and of PH range 5.0 - 8.0 with the optimum PH being 6.2.

4.4 Biological environment

The area is composed of high diversity of plant species of different life forms including herbs, grass, shrubs and trees. The area is dominated by the life forms of trees, herbs, shrubs and grasses which are represented by the high number of species.

The animals observed during assessment are not included on ether the CITES or the IUCN red list. Most of the animals discovered at the site are domestic animals from nearby community or surrounding residential areas. These animals include goats, cows, dogs, chicken, birds and others.

4.5 Water supply and Energy

4.5.1 Water resources

Water is obtained from the boreholes drilled within the site and from the Kisangara river.

A large part of the population at Kisangara depends on the water supply from the private sisal factory. Public standpipes have been provided in the workers camp. Today Kisangara is also served by Changale pipeline but when this is out of order the whole population relies on the private pipeline. Therefore, the sisal estate is more reliable than the government supply.

4.5.2 Energy supply

Electricity supplied in the area is through National Grid (TANESCO). All the area is accessed by electricity. Most of the workers' camps inside estate have reasonable electricity supply while the village houses around the estate fall under REA Project. Other sources include generator, natural gas and solar.

4.6 Geology

The geology of the area is dominated by high-grade metamorphic rocks of the amphibolites and granulites facies which belong to the Pretorozoic Mozambican Belt of the age of 800 to 500 ma old (Mruma and Kinabo,2004) in Nikundiwe (2004).

4.7 Economy

The min economic activities performed by Mwanga community are agriculture (80%), livestock keeping and fishing.

4.7.1 Fishing

Main fishing activity is carried out at "Nyumba ya Mungu" dam where about 1.042,380kgs of fish are fished annually, currently in Mwanga district there are about 694 fishermen.

4.7.2 Infrastructure

Paved trunk road T2 from Dar es Salaam to Arusha passes through the town. The Usambara railway from Tanga to Arusha passes through Mwanga as well. The proposed site is accessed by a rough road. The road is in good condition and can be accessed throughout the year.

4.7.3 Trade

Mwanga district has very small trade sector. Few businesses operate with business licence. Businessmen and small business owners who qualify for business licenses are still being educated and trained by trade officers to register their businesses.

4.8 Population

As per National population and household census, in year 2022 the district had 148,763 populations. Male 72,157 and female 76,606.

4.9 Education & Health

4.9.1 Education

Currently in Mwanga district council there are 88 pre-primary schools, 40 secondary school. In Kisangara village there is one 1 primary school.

4.9.2 Health

In Terms of Healthcare facilities, there are several facilities, such as health centers and clinics. There is no district hospital; instead, the community accesses healthcare through a referral system to the regional hospital in Mwanga. This is a significant issue that forces serious patients, particularly pregnant women, to travel great distances in order to access medical care, particularly surgical services.

4.10 Environmental Measurement Parameters

Measurement of air quality and noise levels were conducted at operational areas. Data were collected during the day from 10:15-12:50hrs. Results are discussed below;

4.10.1 Indoor Air quality

Level of gases were measured using a BH-4S Portable Multi-Gas Detector. The average measured concentrations of CO, CO_2, NO, and SO_2 from the selected sampling stations are presented in Table 4.1. All the measured parameters were found to be within stipulated local (TBS) and international guidelines i.e., WHO Ambient Air Quality Guidelines. The observed emission levels reflect no/low air pollution.

Table 4.1: Average values of Measured Indoor Gaseous Emissions

Sample area	Measured Parameters			
	CO_2	CO	NO	SO_2
	%	mg/m^3	mg/m^3	mg/m^3
Decortication area	0.00	1.00	0.02	0.01
Drying yard	0.01	3.00	0.01	0.00
Brush room	0.02	2.00	0.01	0.00

Bailing room	0.00	2.00	0.02	0.00
TBS	**-**	**Maximum permitted exposure of 100 mg/m^3 for the periods not exceeding 15 minutes**	**-**	**Daily average of hourly value not exceeding 0.15**
WHO	**-**	**30**	**0.12**	**0.5**
Source: Field measurement. Sampling date: 3rd October, 2023				

4.10.2 Average Dust–Particulate Matters (PM 2.5 and PM10)

From the results summarized in table 4.2, Decortication and drying area had dust concentration which comply with both TBS (TZS845:2005) and WHO, 2005 guidelines. In brushing and bailing room PM 2.5 and 10 were above prescribed emission level. Workers in these areas are equipped with respiratory protective to ensure a safe working environment and minimizing exposure to potential airborne hazards.

Table 4.2: Average values of measured Dust levels

Sample collection point	**PM2.5 [µg/m^3]**	**PM10 [µg/m^3]**
Decortication area	11	20
Drying yard	8	22
Brush room	55	98
Bailing room	42	105
Local standard (TZS: 845:2005)	**N.M**	**60-90**
International standard [WHO:2005]	**25**	**50**

Source: Field measurement. Sampling date: 3rd October, 2023

4.10.3 Average noise level from the operating machines

From the results summarized in table 4.3 below, drying area, brushing and bailing area had noise levels which comply with the Environmental Management (Standard for the control of Noise and Vibrations Pollution) which is 85dBA. In decortication area noise levels were above prescribed standard level. The source of noise level was from the movement of machines.

The management should continue enforcing the use of earmuffs/earplugs to workers and consider job rotation and exposure reduction to the area. Also, the management should ensure Machinery and equipment's are well maintained and repaired so as to reduce the noise caused by faultiness, tear and wear.

Table 4.3: Average noise level from the operating machines

Name of Sampling Point (SP)	Noise level (dB)
Decortication area	89.3
Drying yard	41.3
Brush room	77.8
Bailing room	68.2
The Environmental Management (Standards for the Control of Noise and Vibrations Pollution), 2014	85

Source: Field measurement. Sampling date: 3rd October, 2023

CHAPTER FIVE

5.0 Stakeholder Involvement

5.1 Overview

Stakeholder engagement is the continuous and iterative process by which the proponent identifies, communicates, and facilitates a two-way dialogue with the people affected by its decisions and activities, as well as others with an interest in the implementation and outcomes of its decisions and the project. It considers the different access and communication needs of various groups and individuals, especially those more disadvantaged or vulnerable, including consideration of both communication and physical accessibility challenges. The stakeholders' engagement under this project was conducted for the following reasons;

i. To identify stakeholders and build and maintain a constructive relationship with them, in particular with project-affected parties.

ii. To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be considered in project design and environmental and social performance

iii. To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format.

iv. To provide project-affected parties with accessible and inclusive means to raise issues and grievances and allow Borrowers to respond to and manage such grievances.

5.2 Identification of Stakeholders

Firstly, the consultant identified organization, groups and individuals considered to be regarded as "stakeholders". This identification was based on each one's roles and their relevance in the proposed development project. Some of the stakeholders such as government authorities, district level, wards and sub-ward level that might be impacted by or have interest in the project or exercise some influence on the project were predetermined as shown under each level in table 5-1 below.

Table 5.1: Stakeholder identification and analysis

LEVEL	STAKEHOLDER	REMARKS
National	-Tanzania Sisal Board -Pangani Basin Water Board	-Director General -Principle Technician
District	- Mwanga District Executive Director's Office	District Management Team members responsible for: - Agriculture - Natural resource management and environment - Land
Local	- Kisangara Village Executive Officer (VEO) - Lembeni Ward Executive Officer - Local communities surrounding Husseni estate	- Local government authorities - Direct project beneficiaries - Communities in the project footprint - Project affected persons

5.3 Public Participation Process

Public consultations process was done by consulting district experts, workers and local government officers and members.

Table 5:2: Public participation process

Stakeholder	Date of visit	Venue	Stakeholders consulted	Methodology
Tanzania Sisal Board	2/12/2023	-	1. Director General	-Through Email
Pangani Basin Water Board	14/03/2024	Pangani Basin Office	2. Principle Technician	- Interview
Mwanga District Council	6/10/2023	Agriculture, Irrigation and Cooperative Office Land Office Environment Office	1. District Agriculture, Irrigation and Cooperative Officer (DAICO) 2. District Land Officer 3. District Environment Management Officer	-Interview
Kisangara village, Lembeni ward	5/10/2023	Husseni Sisal Estate Meeting Room	1. Village Executive Officer (VEO)	-Focus group discussion -Interview

			2. Ward Executive Officer 3. Members	-Meeting
Workers	5/10/2023	By following them into their working section	1. Workers from different section	-Interview
Local Community	16/03/2024	Kisangara village	1. Villagers surrounding the estate	Focus group discussion Public meeting

5.4 Identification of Issues and Problems

The field visits helped to identify a number of issues, problems and challenges regarding the proposed project. These issues and problems are organized into major categories, issues and problems within this categories and possible sources of data and information.

Table 5.1: Categories of issues and problems

S/N	Category of issues /problems	Issues/Problems	Responsible
1.	Employment opportunities	Priority to the locals Gender consideration	Developer
2.	Revenue Generation	Taxation Job creations	Developer, TRA,
3.	Waste management	Solid and liquid waste management	Contractor, Developer, District Environmental Officer
4.	Infrastructure	Room of improvement in Storm water drainage Sewerage system improvement Road network Improvement in Sanitary facilities Upgrades Workers house	Contractor, Developer, Town planner
5.	Safety of workers	Provision of PPE's to workers	OSHA, Developer

6.	Environmental and Health issues	Noise levels Air quality – dust from the project Water	OSHA, Developer, Environmental Officer
7.	Corporate social responsibility	Provision of services and amenities	Developer

5.5 Stakeholders Views and Concerns

Table below summarizes the issues/concerns/views from the stakeholders.

Table 5.4: Stakeholders consulted and their views

SN	NAME & POSITION	ORGANIZATION	VIEWS	RESPONSE
1.	Saddy H. Kambona General Manager	Tanzania Sisal Board	i. The company should consider putting up infrastructure for rainwater harvesting as sisal farming expansion will attract more decortication centers which require enough water for sisal washing and other domestic use. ii. The company should also consider water recycling technology in its decortication centers to minimize water usage. iii. Sisal waste should be used as manure to improve soil fertility and productivity. iv. The company should consider possibility of interfering with corridors of wild animals such as elephants and wild pigs which feed on sisal. v. Proper technology for expelling such animals be put in place to avoid loss to the company. vi. The company should consider coming up with technology that allows use of sisal waste as source of energy to run various operations at	Rainwater harvesting will be considered as another source of water for decortication. In the future waste water from decortication will be recycled and used in decortication again. Currently sisal wastes are used as organic fertilizers by the nearby village farms. There is no animal corridor.

			the estate. This is because of recent power cut and low voltage which slow down sisal production.	
2.	Zania P. Msangi	Pangani Water Basin Board	i. The proponent should apply for water use permit before starting abstraction. ii. The proponent should apply for waste water discharge permit before operation started. vii. The proponent should apply permit for borehole drilling.	Water use permit, waste water discharge permit and boreholes drilling permit will be applied to the Pangani Water Basin.
3.	Linus Kinunda Agriculture Engineer	Mwanga District Council	i. There is no land conflict between the villagers and the owner of the farm. ii. Villagers requested the estate management to offer a small area to be used as a bus stand. iii. Ensure proper management of liquid waste comes from decortication process.	The government has offered alternative land for bus stand so as to avoid diversifying the agriculture land. Liquid waste is managed by use of waste water treatment ponds.
4.	Elirehema Pallangyo District Environmental Officer	Mwanga District Council	i. Ensure proper treatment of liquid waste before discharging to the environment. ii. Ensure proper management of solid waste. iii. There is proper area for decomposing solid waste. iv. Ensure wastewater recycling, since it can later be used for decortication. v. Ensure provision of PPE'S. vi. Follow strictly OSH policy.	Liquid waste from decortication discharged into the treatment ponds before released into the environment. Solid waste management that includes segregation of waste at source, proper storage, and disposal is being followed.

			vii. Ensure water quality test before discharge to the environment.	Waste water from decortication is being recycled and used in decortication again. OHS policy is being strictly followed. Workers are provided with PPEs depending on their nature of job. Water quality test will be conducted regularly before discharged into the environment.
5.	Elizabeth Marco Lugoda (Occupational Health Inspector)	Occupational Health and Safety Authority (OSHA-Northern zone)	i. Provision of personal protective equipment's (PPE's) to workers. ii. Ensure provision of sanitary facilities. iii. Provide safe and clean drinking water. iv. Medical examination for all workers should be done v. Risk assessment and OHS policy should be prepared vi. Safety representative and first aider training should be done among the site workers vii. Safety inspection should be done by OSHA	Workers are provided with PPEs depending on their nature of job. Currently, sanitary facilities are sufficient however, more will be provided due to anticipated big number of workers during project implementation phase. Provision of safe drinking water is available.

				Medical checkups will be conducted to workers annually. HSE policy has been effectively implemented, and a comprehensive risk assessment of the facility has been conducted. Trainings are being conducted on a variety of safety topics. OSHA is conducting annual inspections.
6.	Dr. Benignus Ngowi Director-Plant Biosecurity	Tanzania Plant Health and Pesticides Authority (TPHPA)	i. Apply good and reliable seeds that can withstand climate change and pest issues; ii. Conduct regular training on sisal production to workers; iii. Provide permanent/renewed contracts to workers, social security funds and on time payments after injuries from work; iv. Use biological control measures to overcome the issue of pest.	All comments will be adhered as suggested.
7.	Jeremiah Mkomagi ASF-Regional Fire Commissioner	Fire and Rescue Force Kilimanjaro	i. It's recommended that a plan layout should be submitted in our office and the Layout should include fire protection plan.	Site layout plan and fire protection plan will be submitted.

			ii. Fire Safety Certificate should be provided and renewed annually. iii. Fire awareness training for the staff should be provided.	The company has fire safety certificate and its renewed annually. Fire awareness training is provided to the workers.
8.	Village government meeting	Kisangara village, Lembeni ward	i. The estate benefit villagers through employment provision. ii. There is good cooperation between the company and the village. iii. There is no land conflict.	METL is continuing to embrace social and safety issues in its sisal farms.
9.	Workers	Husseni Sisal Estate	i. Workers have expressed concerns regarding salary. ii. More sets of PPE's should be provided per worker. iii. Enhance the first aid measures in place.	Salaries are being paid as per national standard with performance incentives based on the output generated. METL is fully committed to adhering to all labor laws in its engagements. Workers are provided with PPEs depending on their nature of job. Provision of first aid measures are already available and this information will be disseminated by means of regular safety awareness trainings.

10.	Local Community members	Villagers surrounding the estate	i. Management meeting with workers is conducted only once a year. Meeting should happen more frequently. ii. Villagers requested the Estate management to provide the area which will be used for market, since the current market is very small due to population increase. iii. Villagers are not allowed to cut and take sisal pole (malingoti) which they use for fences and firewood. iv. More sets of PPE's should be provided per worker.	Management has proposed to conduct meeting on half yearly basis. The estate management provided an area near the river to be used for the time being. Malingoti pole is part of sisal plant and is very crucial for propagation of new sisal plants hence, management cannot consider this request. Workers are provided with PPEs depending on their nature of job.

CHAPTER SIX

6.0 Identification and Assessment of Impacts and Mitigation Measures

6.1 Overview

Construction and operation of the proposed project is expected to generate a range of impacts in the project impact area. The anticipated impacts will be on a range of biophysical and socio-economic aspects of the environment. Some of the impacts are expected to be positive while others may be negative. The main purpose of this chapter is to identify the potential environmental impacts associated with the project from planning and design, construction, demobilization and operation and maintenance phases; assess their extent and significance; and propose mitigation and enhancement measures to manage the impacts. The positive measures if properly enhanced will contribute towards social and economic development of the area and Tanzania as a whole. The negative impacts will have to be managed to prevent environmental degradation of both the social and physical environment in the project area. Specifically, the chapter is aimed at the following:

a) Predict the potential environmental and social impacts arising from implementation of the project;
b) Assess the possible extent /severity of the predicted impacts (both positive and negative);
c) Assess the significance of the predicted impacts; and
d) Recommend measures for managing the impacts.

6.2 Methodology of impact identification

Impact identification was done by analyzing the project activities and determining their influence on the baseline environmental and social characteristics of the project area. The environmental characteristics of the project include biophysical (topography, soils, climate, rainfall, water resources, flora and fauna) and social characteristics (demography, settlement, land administration and tenure, economic activities, infrastructures and services, water supply and sanitation, healthy and HIV and AIDS). Public consultation complemented the field investigations and literature review. Identification of potential impacts and physical assessment of the following environmental components likely to be impacted was also conducted: a) physical /chemical; b) biological /ecological; c) social /cultural; and d) economic /operational.

Based on the project activities, the approach followed included:

a) Analysis of topographical maps, in order to identify the main environmental and social components of topography, land under cultivation, existing industrial establishments, infrastructure and water resources;
b) Site investigations, focusing particularly on the areas of project influence especially the neighboring designated institutions to identify critical environmental and social elements to be affected including soils, physical developments, social infrastructure, water and sanitation, health, flora and fauna, soils and local economy;

c) Screening of the anticipated potential and significant impacts of the project, in accordance with the project stages of planning and design, construction, operation and maintenance and decommissioning; and
d) Assessment of environmental impacts in order to describe the positive and negative impacts, both direct and indirect as identified at each stage of the project cycle.

The methodology adopted for impact identification mainly considered the environmental impacts at various phases of the project and the activities to be undertaken at each phase. The following phases were considered:

a) **Planning Phase** – Activities during planning and design phase include preparation of building designs, tender process, obtaining building permits and all the approvals necessary for the construction and operation of the project. It is expected that the environmental management measures, which will be proposed for the project will be incorporated into the engineering design of the project.
b) **Construction Phase** – For this phase, the main activities are land clearing; landscaping; grading; excavation; compacting; trenching; construction of service infrastructure such as access roads, construction of temporary structures such as storage, backfilling with compaction consolidation; levelling and earth marking; transportation of building materials; and construction of the worker's house and renovation of factory buildings. Other activities include land cultivation, planting etc.,
c) **Operation Phase** – During operation phase, sisal fibres will be produced. Sisal fibre process include decortication, brushing, drying, grading, balling, storage and market. The impacts were identified by considering project activities including inputs and outputs in the various project phases outlined above and how these would affect various components of the environment. The steps undertaken were:

i. Assessment of baseline conditions

The purpose of assessing baseline conditions was to understand the existing situation as this is the basis for determining changes that may occur as a result of the project.

ii. Assessment of project inputs associated with the project

Project inputs were examined to determine the potential changes and impacts that would be created through the application of project inputs.

iii. Assessment of project activities that will be undertaken

Project activities were examined to identify the impacts that the activities would bring on the environment.

iv. Assessment of project outputs associated with the project

Project outputs were examined to determine the potential changes and impacts that would happen as a result of the outputs.

v. Determination of environmental impacts

Based on the above steps, the environmental impacts of the project were identified.

6.3 Impact Evaluation and Scoring Matrix

After identifying the positive and negative environmental impacts the project will have on the environment, further analysis was conducted to determine the extent and significance of the impacts. The aspects that were considered were magnitude, significance, probability of occurrence and duration of impacts which have been properly explained.

6.3.1 Magnitude

Magnitude is a measure of the general degree, extensiveness, or scale of impacts. The magnitude was scored at four levels i.e. household level, local level, regional level and national level.

6.3.2 Significance

This is a measure of the importance of a particular action on the environmental factor in the specific instance under consideration. This was scored using values ranging from +3 to - 3 with a score of 1 representing a low/minimal impact, 2 moderate impact and 3 representing a high impact. Negative impacts were assigned a minus (-) sign and positive impacts are given a plus (+) sign.

6.3.3 Probability of occurrence

Provides an estimate of the probability of an impact occurring before mitigation is applied. The impacts were considered as:

a) Possible (impact may occur but it is not probable);
b) Probable (the impact is very likely to occur); and
c) Definite (impact is unavoidable).

6.3.4 Duration

Refers to the period of time over which an impact may occur, from once-off to continuous for the life of the project. Duration of impacts was considered as 1 for a low/ minimal impact and the score of 3 for a high impact. Each impact is given a score from 1 to 3 against each of the four attributes. The scores for each impact are added to give a total score for the four attributes, indicating the overall severity of the impact. A high score (3) represents a high impact and a low score (1) represents a low impact. Negative impacts are assigned a minus sign and positive impacts are given a plus sign. Table 6.1 shows the scoring scale used for evaluation of the impacts. The four rows allow evaluation of impacts in terms of the

magnitude, significance, probability and duration. The columns outline the scoring scale; with a score of 1 for a low/ minimal impact and the score of 3 for a high impact. Each impact is given a score from 1 to 3 against each of the four attributes. The scores for each impact are added to give a total score for the four attributes, indicating the overall severity of the impact. A high score (3) represents a high impact and a low score (1) represents a low impact. Negative impacts are assigned a minus sign and positive impacts are given a plus sign. For purposes of this analysis an impact matrix was prepared and is provided in Table 6.1.

Table 6.1: Impact scoring matrix with significant level

Impact	Spatial extent of the impacts	Significance of the impact	Probability of occurrence of the impact	Duration of the impact	Total Score
IMPACTS DURING PLANNING AND DESIGN					
POSITIVE IMPACTS					
Creation of employment	1	1	3	1	6
IMPACTS DURING CONSTRUCTION					
POSITIVE IMPACTS					
Creation of employment	3	3	3	3	12
Creation of a market for local construction materials	3	2	3	2	10
Increase in business	3	3	3	2	11
NEGATIVE IMPACTS					
Impact from exhaust emission	-2	-2	-2	-2	-8
Noise Pollution	-1	-2	-2	-2	-7
Impact from Vibration	-1	-2	-2	-2	-7
Soil erosion	-2	-2	-2	-3	-9
Vegetation disturbance	-1	-2	-2	-3	-8
Impact from solid waste generation	-1	-2	-2	-2	-7
Soil contamination	-1	-2	-2	-2	-7
Increase in accident incidences	-1	-2	-2	-3	-8
HIV/AIDS and other sexually transmitted diseases	-1	-2	-2	-2	-7
Increase in criminal activities	-1	-2	-2	-2	-7
Inadequate waste management	-1	-2	-2	-2	-7
Inadequate sanitation	-2	-2	-2	-2	-8

Gender based violence (GBV)	-2	-2	-2	-2	-8
IMPACTS DURING OPERATION					
POSITIVE IMPACTS					
Increase in Sisal fibre production	3	3	3	2	11
Increase in revenue to the National and District Government	3	3	3	2	11
Income generation to local communities/ villagers	2	2	3	3	10
Corporate Social responsibility benefits from the Estate	3	2	2	3	10
Creation of employment	3	2	3	3	11
NEGATIVE IMPACTS					
HIV/AIDS and other sexually transmitted diseases	-1	-2	-2	-2	-7
Increased pressure on social services and utilities	-1	-2	-2	-2	-7
Risks of fire hazards	-1	-3	-2	-3	-9
Soil contamination	-1	-2	-2	-2	-7
Impacts associated with Solid waste generation	-1	-2	-2	-2	-7
Ground water and surface water pollution	-1	-2	-2	-2	-7
Impacts on Fauna	-1	-2	-2	-2	-7
GBV/SEA/SH impacts	-1	-2	-2	-2	-7
Increase in Criminal Activities	-1	-2	-2	-2	-7
Cultural resources impact	-1	-2	-2	-2	-7
Security (private) personnel and interaction with communities including use of force	-1	-2	-2	-2	-7

IMPACTS DURING DEMOLITION					
POSITIVE IMPACTS					
Employment Opportunities	3	3	3	3	12
Rehabilitation	3	2	3	2	10
NEGATIVE IMPACTS					
Soil Erosion	-2	-2	-2	-2	-8
Loss of employment	-1	-2	-2	-3	-8
Loss of income	-1	-3	-2	-3	-9
Solid Waste Generation	-1	-2	-2	-2	-7
Worker's accidents and hazards during demolition	-1	-2	-2	-2	-7

KEY;

+3	High positive impacts
+2	Moderate positive impacts
+1	Minor positive impact
-1	Minor negative impact
-2	Moderate negative impacts
-3	High negative impacts-

6.4 Construction Phase Impacts

6.4.1 Positive impacts from construction phase

i. Employment opportunities

Some people in the Project area and the neighboring areas will be employed to render both manual and skilled labor during the implementation of the proposed project. As a result, many will benefit from improved livelihood and increased income from employment in the farm. This impact is high, regional and will be long term.

ii. Provision of market for construction materials

The project will require supply of materials for the renovation/construction of some of the facilities required in the estate such as the offices, workers house, factory buildings among others. Some of these construction materials will be sourced locally and from the surrounding areas. These include sand, stones, cement, etc. This will provide a ready market for such construction material suppliers including hardware shops. This impact is high, regional and will be long term.

iii. Increase in business activities within the project area

The presence of construction workers at the project site will create an opportunity for small scale business men and women to sale food stuffs, refreshments and to open barbershops and grocery shops.

6.4.2 Negative impacts from construction phase

i. Noise Pollution

Operation of heavy construction machineries and vehicle movements would generate a lot of noise which could be a nuisance to workers and people staying close to the project site. Noise can create stress and can be a hazard within the project site since it can make it difficult for workers to communicate or hear warning signs. *This is a short-terms impact.*

ii. Impact from Vibration

One of the most silent 'killer' on construction sites are vibrations which are created and disseminated from construction and excavation equipment and industrial machinery. Construction site vibration can have a tangible negative impact on a number of parties and assets, including communities, surrounding buildings, and the workers operating machines and equipment.

Workers whose hands are regularly exposed to high vibration from tools and machines often suffer from several short- and long-term injuries-including issues with hands and arms, impaired blood circulation and damage to the nerves and muscles.

iii. Impact from exhaust emissions

Potential air emission is from the motor vehicles during vegetation clearance, excavation works and transportation of materials to and from the project sites.

Motor vehicle exhaust is composed of gaseous compounds such as carbon monoxide (CO), Hydrocarbon (HC), Nitrogen Oxides (Nox), Sulfur Oxides (Sox), Lead (Pb) and Solid Particles (PM 2.5 and 10) produced by the combustion of fossil fuel such as diesel by fuel-fired motor vehicles.

The impact of motor vehicle exhaust on the environment include generation of acid rain, ozone depletion, photochemical smog and global warming.

Health impact: exhaust fumes can irritate the eyes and respiratory tract and are a risk to health by breathing in.

iv. Soil erosion

The soil will be exposed once the vegetation has been cleared resulting in soil erosion. The other sources include top soil stripping during land preparation and construction works. It is expected that the impacts will be low, local, and they will occur mostly during the construction stage (short term).

v. Vegetation disturbance at the Proposed Project site

During land preparation, vegetation mainly grasses and trees will be cleared to pave way for the proposed farm. The disturbance of vegetation in the site will affect the biophysical environment. However, the proponent is committed to replanting more grass in the unused areas of the farm and planting of more indigenous trees and also leaving 15% of the farm under tree cover. This impact is direct, moderate, local and will be long-term.

vi. Impacts associated with solid waste generation

Renovation/construction activities create solid wastes that need to be disposed. Such wastes include: plastic containers, cement bags and other packaging materials; and Metal, glass, plastic containers and other unwanted materials.

These wastes may have a direct impact on the neighboring areas, residents and domestic animals. 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 and pollution of physical environment. Proper waste management will however be taken into consideration and proper dumping done according to the Environmental (Solid Waste Management) Regulations, 2016. This is considered to be of long-term with high significance

vii. HIV/AIDs, STDs and other diseases (i.e. COVID – 19)

The concentration of too many people in a project site with relatively temporary social facilities is likely to cause increased levels of communicable diseases. During renovation/construction phase about 600 workers (skilled and unskilled) both local and experts from different areas will be employed hence with the onset of HIV/AIDS in Tanzania, any concentration of people is likely to be the source of the spread of HIV/AIDS,

Sexually Transmitted Diseases (STDs) and the risk of spreading COVID - 19. Although for short term only, may complicate the already fragile situation. Therefore, the impact is negative and of high significance.

viii. Incidences of risks, hazards and accidents

Risk is the possibility that something negative will occur; expressed in terms of probability while hazards can cause injury, disease, economic loss or Environmental damage. Risks and hazards are likely to occur during land preparation, cultivation/planting also during construction and renovation. The activities which may lead to OHS risks are working at height, confined spaces, equipment accidents, non-usage of PPEs, welding. The use of machines and equipment's during renovation may cause accidents if not properly managed. The impact is considered to be low, short term and insignificant if properly managed. This impact is moderate, localized and will be long term.

ix. Impacts associated with disposal of sewage

When access to adequate sanitation is limited, it can lead to challenges such as the use of secluded areas for defecation, which may create unsanitary conditions. Management of sewage disposal presents an opportunity to protect underground water resources. With appropriate mitigation the impact is considered to be indirect, short term and insignificant.

x. Labour influx

Labor influx for expansion and rehabilitation works can lead to a variety of social and environmental risks and impacts. Accommodating workers in construction areas can have positive and negative effects, for the workers, the host community, and the environment. The social risk associated with labor influx are such as Risk of social conflict, Increased risk of illicit behavior and crime, Influx of additional population, Impacts on community dynamics.

xi. Child Labour/Forced Labour

There is a risk that some project-related activities could involve child labour - employment of children in project activities depriving children of their childhood and that is mentally, physically, socially or morally dangerous and harmful. The Labour Management Plan may need to be provided that no one under the age of 18 may be employed or engaged in connection with the project. This impact is minor, localized and will be short-term.

xii. Gender based violence GBV/SEA/SH impacts

Large component of workers will be from local area. Some Workforce, largely composed of younger males, may experience a shift in their social dynamics as they navigate new environments and interactions while being away from home. This situation highlights the importance of understanding the complexities of community relationships, particularly regarding the well-being of women and girls. The influx of male labor can lead to various social challenges. This impact is minor, localized and will be short-term.

xiii. Potential of Criminal Act

The influx of people to the project area may attract people with bad intentions who can create havoc within the project surrounding areas. There may also be conflicts between the migrant workers and the locals that may culminate into violent acts.

xiv. Cultural resources impact

Renovation activities of the sisal estate may have impact on cultural resources through people's interactions. A cultural resource is defined as a site, location or feature of cultural importance to an Indigenous Group and identified as such by an Indigenous Group. Cultural resources may include, but are not limited to; Prayer flags, Trails, Camps, including sites for cultural gatherings, Habitation sites, Spiritual sites, burials.

xv. Community health and safety impacts

Delivery of supplies for construction workers and the transportation of workers can lead to an increase in traffic, as well as additional burden on the transportation infrastructure.

xvi. Security (private) personnel and interaction with communities including use of force

Risks to and potential impacts on human security due to the engagement of security personnel can be mitigated through measures set out in procurement documents and other forms of written agreements, as well as in specific management plans.

6.5 Operational Phase Impacts

6.5.1 Positive from Operational Phase

i. Increase in Sisal fibre production

The improvement of Husseni Sisal estate will lead into increase of productivity in the sisal fibre as the project aims to capture the ever-increasing demand for sisal products, and hence generate income with a view of providing profitable returns to the shareholders and increase the national outputs. This impact is direct, high, and national and will be long-term.

ii. Increase in revenue to the National and District Government

The operation of the proposed project will result in positive gains for numerous Authorities- The local government, Tanzania Revenue Authority (TRA), Sisal Board etc. through payment of relevant taxes, rates and fees to respective institutions. This impact is direct, high, and national and will be long-term.

iii. Income generation to local communities/ villagers

There would be secondary benefit as money would move into the local communities through selling sisal to the Proponent for production, provision of food supplies, this will increase the income of local

communities as well as improving their living standard. This impact is direct, high, and national and will be long-term.

iv. Corporate Social responsibility benefits from the Estate

Corporate Social Responsibility (CSR) is essential towards the success of companies. Its essence is in making companies part of the community in assisting its development through establishing projects, as a way of sharing part of their success to the marginalized communities. It is the proponent's duty to attend such responsibilities and to be socially accountable to itself, its stakeholders, and the public. This impact is direct, high, and national and will be long-term.

v. Employment opportunities

The project will directly and indirectly create employment for a number of workers, especially casual workers within Kisangara village and other location. Though the employment terms will be temporary or permanent, those who will be employed will earn income hence use the money to satisfy some of their needs. This impact is direct, high, and national and will be long-term.

6.5.2 Negative from Operational Phase

i. Increased pressure on social services and utilities

The presence of the proposed project will increase pressure on social services and utilities such as water, electricity, waste water and solid waste collection facilities, etc. The demands will strain the service delivery system in one way or the other. This impact is considered to be direct, negative, long term and of high significance.

ii. Risks of fire hazards

Fire outbreak is fast propagative and may cause magnitude economic losses to buildings, installation, flora and fauna. If not contained in time fire outbreak may result in injuries, loss of human life and air pollution beyond the boundary of the project area. During operation phase of the estate there some activities which may lead to fire outbreak such as smoking, fuel leaking, improper storage of chemicals etc. This impact is considered to be indirect, negative and of high significance.

iii. HIV/AIDs, STDs and other diseases (i.e. COVID – 19)

The concentration of many people during the project operation with relatively temporary social facilities is likely to cause increased levels of communicable diseases. Currently there about 600workers (skilled and unskilled), more workers will be employed after expansion depending on the season hence with the onset of HIV/AIDS in Tanzania, any concentration of people is likely to be the source of the spread of HIV/AIDS, Sexually Transmitted Diseases (STDs) and the risk of spreading COVID - 19. Although for short term only,

may complicate the already fragile situation. This impact is indirect, negative, long term and of high significance

iv. Soil contamination

Sisal plants especially during nursery stage are often treated with pesticides to protect them from pests and diseases. However, the use of these chemicals can have negative environmental impacts such as soil and water contamination and harm to non-target organisms.

v. Impacts associated with Solid waste generation

Considerable volumes of solid waste will be generated during operation of the factory and farming activities. There will be solid wastes such as garbage waste like papers, food remains, packaging materials etc. The wastes biodegradable will be kept and used as manure for the farms while the plastic wastes will be collected and given to the plastic recyclers. This waste will negatively impact the aesthetic value of the site and surrounding environments if not properly managed. The impact is direct, long term and significant.

vi. Ground water and surface water pollution

The decortication process presents opportunities for water conservation and pollution prevention, but it also poses risks to water quality if not managed effectively. Wastewater generated during decortication can potentially harm the environment, while pesticides and fertilizers used on sisal plants require careful management to prevent runoff into nearby waterways. Furthermore, chemicals used in processing and cleaning must be handled and disposed of properly to avoid contaminating the water supply. The impact is direct, long term and significant.

vii. Child Labour/Forced Labour

Increased opportunities for the host community to sell goods and services to the incoming workers can lead to child labor to produce and deliver these goods and services, which in turn can lead to enhanced school dropout. This impact is minor, localized and will be short-term. This impact is minor, localized and will be short-term.

viii. Impacts on Flora/Vegetation clearance

The proposed site has some vegetation and greenery areas that blend very well with the surroundings. Sisal farming activities may impact on vegetation of the site. This impact is minor, localized and will be short-term.

ix. Impacts on Fauna

The farming activities would impact the fauna of the site in several different ways. Firstly, there would be noise associated with the excavation activities. This may frighten many of the larger mammals away from the area. This impact is minor, localized and will be short-term.

x. GBV/SEA/SH impacts

Large component of workers will be from local area. Some Workforce, largely composed of younger males, may experience a shift in their social dynamics as they navigate new environments and interactions while being away from home. This situation highlights the importance of understanding the complexities of community relationships, particularly regarding the well-being of women and girls. The influx of male labor can lead to various social challenges. This impact is minor, localized and will be long-term.

xi. Crime

During operation phase, the influx of workers and service providers into communities may increase the rate of crimes and/or a perception of insecurity by the local community. Such illicit behavior or crimes can include theft, physical assaults, substance abuse and exploitation. This impact is minor, localized and will be long-term.

xii. Cultural resources impact

Operations of the sisal estate may have impact on cultural resources through people's interactions. A cultural resource is defined as a site, location or feature of cultural importance to an Indigenous Group and identified as such by an Indigenous Group. Cultural resources may include, but are not limited to; Prayer flags, Trails, Camps, including sites for cultural gatherings, Habitation sites, Spiritual sites, burials.

xiii. Community health and safety impacts e.g., traffic hazards, site access hazards

Delivery of supplies to the factory and farms workers and the transportation of workers can lead to an increase in traffic as well as additional burden on the transportation infrastructure. This impact is moderate, localized and will be long term.

xiv. Security (private) personnel and interaction with communities including use of force

Risks to and potential impacts on human security due to the engagement of security personnel can be mitigated through measures set out in procurement documents and other forms of written agreements, as well as in specific management plans. This impact is moderate, localized and will be long term.

xv. Impacts associated with wastewater from decortication

Waste water from decortication can lead to water pollution, they can seep into nearby rivers and streams, contaminating the water supply. They can also be the source of eutrophication since they contain nutrients. This problem has been addressed by provision of waste water stabilization ponds on site.

6.6 Decommissioning Phase impacts

6.6.1 Positive Decommissioning Phase Impacts

i. Employment opportunities

Demolition phase will require a number of people in demolishing the existing building and infrastructures,

collecting wastes generated and rehabilitating the area. Among others, the following staff will be directly or indirectly linked to the project: Supervising Engineering team, Ecologist, Environmental Officer, Electrical Engineer, Water Resources and Plumber Engineer, unskilled labour force and other essential services and monitoring personnel from various government institutions (NEMC and OSHA). This is considered to be of short term with high significance.

ii. Rehabilitation

Upon decommissioning, rehabilitation of the project site will be carried out to restore the site to its original status. This will include replacement of topsoil and revegetation that will lead to improved visual quality of the area.

6.6.2 Negative Decommissioning Phase Impacts

i. Loss of employment

Decommissioning will result in the loss of employment for the workers such as farmers, cleaners, guards, specialists, engineers, and managers who were employed. This loss will be significant at individual level and at the national level, especially as national policies seek to create more jobs. This is considered to be of short-term with high significance.

ii. Loss of income

The loss of employment as a result of decommissioning process will impact the lifestyle and quality of life of the people. Mostly affected ones are the workers who were working at the project also, business vendors who were depending on delivering goods such as foods, drinks, and fruits to the workers. Lack of proper measures to deal with the effects of losing job can made life of the workers more difficult socially, psychologically and economically. So the developer has to timely pay pension/terminal benefits of workers. This is considered to be of short term with high significance.

iii. Impacts associated with Solid Waste Generation

Demolition of the proposed development will result in solid waste. The waste will contain the materials used in renovation including concrete, metal, drywall, glass, paints etc. Waste may lead to release of certain 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. Hence the impact is considered to be direct and short-term impact.

iv. Dust emission

Large quantities of dust will be generated during demolition works. This will impact on the demolition staff as well as the neighboring residents. The impact is indirect and of short term if there will be proper mitigation measures. This is considered to be of short-term with high significance.

v. Impacts associated with Noise

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 that will be experienced as a result of demolishing the project. This is considered to be of short-term with high significance.

vi. Soil Erosion

Decommissioning will involve demolition of structures, management of spoil material and trucking them from the site. This would require more trucks to do the work, which may result in soil erosion and increased levels of dust. Heavy trucks moving between the site and the dump place may also cause vibration that may result in accelerating soil erosion. This impact is direct, negative, short term and of medium significance.

vii. Workers accidents and hazards during demolition

Demolition phase of the proposed project requires careful planning and execution to ensure worker safety. We recognize the potential for hazards such as accidents from falls, equipment operation, and hazardous materials, and are dedicated to preventing them through rigorous safety measures and training. With proper mitigation measures the impact is indirect, short term and insignificant. Hence the impact is considered to be direct and short-term impact.

CHAPTER SEVEN

7.0 Project Alternatives

7.1 Overview

Consideration of project alternatives is crucial in ensuring that the Proponent and decision–makers have a wider base from which they can choose the most appropriate option. In this study, the following alternatives are considered and will be examined in detail during the EIA process.

7.2 No Project Alternative

This involves maintaining the current status quo without Expansion of the estate. Accepting this option would mean avoiding most of the negative effects associated with the project and missing all the positive benefits that would occur.

Advantages

- Air pollution from dust as a result of the renovation will not occur.
- There would not be removal of bushes
- There would be no soil or water contamination.

Disadvantages

- There will be no creation of new employment
- There will be no secondary development as a result of the project
- The factory will not be renovated

7.3 Project Alternative

Before the decision of the renovation and expansion, the study was specially made with the aims of analyzing the prevailing cost and benefits of various alternatives. The study was hinged on the following criteria for suitable facility. The project option for the proposed project development is very strategic and will open up other avenues of economy for the community around and in the Region at large. The do the project option is in order to comply and conform to future development as; a new economic regime will emerge. This approach will increase revenue collection for the Mwanga District Council. This option implies that the project will be implemented and once implemented there will be a number of losses and gains that will be realized. We strongly recommend these options as the benefits far outweigh the negative impacts.

Advantages

- There will be creation of employment.
- There will be secondary development as a result of the project.
- The expected income in the form of profits to the Proponent and in the form of taxes to The government will be realized.

Disadvantages

- Air pollution from dust as a result of the renovation will occur
- There will be noise pollution due to renovation activities

7.4 Different Site Selection/ Location

This option involves using another area from the proposed site location.

Selected alternative

Under the proposed development alternatives, the proposed development would create employment; improve people's welfare and so on. Thus, the proposed site provides the optimum alternative for implementing and operating the proposed project subject to the effective implementation of the proposed ESMP and EMP.

7.5 Alternative Source of Water

Alternative one: Groundwater Extraction/Borehole

It has been noted that ground water can be a sole source of water supply due to water shortage and scarcity in the proposed area. In the proposed area, borehole is the most reliable source of water.

The proponent will drill a borehole onsite during construction phase after conducting a hydrological survey so as to be sure that extraction of underground water won't affect the nature of water catchment area. Also, water testing to know the quality of water for domestic uses during operating.

Alternative two: Rainwater Harvesting

Rain water harvesting is another viable alternative for water supply. The rainwater will be harvested from both roof and land catchment after proper design of rainwater harvesting and storage system. The proponent will use this water for washing the premises and watering garden and trees around the site.

7.6 Alternative Source of Power

Alternative one: TANESCO

Currently, the proposed site is supplied with electricity from TANESCO and there are high tension lines passing near the proposed site.

Alternative two: Standby Generator

Standby generators will be used as source of energy during power cut.

Alternative three: fuel wood

Fuel wood will be the major source of fuel for the facility, the proponent has already planted enough trees to provide fuel for the facility, and local farmers have been encouraged to plant trees as the facility will provide a ready market for trees. The estate has a total land area of; 231 ha (10%) are under fuel wood

plantation; The estate has set aside 34 ha (1%) for additional fuel wood plantation.

Alternative four; Solar Energy: This will be another source of Energy in the estate supplying clean solar electricity during the daytime to meet most of the sisal processing factory's energy demand.

Selected alternative

The proposed site will use the alternatives from both TANESCO, Solar energy and standby generator.

7.7 Solid Waste Management Alternatives

Alternative one: Source reduction

The proponent will give priority to reduction at source of the materials. This option will demand solid waste management awareness programme.

Alternative two: Reuse and Recycling

Reuse and recycling of the waste will be the second alternative in priority. This will call for a source separation programme to be put in place. The recyclables will be solid to waste buyers within the surrounding areas.

Alternative three: Disposal of waste

The waste will be stored in sealed units in order to minimize litter contaminating the surrounding area. The proponent will have to liaise with the District Council to contract a waste handler to dispose the waste into a designated dumpsite.

Selected solid waste management alternative

The proposed project will implement all alternative for effective solid waste management. The management of the project will implement reduction of solid waste at the source, reuse and recycle and lastly will dispose waste at the designated dump site.

7.8 Waste Water Management Alternatives

Alternative one: Waste water treatment plant

This can be constructed for the purpose of using chemicals or natural bacteria to treat effluent water to acceptable levels before discharging the water into the open environment. This process is expensive and requires vigilant attention and use of substantial amount of space.

Alternative two: Use of septic tank and soak away pit

This involves the renovation of underground concrete-made tanks to store the sludge with soak pits. Septic tanks and soak pits demand little space compared to other options.

Alternative three: Use of wastewater stabilization ponds.

Ponds are large, shallow ponds designed to treat wastewater through the interaction of sunlight, bacteria, and algae. This process is cheap but require large space.

Selected waste water management alternative

Septic tank and soak away pit will be used to manage domestic waste water. Wastewater from decortication process will be managed by waste stabilization ponds. However later the proponent might opt the use of treatment plant.

7.9 Alternative pesticides

Chemical pesticides are used widely in agriculture. They play a significant role in many different types of farming, including sisal production. However, due to the potential environmental and health risks associated with their use, pesticides are beginning to alarm both consumers and producers alike.

Selected alternative; Integrated Pest Management (IPM) - means considering all available pest control techniques and other measures that discourage the development of pest populations, while minimizing risks to human health and the environment. IPM is the best combination of cultural, biological and chemical measures to manage diseases, insects, weeds and other pests. It takes into account all relevant control tactics and methods that are locally available, evaluating their potential cost-effectiveness. IPM does not, however, consist of any absolute or rigid criteria. It is a flexible system that makes good use of local resources and the latest research, technology, knowledge and experience.

Benefits of IPM

IPM provides multiple benefits for society and the environment. It is vital for the long-term future of the plant science industry.

- Improved crop profitability due to better pest control measures and appropriate use of crop protection products
- Stable, reliable and quality crop yields
- Decreased severity of pest infestations
- Reduced potential for problems of pest resistance or resurgence
- Increased consumer confidence in the safety and quality of food and fiber products
- Sustained market shares and access
- Less risk of restrictions or deregistration
- New opportunities for established and novel products, techniques and services
- Longer product lifecycles
- Decreased resistance of pests to crop protection products and biotech plants
- Increased public confidence in, and credibility of, the crop protection industry

CHAPTER EIGHT

8.0 Impact Mitigation and Enhancement Measures

8.1 Overview

This chapter is devoted to describing measures or actions that shall be implemented so as to minimize any of the potential impacts identified. Many of the mitigation measures put forward are nothing more than good engineering practice that shall be adhered to during the design and construction phases. The developer is committed to the implementation of mitigation measures contained in this report.

In order these mitigation measures to be implemented, the safeguards mandatory tools which shall also form part of the tender and bid documents and the contract shall be prepared by the Contractor. These safeguards tools include: ESMP, Contractor's ESMP (C-ESMP); Health and Safety Management Plan (HSMP); Waste Management Plan (WMP); Emergence Preparedness Plan (EPP).

Table 8.1; Impacts Mitigation / Enhancement measures

Positive Impacts – Construction /Renovation Phase		
No	**Impacts**	**Enhancement Measures**
1.	Employment opportunities	• Ensure to set up a formal compliant register system which responds to complaints about nuisances in a timely manner • Adopt policies for recruiting locally and hiring local sub-contractors as much as possible include local communities in the consultations and participation process throughout the project activities • Ensure high rate of local employment to minimize influx of foreign • workers • Ensure equal employment opportunities • Adhere to prohibition of child labour • Prohibit discrimination in any form or manner such as religion, ethnicity, tribe, creed etc. • Adopt a grievance mechanism to enable the communities and employees to relate concerns that arise from the Project or Contractors
2.	Increase in market for local construction materials	• Purchasing materials from as many local suppliers; and • Hiring trucks to transport construction materials like sand, quarry and cement to the project site
3.	Increase in business activities within the project area	• Designating an area as a market close to the project site
Negative Impacts – Construction /Renovation Phase		
No	**Impacts**	**Mitigation Measures**
1.	Impacts associated with solid waste generation	• Promote recycling and reuse of general refuse • Ensure that disposal of hazardous and non-hazardous waste is carried out in line with relevant national legislative and regulatory requirements; any hazardous waste generated on construction sites must be collected, transported and further management by competent and licensed contractors • Prohibit the burning of refuse on the construction and operation site

		• Recycle onsite whenever feasible • Fence construction site to prevent flying materials to deposit in • nature • Ensure that vehicles transporting wastes are fully covered • Ensure adequate onsite waste segregation, including segregation at source for all waste streams (hazardous waste, various recyclables etc.) • Adopt good housekeeping practices during all phases of the project • Prohibit all forms of littering on-site
2.	Impacts associated with noise	• Fitting construction vehicles with silencers to reduce the noise; • Servicing machinery so that they can be in good condition at all times; and • Providing ear protection materials for the workers in noisy areas. • Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only; • Equipment should be regularly inspected and maintained to ensure it is in good working order by manufacturers
3.	Impacts associated with vibration	• Conduct regular vibration monitoring tests to assess the frequency and scale of the vibrations on site, and make more informed decisions about the preventive or corrective actions they can take to better protect their people, other stakeholder and the environment.
4.	Impacts associated with exhaust emission	• Improve and implement international standards • Development of alternative fuels such as natural gas and liquefied petroleum gas (LPG) • Raise the public awareness of environmental protection
5.	Impacts associated with disposal of sewage	• The design of the internal sewerage system should consider the estimate discharges from individual sources and the cumulative discharge of the entire project i.e., it should have the capacity to consistently handle the loads

		even during peak volumes; • All drain pipes passing under building, driveway or parking should be of heavy-duty PVC pipe tube encased in concrete surround. • Sanitary facilities should be kept clean always, through regular washing/cleaning; • Frequent monitoring of the internal drainage system; and • Blockages and damages should be fixed expeditiously • Construction of double chambered septic tanks for disposal of liquid wastes; • Regular inspection and maintenance of the septic tank network; • Use of improved pit latrines for easy maintenance; • Provision of potable water within the site.
6.	Incidences of risks, hazards and accidents	• Contractor should establish contractual clauses (signed code of conduct) to be embedded in the contracts of the workers and sub-contractors that require adherence to law and international standards to be upheld related to worker. • Contractor should prohibit the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health and safety of other employees, community members or the environment. • Contractor and self-employed contractors should assess the H&S risks related with the tasks to be performed during the construction phase. • Pre-employment medical assessments should be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting pre-employment medical assessments include a safer working environment, reduction in workplace injuries, minimized downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction.

		• Contractor should ensure that training on health and safety measures is provided to all construction workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities. • Contractor should implement regular health and safety checks and audits of workers, and subcontractors and implementing sanctions in case of breaches of national standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards. • Contractor should develop and implement a Workers Grievance Mechanism for the Project workforce including workers and subcontractors. • Contractor should establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks. • Contractor should ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents. • Contractor should ensure that its Code of Conduct is followed to regulate the performance and behavior of all workers, including provision for disciplinary action for anti-social behavior and non-compliance with health and safety regulations such as lack of use of PPE. • Contractor should ensure that World Bank Health and Safety guidelines regarding the construction and management of worker accommodation and the provisions of medical facilities at worker accommodation are followed. • Contractor should ensure that adequate clean water, adequate food and access to medical care is provided to all workers on the worksite and at accommodation. • Contractor should develop and implement a Traffic Management Plan covering aspect such as vehicle safety, driver and passenger behavior, use of drugs and alcohol,

		operating hours, rest periods, community education on traffic safety and accident reporting and investigations. • Contractor should develop a Waste Management Plan for the construction phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.
7.	HIV/AIDs, STDs and other diseases (i.e. COVID – 19)	• Contractor should establish HIV/AIDS programmes to raise awareness • Put posters with various messages such as "HIV/AIDS kills", "be faithful". • Preventive measures against the spread of COVID – 19 shall be practiced at the project site.
8.	Child Labour/Forced Labour	• Conduct Selection and Qualification of Subcontractors • Awareness-Raising and Training of Internal Inspectors and Local Authorities • Promoting Access to Education
9.	Impacts on Flora/Vegetation clearance.	• Vegetation clearance for temporary infrastructure should be limited to the minimum core area at the site. Areas cleared of vegetation should be re-vegetated to prevent soil erosion. • Re-vegetation is only possible given suitable ground conditions (soils, slopes, drainage) moisture, and protection from destruction.
10.	Impacts on Fauna	• Ensure that no flora species classified as Vulnerable on the IUCN • Red List are removed or cleared • No tree greater than 200 mm diameter at breast height should be damaged • Promote plantation of native trees and green corridors along the project facility. • Minimize vegetation clearance • Any hunting activities should be prevented • Ensure to report fauna species of high conservation value
11.	GBV/SEA/SH impacts	• Appoint senior focal points in both clients and contractors with responsibility for ensuring that commitments and

		policies to prevent GBVH are implemented. • Increase women's representation, including at senior and decision-making levels in engineering, procurement and construction • Put in place monitoring systems at the highest levels for regular reporting on GBVH. • Include requirements around GBVH in codes of conduct, policies and protocols for contractors, including training on policies and procedures once developed. • Ensure codes of conduct are publicly disclosed in local languages and are widely accessible to all workers and all groups of people in project areas. • Build GBVH risk assessments into key processes, including environmental and social impact assessments (ESIAs) and environmental and social management plans (ESMPs).
12.	Potential of Criminal act	• The contractor or construction management company should designate an employee as the company crime prevention coordinator. • All assets on a construction site should be identified (marked), inventoried (records), and tracked as closely as practical. A company identification numbering system should be developed. • The company crime prevention coordinator should contact neighbors around the job site residents, businesses, even children and solicit their support and help in maintaining a safe and secure job site • Electronic alarm systems can be an effective means of providing security on the job site, particularly for office and storage trailers or for material storage areas.
13.	Cultural resources impact	• Preparing Environmental Protection Plans which describe the cultural management requirements applicable to their scope of work and work areas; • Compliance with cultural obligations applicable to their scope of work and work areas as set out in the applicable Environmental Protection Plans, including site specific

		measures; • Compliance with Chance Find Procedures
14.	Community health and safety impacts e.g., traffic hazards, site access hazards	• Identify emergency scenarios and develop emergency preparedness and response plans with allocation of responsibilities to local communities and authorities, (where appropriate). • Develop specific stakeholder engagement plan based on consultation and participation with government and communities regarding the nature and potential consequences of the risks • Define protocol for community reporting of observed incidents • Maintain community grievance process • Continue safety awareness and education programs for impacted communities, including school programs.
15.	Security (private) personnel and interaction with communities including use of force.	• For projects with high security risks, a stand-alone Security Management Plan contains all the procedures and protocols related to security for the project. • While the Security Management Plan should be an actionable and practical document, it is unlikely to be able to address every possible scenario in detail
16.	Soil erosion	• Landscape the excavated areas in a suitable way to allow native vegetation to regrow naturally • Suspend activities during extreme rainfall events • Ensure to provide drainage channels and silt traps for all parts of the topsoil storage areas • Ensure to rehabilitate areas with topsoil and revegetate after • completion of activities • Install sediment and erosion controls • Use non-toxic and readily biodegradable chemicals on-site where feasible • Install natural or synthetic liners beneath chemicals storage tanks • Grade unpaved roads

Negative Impacts – Operation Phase		
No	**Impacts**	**Mitigation Measures**
1.	Increased pressure on social services and utilities	• Alternative measures such as the use of modern technology equipment that saves energy. • Also, the proponent should try to reduce amount of waste generation at the source so as to ease the solid waste collection facility. • Proponent should consider installation of solar lighting systems complement electricity supply from the national grid. • The project design includes ventilation systems at the factory that allow for sufficient air circulation and lighting to lower the energy demand for the facility.
2.	HIV/AIDs, STDs and other diseases (i.e. COVID – 19)	• Contractor should establish HIV/AIDS programmes to raise awareness • Put posters with various messages such as "HIV/AIDS kills", "be faithful". • Preventive measures against the spread of COVID – 19 shall be practiced at the project site.
3.	Impacts due to mismanagement of hazardous waste like packaging materials for agrochemicals;	• Decontamination at the source: Development of a protocol for rinsing and decontaminating (Agrochemical Plastic Packaging Waste Management) APPW upon preparation of the spray, in order to characterize them as non-hazardous waste. • Development of a secure mechanism to assure the effectiveness of the decontamination method. • Sorting at the source: Sorting of decontaminated, clean APPW to categories of homogenous materials to facilitate their recycling.
4.	Soil erosion due land clearance during farm preparation;	• The contractor to confine the activities within the project core impact area and re-vegetation of the cleared area after planting of sisal.
5.	Risks of fire hazards:	• There shall be a well- designed and properly laid fire hydrant system effectively fighting fires of various proportions and of all classes of fire risks.

		• The management will have to ensure high level training for fire unit personnel and ensures periodical grilling of workers to cope with fire emergencies. • Consider using of fire breaks
6.	Ground water and surface water and soil pollution	• To reduce the environmental impact of sisal production on water usage, sustainable farming practices can be introduced, such as utilizing rainwater harvesting techniques. • Sisal manufacturers may also invest in technologies that can reduce water usage, such as treatment plant • Proper sanitary facility should be available at all time throughout the phases. • Advice to people on the importance of using sanitary facility at all-time throughout the phases.
7.	Impacts associated with Solid waste generation	• Provide each section of the facility with sufficient trash bins that promote sorting at source. • Encourage staff to handle waste through the hierarchy of options that including reduction at source, separation of waste to make it easier to undertaking recycling or reuse
8.	Child Labour/Forced Labour	• Conduct Selection and Qualification of Subcontractors • Awareness-Raising and Training of Internal Inspectors and Local Authorities • Promoting Access to Education
9.	Impacts on Flora/Vegetation clearance.	• Vegetation clearance for temporary infrastructure should be limited to the minimum core area at the site. Areas cleared of vegetation should be re-vegetated to prevent soil erosion. • Re-vegetation is only possible given suitable ground conditions (soils, slopes, drainage) moisture, and protection from destruction.
10.	Impacts on Fauna	• Any slow-moving fauna, such as tortoises or snakes observed at the site during the renovation/ expansion phase should be removed to safety by the ECO. • In order to reduce collisions of vehicles with fauna, speed limits should apply to all roads and vehicles using the site,

		a maximum of 40 km/h is recommended. Animals should have right of way. • All cleared areas which do not need to remain clear of vegetation should be rehabilitated or seeded with local species if natural recovery does not take place within a year of being cleared.
11.	GBV/SEA/SH impacts	• Appoint senior focal points in both clients and contractors with responsibility for ensuring that commitments and policies to prevent GBVH are implemented. • Increase women's representation, including at senior and decision-making levels in engineering, procurement and construction • Put in place monitoring systems at the highest levels for regular reporting on GBVH. • Include requirements around GBVH in codes of conduct, policies and protocols for contractors, including training on policies and procedures once developed. • Ensure codes of conduct are publicly disclosed in local languages and are widely accessible to all workers and all groups of people in project areas. • Build GBVH risk assessments into key processes, including environmental and social impact assessments (ESIAs) and environmental and social management plans (ESMPs).
12.	Potential of criminal act	• The management should designate an employee as the company crime prevention coordinator. • All assets on a construction site should be identified (marked), inventoried (records), and tracked as closely as practical. A company identification numbering system should be developed. • The company crime prevention coordinator should contact neighbors around the job site residents, businesses, even children and solicit their support and help in maintaining a safe and secure job site. • Electronic alarm systems can be an effective means of providing security on the job site, particularly for office and

		storage trailers or for material storage areas.
13.	Cultural resources impact	• Preparing Environmental Protection Plans which describe the cultural management requirements applicable to their scope of work and work areas; • Compliance with cultural obligations applicable to their scope of work and work areas as set out in the applicable Environmental Protection Plans, including site specific measures; • Compliance with Chance Find Procedures
14.	Community health and safety impacts e.g., traffic hazards, site access hazards	• Identify emergency scenarios and develop emergency preparedness and response plans with allocation of responsibilities to local communities and authorities, (where appropriate). • Develop specific stakeholder engagement plan based on consultation and participation with government and communities regarding the nature and potential consequences of the risks • Define protocol for community reporting of observed incidents • Maintain community grievance process • Continue safety awareness and education programs for impacted communities, including school programs.
15.	Security (private) personnel and interaction with communities including use of force.	• For projects with high security risks, a stand-alone Security Management Plan contains all the procedures and protocols related to security for the project. • While the Security Management Plan should be an actionable and practical document, it is unlikely to be able to address every possible scenario in detail
16.	Impact of waste water from decortication	• Discharge all the liquid waste into a waste treatment plant. • Conduct water quality test before used for irrigation • Frequent monitoring of the treatment ponds system
Positive Impacts – Operational Phase		
No	**Impacts**	**Enhancement Measures**
1.	Increase in revenue to the National and District	• In order to ensure that the benefits are sustained, the Government has to improve the collecting authority for

	Government	taxes (Tanzania Revenue Authority) and strengthen collection mechanisms.
2.	Income generation to local communities/ villagers	• In order to ensure that the benefits are sustained, the Proponent is advised to continue procuring goods from the local communities. • Also, there should be significant prices of the sisal produced by the out growers.
3.	Corporate Social responsibility benefits from the factory	• The proponent should adhere to Corporate Social responsibility law
4.	Employment opportunities	• The first priority will be given for qualified Tanzanians in Mwanga District and the rest of Tanzania.
5.	Increase in sisal fibre production	• Produce quality fibres
Positive Impacts – Decommissioning Phase		
No	**Impacts**	**Enhancement Measures**
1.	Employment opportunities	• The first priority will be given for qualified Tanzanians in Mwanga District and the rest of Tanzania.
Negative Impacts – Decommissioning Phase		
No	**Impacts**	**Mitigation Measures**
1.	Impacts associated with Noise and vibration	• Restriction of noisy demolition activities during normal working hours (8am - 5pm). • Local residents will be informed via notices and advisories, of pending noisy periods and solicit their tolerance well before the commencement of piling works. • Workers operating equipment that generates noise will be equipped with noise protection gear including ear muffs and plugs. Workers operating equipment generating noise levels greater than 85 dBA continuously for 8 hours or more should use earmuffs whereas those experiencing prolonged noise levels of 70 - 80 dBA should wear earplugs.
2.	Loss of employment	• Workers will be provided with skills for self-employment and others with special skills will be availed jobs to other places.
3.	Dust emission	• Access roads and exposed ground will be wetted in a

		manner and at a frequency that effectively keeps down the dust. • Workers in dusty areas on the site will be issued with dust masks during dry and windy conditions.
4.	Impacts associated with Solid Waste Generation	• A site waste management plan will be prepared by the contractor prior to commencement of demolition activities. This will include designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring.
5.	Soil Erosion	• Planting indigenous plants on site to support the disturbed soil; • Backfilling any foundation and trenches by used the top soil onsite so as to stabilize the disturbed area; • Reestablish the original grade and drainage pattern to the extent practicable;
6.	Workers accidents and hazards during demolition	• Proper signs on site to warn workers safety requirements as regards machines with moving parts and other equipment at site; • First Aid box and have a trained person to handle site emergencies and incidences will be in place; • Site vehicle to specifically transport the injured to hospital will be available; • Providing fire-fighting mechanism at site; • Providing safe scaffoldings and railings at heights; • Providing washing (enclosed bathroom) and toilet facilities at site with both drinking and washing water. The number of workers engaged determines the number of toilets and bathrooms provided; and • Providing safety helmets, safety masks (welders), safety shoes (loaders), uniforms and hand gloves to the workers.

CHAPTER NINE

9.0 Environmental and Social Management Plans

9.1 Overview

Environmental and Social Management Plan (ESMP) for developing projects usually provides a logical framework within which identified negative environmental impacts can be mitigated and monitored. In addition, the ESMP assigns responsibilities of action to various actors and provides a time frame within which mitigation measures and monitoring can be done. The ESMP is a vital output of a proposed project as it provides a checklist for project monitoring and evaluation. The ESMP outlined has addressed the identified potential negative impact and mitigation measures of the proposed project based on the section of Environment Impact and Mitigation Measures of the Negative Impacts.

9.2 Institutional roles and responsibilities

9.2.1 Financing agency

Mohammed Enterprises Tanzania Limited (METL) is the financing agency for this project. They are responsible for providing funds for implementation of mitigation measures and compliance monitoring.

9.2.2 Implementing agency

The implementing agency for this project is the Mohammed Enterprises Tanzania Limited (METL). The organization holds final responsibility for the environmental performance of the project. The Project will have an Environmental and Social Management Team that oversee environmental and social performance and compliance with legal and policy requirements including the African Development Bank's Guidelines and Policies. The Team will include an Environmental Compliance Officer and a Community Liaison Officer. The Team will be responsible for implementation of the Environmental and Social Mitigation and Management measures as well as oversee performance of contractors as prescribed in the Project's Environmental and Social Management Plan.

9.2.3 Supervision Consultant

The Supervision Consultant is appointed by the implementing agency and is responsible for monitoring and supervision of the renovation works including implementation of ESMP. The Consultant shall appoint a Resident Engineer to oversee the renovation works and monitor the works undertaken by the Contractor and implementation of ESMP to ensure compliance with contract specification and contractual requirements. However, for supervision and monitoring of the implementation of ESMP throughout the renovation phase the implementing agency can engage an Independent Environmental Consultant. The Environmental Consultant shall be responsible for environmental compliance monitoring. This includes checking, verifying and validating the overall environmental performance of the project through regular audits, inspection and review of project submissions.

9.2.4 Contractor

The Contractor and his team shall be responsible for implementation of renovation works and ensure compliance with environmental requirements. The Contractor shall appoint a Site Engineer who shall be responsible for implementation and management of the ESMP programme and the required environmental monitoring works. Most important will be Occupational Safety and Health of workers.

9.2.5 Local government authorities and local NGOs / CBOs

The involvement of local authorities is crucial for successful implementation of ESMP because some of the mitigation measures are better undertaken by local communities with the support of the Local Government Authorities and NGOs. It is therefore important that the Mwanga District Council be involved in the implementation of ESMP. The respective Local Government Authorities and local NGOs should be well informed and invited to comment on the ESIA report at the design stage rather than when all major decisions have been made. One copy of this report should be sent to Mwanga District Council to ensure that, the Council through its Environmental Management Officer will be involved in monitoring compliance with mitigation measures.

9.2.6 Local communities

In general, the local communities do support the project because they know it is going to benefit them and the nation at large. However, the project can obtain maximum benefit if it involves the local communities and spends some amount of funds for the benefit of the local communities. Table below outlines the environmental and social management plan for the proposed development. The plan considers the development activity, predicted environmental impact, proposed mitigations, actors, timeframe and costs for implementation.

Table 9.1: Shows Environmental and Social Management Plan

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Tshs)
IMPACTS FROM PLANNING AND DESIGN PHASE				
POSITIVE IMPACTS				
1	Creation of employment	• Employment of local consultants	Proponent	N/A
IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT				
POSITIVE IMPACTS				
1	Creation of employment	• Employing unskilled labours as much as possible from the project area • Giving women equal employment opportunities as men.	Proponent	N/A
2	Increase in market for local construction materials	• Purchasing materials from as many local suppliers • Hiring trucks to transport construction materials like sand, quarry and cement to the project site.	Contractor/ Project manager	N/A
3	Increase in business activities within the project area	• Designating an area as a market within the project site	Contractor	NA

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Tshs)
CONSTRUCTION PHASE NEGATIVE IMPACTS				
1.	Impacts associated with solid waste generation	• Promote recycling and reuse of general refuse • Ensure that disposal of hazardous and non-hazardous waste is carried out in line with relevant national legislative and regulatory requirements; any hazardous waste generated on construction sites must be collected, transported and further management by competent and licensed contractors • Prohibit the burning of refuse on the construction and operation site • Recycle onsite whenever feasible • Fence construction site to prevent flying materials to deposit in • nature • Ensure that vehicles transporting wastes are fully covered • Ensure adequate onsite waste segregation, including segregation at source for all waste streams (hazardous waste, various recyclables etc.) • Adopt good housekeeping practices during all phases of the project • Prohibit all forms of littering on-site	Contractor	15,000,000
2.	Impacts associated with noise	• Fitting construction vehicles with silencers to reduce the noise; • Servicing machinery so that they can be in good condition at all times; and	Contractor	10,000,000

		• Providing ear protection materials for the workers in noisy areas. • Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only; • Equipment should be regularly inspected and maintained to ensure it is in good working order by manufacturers		
3.	Impacts associated with vibration	• Conduct regular vibration monitoring tests to assess the frequency and scale of the vibrations on site, and make more informed decisions about the preventive or corrective actions they can take to better protect their people, other stakeholder and the environment.	Contractor	5,000,000
4.	Impacts associated with exhaust emission	• Improve and implement international standards • Development of alternative fuels such as natural gas and liquified petroleum gas (LPG) • Raise the public awareness of environmental protection	Contractor	5,000,000
5.	Impacts associated with disposal of sewage	• The design of the internal sewerage system should consider the estimate discharges from individual sources and the cumulative discharge of the entire project i.e., it should have the capacity to consistently handle the loads even during peak volumes; • All drain pipes passing under building, driveway or parking should be of heavy-duty PVC pipe tube encased in concrete surround. • Sanitary facilities should be kept clean always, through regular washing/cleaning;	Contractor/ Project Manager	15,000,000

		• Frequent monitoring of the internal drainage system; and • Blockages and damages should be fixed expeditiously • Construction of double chambered septic tanks for disposal of liquid wastes; • Regular inspection and maintenance of the septic tank network; • Use of improved pit latrines for easy maintenance; • Provision of potable water within the site.		
6.	Incidences of risks, hazards and accidents	• Contractor should establish contractual clauses (signed code of conduct) to be embedded in the contracts of the workers and sub-contractors that require adherence to law and international standards to be upheld related to worker. • Contractor should prohibit the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health and safety of other employees, community members or the environment. • Contractor and self-employed contractors should assess the H&S risks related with the tasks to be performed during the construction phase. • Pre-employment medical assessments should be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting pre-employment medical assessments include a safer working environment, reduction in workplace injuries, minimized downtime, matching	Contractor/ Project Manager	20,000,000

		the capacity of the employee with the role, and overall recruitment cost and risk reduction. • Contractor should ensure that training on health and safety measures is provided to all construction workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities. • Contractor should implement regular health and safety checks and audits of workers, and subcontractors and implementing sanctions in case of breaches of national standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards. • Contractor should develop and implement a Workers Grievance Mechanism for the Project workforce including workers and subcontractors. • Contractor should establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks. • Contractor should ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents. • Contractor should ensure that its Code of Conduct is followed to regulate the performance and behavior of all workers, including provision for disciplinary action for anti-social behavior		

		and non-compliance with health and safety regulations such as lack of use of PPE. • Contractor should ensure that World Bank Health and Safety guidelines regarding the construction and management of worker accommodation and the provisions of medical facilities at worker accommodation are followed. • Contractor should ensure that adequate clean water, adequate food and access to medical care is provided to all workers on the worksite and at accommodation. • Contractor should develop and implement a Traffic Management Plan covering aspect such as vehicle safety, driver and passenger behavior, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations. • Contractor should develop a Waste Management Plan for the construction phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.		
7.	HIV/AIDs, STDs and other diseases (i.e. COVID – 19)	• Contractor should establish HIV/AIDS programmes to raise awareness • Put posters with various messages such as "HIV/AIDS kills", "be faithful". • Preventive measures against the spread of COVID – 19 shall be practiced at the project site.	Contractor	8,000,000

8.	Child Labour/Forced Labour	• Conduct Selection and Qualification of Subcontractors • Awareness-Raising and Training of Internal Inspectors and Local Authorities • Promoting Access to Education	Contractor	N/A
9.	Impacts on Flora/Vegetation clearance.	• Vegetation clearance for temporary infrastructure should be limited to the minimum core area at the site. Areas cleared of vegetation should be re-vegetated to prevent soil erosion. • Re-vegetation is only possible given suitable ground conditions (soils, slopes, drainage) moisture, and protection from destruction.	Contractor	N/A
10.	Impacts on Fauna	• Ensure that no flora species classified as Vulnerable on the IUCN • Red List are removed or cleared • No tree greater than 200 mm diameter at breast height should be damaged • Promote plantation of native trees and green corridors along the project facility. • Minimize vegetation clearance • Any hunting activities should be prevented • Ensure to report fauna species of high conservation value	Contractor	N/A
11.	GBV/SEA/SH impacts	• Appoint senior focal points in both clients and contractors with responsibility for ensuring that commitments and policies to prevent GBVH are implemented. • Increase women's representation, including at senior and decision-making levels in engineering, procurement and construction	Contractor	N/A

		• Put in place monitoring systems at the highest levels for regular reporting on GBVH. • Include requirements around GBVH in codes of conduct, policies and protocols for contractors, including training on policies and procedures once developed. • Ensure codes of conduct are publicly disclosed in local languages and are widely accessible to all workers and all groups of people in project areas. • Build GBVH risk assessments into key processes, including environmental and social impact assessments (ESIAs) and environmental and social management plans (ESMPs).		
12.	Potential of Criminal act	• The contractor or construction management company should designate an employee as the company crime prevention coordinator. • All assets on a construction site should be identified (marked), inventoried (records), and tracked as closely as practical. A company identification numbering system should be developed. • The company crime prevention coordinator should contact neighbors around the job site residents, businesses, even children and solicit their support and help in maintaining a safe and secure job site • Electronic alarm systems can be an effective means of providing security on the job site, particularly for office and storage trailers or for material storage areas.	Contractor/ Project Manager	6,000,000

13.	Cultural resources impact	• Preparing Environmental Protection Plans which describe the cultural management requirements applicable to their scope of work and work areas; • Compliance with cultural obligations applicable to their scope of work and work areas as set out in the applicable Environmental Protection Plans, including site specific measures; • Compliance with Chance Find Procedures	Contractor	N/A
14.	Community health and safety impacts e.g., traffic hazards, site access hazards	• Identify emergency scenarios and develop emergency preparedness and response plans with allocation of responsibilities to local communities and authorities, (where appropriate). • Develop specific stakeholder engagement plan based on consultation and participation with government and communities regarding the nature and potential consequences of the risks • Define protocol for community reporting of observed incidents • Maintain community grievance process • Continue safety awareness and education programs for impacted communities, including school programs.	Contractor/ Project Manager	15,000,000
15.	Security (private) personnel and interaction with communities including use of force.	• For projects with high security risks, a stand-alone Security Management Plan contains all the procedures and protocols related to security for the project. • While the Security Management Plan should be an actionable and practical document, it is unlikely to be able to address every possible scenario in detail	Contractor/ Project Manager	N/A

16.	Soil erosion	• Landscape the excavated areas in a suitable way to allow native vegetation to regrow naturally • Suspend activities during extreme rainfall events • Ensure to provide drainage channels and silt traps for all parts of the top soil storage areas • Ensure to rehabilitate areas with topsoil and revegetate after • completion of activities • Install sediment and erosion controls • Use non-toxic and readily biodegradable chemicals on-site where feasible • Install natural or synthetic liners beneath chemicals storage tanks • Grade unpaved roads	Contractor	6,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Tshs)
IMPACT FROM DECOMMISSION PHASE				
NEGATIVE IMPACTS				
1.	Soil Erosion	• Planting indigenous plants on site to support the disturbed soil; • Backfilling any foundation and trenches by used the top soil onsite so as to stabilize the disturbed area; • Reestablish the original grade and drainage pattern to the extent practicable.	Mohammed Enterprises Tanzania Limited (METL)	9,000,000
2.	Loss of employment	• Ensuring that all employees are members of the security fund and the employer will ensure that the company contributions are made; • Employees will also be prepared for forced retirement by providing skills for self-employment; and • The project will provide relevant skills to workers through on job training to make them marketable after decommission	Mohammed Enterprises Tanzania Limited (METL)	N/A
3.	Loss of income	• The developer should ensure that all workers employed are provided with various skills and trainings for self-employment that will help them when they lost their employment position at the facility; • Ensuring that workers are provided with small loans for them to invest in small business that will be their backbone in life once they lost employment.	Mohammed Enterprises Tanzania Limited (METL)	N/A
4.	Solid Waste Generation	• A site waste management plan will be prepared by the contractor prior to commencement of demolition activities. This will include designation of appropriate waste storage areas,	Mohammed Enterprises Tanzania Limited (METL)	16,000,000

		collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring; • Trash and waste shall be well collected and removed from the site to district dumpsite; • Reusable materials like doors, windows and timber will be sold to licensed scrap dealers; • Decomposable materials shall be collected and taken to the approved dumpsite outside the park boundary. Plastics and other recyclable materials will be collected and sent out for recycling; and • Making arrangements for the daily collection of litter and demolition debris from the site by a licensed solid waste transporter for dumping at approved site. • Decomposable materials shall be collected and taken to the approved dumpsite outside the park boundary. Plastics and other recyclable materials will be collected and sent out for recycling; and • Making arrangements for the daily collection of litter and demolition debris from the site by a licensed solid waste transporter for dumping at approved site.		
5.	Workers accidents and hazards during demolition	• Proper signs on site to warn workers safety requirements as regards machines with moving parts and other equipment at site; • First Aid box and have a trained person to handle site emergencies and incidences will be in place;	Mohammed Enterprises Tanzania Limited (METL)	20,000,000

		• Site vehicle to specifically transport the injured to hospital will be available; • Providing fire-fighting mechanism at site; • Providing safe scaffoldings and railings at heights; • Providing washing (enclosed bathroom) and toilet facilities at site with both drinking and washing water. The number of workers engaged determines the number of the toilets and bathrooms provided; and • Providing safety helmets, safety masks (welders), safety shoes (loaders), uniforms and hand gloves to the workers.		
6.	Dust and gases emission	• Covering of all haulage vehicles carrying debris for dumping at approved sites; • Stockpiles of fine materials will be wetted or covered with tarpaulin during windy conditions; • Workers are going to be issued with proper protective equipment.	Mohammed Enterprises Tanzania Limited (METL)	7,000,000

CHAPTER TEN

10.0 Environmental Monitoring Plan

10.1 General Overview

Monitoring is a long-term process, which should start from the beginning of the project and should continue throughout the life of the project. Monitoring involves the continuous or periodic review of Renovation/Upgrading, operation and maintenance activities to determine the effectiveness of recommended mitigation measures. Consequently, trends in environmental degradation or improvement can be established and previously unforeseen impacts can be identified or pre- emptied.

The outcomes of the monitoring will be recorded and assessed by Mohammed Enterprises Tanzania Limited (METL) and their contractual representatives during renovation and operations of the estate so as to either conforms or otherwise with the ESMP. Where non-compliance is observed the necessary corrective actions will be implemented as soon as possible such that the environmental or social impact is addressed and returned to acceptable levels. Corrective actions may include changes to work methods type/condition of plant and equipment and personnel and may also include changes to the frequency and type of monitoring.

There are four types of monitoring that are also relevant to this project. These are:

- Baseline monitoring – The measurement of environmental parameters during a pre-project period and operation period to determine the nature and ranges of natural variations and where possible establish the process of change.
- Impact/effect monitoring*:* Involves the measurement of parameters (performance indicators) during renovation, operation and decommissioning phase in order to detect and quantify environmental and social change, which may have occurred as a result of the project.
- Compliance monitoring: Takes the form of periodic sampling and continuous measurement of levels of compliance with standards and thresholds – e.g. for waste discharge and diseases.
- Mitigation monitoring: Aims to determine the suitability and effectiveness of mitigation measures and programs, designed to diminish or compensate for adverse effects of the project.

10.2 Implementation of monitoring plan

The environmental monitoring during renovation phase will be comprised of two activities:

- Review of Contractor's plans, methods statement, and temporary works design and arrangements to ensure that environmental protection measures specified in the contract documents are adopted and Contractor's proposals provide acceptable levels of impact control.

- Systematic observation of all site activities and the Contractor's offsite facilities, including borrow pits and quarry sites areas. To ensure that the contract requirements relating to environmental matters are being complied with, and that no impact foreseen and unforeseen are occurring.

The monitoring activities will be comprised of visual observation during site inspection and will be carried out at the same time as the engineering monitoring activities. Site inspections will take place with emphasis on early identification of any environmental problem and the initiation of suitable remedial action. Where remedial actions have been required on the part of the Contractor, further checks will need to be made to ensure that these are actually being implemented to the agreed schedule and in the required form. All sites where renovation is taking place will be formally inspected from an environmental view point on a regular basis.

The monitoring plan will also be integrated with other renovation supervision and carried out by the Implementing Agency's Engineer. The Engineer will decide on the appropriate course of action to be taken in cases where unsatisfactory reports are received from the field staff regarding environmental matters. In case of relatively minor matters, advice to the Contractor on the need for remedial action may suffice, but in all serious cases, Implementing Agency's Engineer should issue a formal instruction to the Contractor to take remedial action, depending on the extent of delegated powers. Table below providesa variety of tools and methods to be used in the monitoring exercise.

Table 10.1: Monitoring plan for the proposed project

Monitoring tool	Comments
Visual inspection/witness	Inspection of work methods, temporary works site cleanliness, drainage and flooding
Professional certification	Skilled personnel to provide
Method statements	Contractor of renovation will provide overall method statement as well as task specific method statement as instructed
Work schedules	Updates of work schedules showing main activities, planned progress and actual critical path allocation of resources.
ESMP, H & S Plan	The contractor shall take the responsibility of preparing a detailed ESMP and a health and safety plan. These will provide guidelines concerning procedures and documentation and will be used to monitor compliance.

Periodic meetings	Includes project progress meetings, technical coordination meetings.
External audits	Organized by Mohammed Enterprises Tanzania Limited (METL)
Approvals and permits from jurisdictional authorities/agencies	At various points in time it may be necessary to obtain approvals
Miscellaneous documentation	Various documentations may be requested from time to time to ensure performance and/or compliance such as delivery notes of materials, labour and insurances, equipment performance.
Technical specification and drawings	The contracts documents, including the technical specifications and drawings will provide clear guideline concerning procedures and documentation and will be used to monitor compliance.

Table 10.2: Proposed Environmental and Social Monitoring Plan

Item	Potential impact	Recommended Enhancement/MitigationMeasure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Tshs)
IMPACTS FROM PLANNING AND DESIGN PHASE							
POSITIVE IMPACTS							
1.	Creation of employment	• Employment of local consultants	No. of local consultants employed	Employment records	Once, on commencement of assignment	Mohammed Enterprises Tanzania Limited (METL)	N/A
IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT							
POSITIVE IMPACTS							
1.	Creation of employment	• Employing unskilled labours as much as possible from the project area • Giving women equal employment opportunities as men.	Number of local people employed Number of women employed	Records	quarterly	Mohammed Enterprises Tanzania Limited (METL)/ Project manager	50,000,000
2.	Increase in market for local construction materials	• Designating a place for the local market close to the site	No. of local people supplying materials	Interviews	quarterly	Contractor/ Project manager	100,000,000

		• Purchasing materials from as many local suppliers. • Piling trucks to transport construction materials like sand, quarry and cement to the project site	Number of local transporters ferrying material				
3.	Increase in business activities within the project area	• Designating an area as a market within the project site	Number of local people selling goods at the project site	Interviews	quarterly	Contractor/ Project manager	5,000,000
NEGATIVE IMPACTS							
1.	Air pollution	• Applying water regularly to civil works and earth roads to suppress dust; • Controlling the speed of construction vehicles to reduce generation of dust.	Exhaust emissions consisting of carbon monoxide (CO), Carbon dioxide (CO_2), Nox Dust emission PM2.5 and 10	SO2<0.5 µg/m^3 for 10 mins CO < 150 µg/m^3 for less than 15 mins NOx< 150 µg/$m^3$for 24 hours PM 2.5 [WHO:2005] 25 µg/m^3 PM 10 Local standard (TZS:	quarterly	Mohammed Enterprises Tanzania Limited (METL)	15,000,000

				845:2005)60-90 µg/m^3 PM 10 [WHO:2005] 50 µg/m^3			
2.	Noise	• Fitting construction vehicles with silencers to reduce the noise • Servicing machinery so that they can be in good condition at all times • Providing ear protection materials for the workers in noisy areas	No. of vehicles fitted with silencers Machines in good condition No. of workers using PPEs inspections	Noise standard level (dBA) 85	quarterly	Contractor	10,000,000
3.	Vibration	• Conduct regular vibration monitoring tests to assess the frequency and scale of the vibrations on site, and make more informed decisions about the preventive or corrective actions they can take to better protect their people,	Number of complaints about excessive noise	Tolerance Limits for Whole Body Vibration Daily exposure limit value 1.15 m/s^2	quarterly		

		other stakeholder and the environment.		Tolerance Limits for Hand Arm Vibration Daily exposure limit value 5 m/s^2			
4.	Soil erosion	• Carrying out construction works out from May – September • Creating drainage channels to direct storm water movement • Creating stone pitching where soils have been excavated • Clearing only those places where buildings will be constructed	Construction period Availability of drainage channels Presence of stone pitching	inspections	Once on commencement	Contractor	5,500,000
5.	Soil Contamination	• Construction vehicles should be in good condition to avoid fuel leaks • Servicing areas for vehicles should have impermeable surfaces	No. of vehicles serviced Availability of impermeable surface	Records	quarterly	Contractor/ Project Manager	5,000,000

6.	Increase in accident/ incidences	• Introducing humps on the road to help reduce the speed of the vehicles • Erecting warning signs showing that there is heavy machinery and construction vehicles using that road for people to be alert • Following health and safety regulations • Providing workers with protective clothing • Training workers in the proper use and handling of heavy equipment and machinery • Maintaining a first aid kit at the project site	No. of humps on the local road No. of warning signs erected No. of people using PPEs No. of people trained Presence of a first aid kit	Inspections	Once on commencement	Contractor/ Project Manager	20,000,000
7.	HIV/AIDS and other diseases	• Sensitizing local people and workers at the site on the dangers of unacceptable unions • Distribute condoms to both men and women	No. of sensitization meetings No of school drop outs	Records	quarterly	Contractor/ Local leaders/ District AIDS Coordinator	17,000,000

		• Encouraging girls to go to school to avoid early marriages • Providing women with loans for small scale businesses so that they can be self-sufficient • Develop an HIV and AIDS workplace policy	No. of women carrying out businesses HIV policy in place Records				
8.	Potential criminal Acts.	• Employ people from the surrounding areas to reduce number of migrant workers • Sensitize the community on the ownership of the project • Introduce community policing in conjunction with the Police station • Request for a police unit within the project area	No of criminal incidences No. of local people employed Community policing in place Police unit in place	Police records Records	Quarterly Once on commencement	Developer	5,000,000
9.	Inadequate waste management	• Provision of dust bins or rubbish pits for the wastes produced	Dust bins for each type of waste in place	Inspections	Quarterly Once on commencement	Contractor	25,000,000

		• Segregation of wastes by providing different bins for each type of waste • Identification of a dumping site within the project area for various types of wastes • Disposing of wastes at the designated places regularly	Dumping site identified No. of times rubbish is removed				
10.	Inadequate sanitation	• Provision of pit latrines for workers on the construction site Provision of potable water within the site • Sensitization of workers on the importance of good hygiene practices	Pit latrines in place Potable water in place No. of sensitization meetings	Inspections records	Quarterly Once during commencement	Contractor Project Manager	15,000,000
11.	Degradation of land and river banks	• Buying sand and quarry from registered local artisans • Carrying out sensitization of local artisans on good mining practices • Designating places for sand and quarry mining	No. of local registered local artisans supplying materials No. of meetings	Records	quarterly	Mines Local communities	8,000,000

		• Assisting communities with afforestation programs for river banks • Introducing alternative income generating activities in the area.	No of official mining sites No. of afforestation programs				
12.	Risks of child labour on the construction site	• Recruitment of workers through district labour office • Erect sign board "NO CHILD LABOUR" on site	Records of recruitment Presence of sign of "No Child Labour	Signposts Records	Monthly	Ministry of Labour	2,500,000
IMPACTS FROM OPERATION PHASE							
POSITIVE IMPACTS							
1.	Creation of employment	• Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs • Giving equal employment opportunities for both men and women	No. of people local people employed No. of women employed	Records	Annually	Proponent	N/A

2.	Improved access to social services by the local community	• Providing extra social services that can be accessed by the communities.	Presence of social services	Inspection	Once on	Local communities	N/A
3.	Increase in economic activities	• Sourcing funds for operation and maintenance cost • Outsourcing non-core functions • Traders from the project area to be given the opportunity to supply food stuffs for workers meals.	No. of traders supplying goods	Records	Quarterly	Proponent	N/A
4.	Increase in revenue by government through taxes	• Remitting taxes to TRA from wages and service contracts in time	Remittances to TRA	Records	Annually	Proponent	N/A
NEGATIVE IMPACTS							
1.	Inadequate waste management	• Provision of dust bins or rubbish pits for the wastes produced • Segregation of wastes by providing different bins for each type of waste	No. of dust bins Presence of dumping site Frequency of waste disposal	Inspections Records Inspections	Quarterly Once during operation quarterly	Estate management / workers	20,000,000

		• Maintaining the dumping site that will be identified during construction • Collecting and disposing of wastes at the designated places regularly • Used chemicals should be disposed in consultation	Presence of hazardous waste disposal site				
2.	Inadequate Sanitation	• Provision of adequate toilets for workers of staff • Construction of double chambered septic tanks for disposal of liquid wastes • Regular Inspection and maintenance of the septic tank network	No of toilets Presence of septic tank in good condition	Inspections	Once during operation Quarterly	Estate management / workers	10,000,000
3.	HIV and AIDS and other sexually transmitted diseases	• Carry out sensitization meetings for staffs/workers and local communities from time to time. • Develop an HIV and AIDS workplace policy; • Distribution of condoms and information materials	No of meetings Policy in place No. of condoms distributed	Records	Quarterly	Local Communities /Management	3,000,000

		on HIV and AIDS to workers					
4.	Potential of criminal acts	• Sensitize the communities and workers on how they can live in harmony • Sensitizing the community members on the ownership of the estate • Introduce community policing in conjunction with the Police station • Request for a police unit within the project area.	No. of criminal incidences Community policing in place Police unit in place	Police Records Inspections	Quarterly Once during operation	Police Station	2,000,000
5.	Surface Drainage	• Rain water harvesting gutters and storage tanks should be installed to reduce the amount of rainfall reaching the surface. • Semi permeable materials should be used for construction of pavements. • After completion of construction, the proponent should embark	Presence of rain harvesting gutters and storage tank	Inspection	Bi-annual	Estate Management	7,500,000

		on comprehensive landscaping to increase softscape cover on the plot.					
6.	Fire outbreaks	• Hire competent and properly authorized electrical contractor to do the wiring and other electrical works. • Install fire alarm system for entire project • Install smoke detectors in kitchens. • Installation of firefighting equipment following Country Fire requirements. • Conduct regular firefighting drills within the site. • Develop and adapt an (fire) emergency response plan for the project during and occupation stage. • Ensure that all firefighting equipment are regularly maintained and serviced.	Presence of fire exit signs Presence of firefighting equipment and records of servicing Presence of fire hazard signs	Inspection	Bi-annual	Estate Management	10,000,000

		• Provide fire hazard signs such as "No Smoking sign", Direction to exit in case of any fire incidence and emergency numbers.					
7.	Increase in Energy Demand	• Put off all lights immediately when not in use or are not needed. • Use energy conserving electric lamps for general lighting • Make use of alternative source of energy such as solar power. • Solar panels proposed in the project should be fully utilized and timely repaired in case of damage.	Presence of energy conserving electric lamps Availability and condition of solar panels	Inspection	Quarterly	Energy Department	25,000,000
8.	Increase in water demand	• Install water conserving taps that turn-off automatically when water is not in use. • Encourage water reuse/recycling during occupation phases.	Presence of water conserving taps Monthly bills	Inspection	Quarterly	Water department	10,000,000

		• Roof catchments of building blocks should be provided with rainwater harvesting systems (gutters, down pipes and water storage facilities) to enhance collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc. • Provide notices and information signs to sensitize on means and needs to conserve water resource i.e. Keep/Leave the Tap Closed etc. This will awaken the civic consciousness of the workers and residents with regard to water usage and management					

IMPACTS FROM DECOMMISSIONING PHASE							
POSITIVE IMPACTS							
1.	Reduced noise levels	• Removing all working and damaged construction machinery and equipment	All equipment removed	Inspections	Once upon decommission	Contractor Project Manager	N/A
NEGATIVE IMPACTS							
1.	Loss of employment	• Informing workers of project duration when employing them • Educating the labour force on the need to save part of their wages • Paying severance benefits to all laid off workers according to the provisions of the labour laws	Severance benefits	Records	Once	Contractor Project Manager	N/A
2.	Inadequate waste management	• Disposing of construction wastes at the dumping sites that will be identified during construction phase. • Scrap metals will have to be sold or disposed at a dumping site that will be designated specifically for such wastes.	Site clear of construction wastes and scrap metal	Inspections	Once	Contractor Project Manager	N/A

		• Trees and grass should be planted in bare areas of the project site as a way of restoring the area.	Well landscaped premise				
3.	Loss of business opportunities	• Informing local traders of the project duration in time • Paying for all materials that were obtained on loan in time • Outsourcing some services for non-core activities for the estate	Materials paid for	Records	Once	Contractor Project Manager	N/A
4.	Noise pollution	• Demolition activities to be restricted to daytime i.e. 8am to 5pm • Use of Suppressors on noisy equipment or use of noise shields for instance corrugated iron sheet structures • Workers in the vicinity or involved in high level noise to wear respective safety & protective gear.	TBS standards	Inspection Observation Routine Maintenance	Daily	Proponent Contractor Workers	

		• Comply with TBS (Noise and excessive vibration pollution control) Regulations 200					
5.	Health and safety of workers	• All workers to wear PPEs e.g. helmets. • All workers will be sensitized before demolition begins, on how to control accidents related to construction. • Accordingly, adherence to safety procedures will be enforced. • All workers will be adequately insured against accidents.	No. of warning signs erected No. of people using PPEs No. of people\ trained Presence of a first aid kit	Inspection Observation Routine maintenance	Daily	Proponent Contractor Workers	20,000,000

CHAPTER ELEVEN

11.0 Cost Benefit Analysis

11.1 Introduction

The cost-benefit analysis presents a brief comparison of environmental and social costs of implementing the proposed project versus benefits accrued from the project when implementation of the project has been completed. It is a clear fact that, it is not possible to account for all the impacts accrued from the implementation of the project. This is because some of the impacts are direct while others are indirect; some are short-term while others are long-term, some of the impacts are site specific while others cross the boundaries of the project area to affect a much larger population, though it may not be necessarily a significant impact. Similarly, valuation of these impacts is more or less dictated by the social group biases tied to the environment to which the project has been subjected. Therefore, methodology used in this cost benefit analysis, will base on comparing between the following:

"The total amount of cash that would be spent by the proponent into the local environment" termed as "BENEFIT" **Versus** "The opportunity cost of the items the people and the society will miss when the project is implemented" plus "environmental costs of mitigating any significant impact caused by the project's activities after it is fully implemented to the closure phase". Termed as "COST"

Since this project is expected to exist for many years, with 3 year of development costs and one year of decommissioning, the aspect of "Time Value for Money" will be ignored and all the costs will be considered as "Constant Dollar" with inflation and cost escalation assumed to be zero.

11.2 Benefits Related to the Project

Benefits from the proposed project can be classified as direct benefits and indirect benefits to the estate, neighbour and the government. However, primary benefits of this project is further classified as direct benefits and indirect benefits. Construction activities may generate negative benefits though; they are usually minimal compared to the positive benefits. Some of those impacts are non- quantifiable thus cannot be used in the benefit-cost analysis estimations. Generally, the benefits of the project are experienced in all phases from mobilization, construction, operation to decommissioning phase. To mention few, employment opportunities and public benefits will occur during both the construction and the operation phases. Several benefits are associated with the proposed development both at local and national level in terms of revenue generation and the multiplier effects associated with linkages with local and national economy.

Direct benefits: the proposed project will create many job opportunities, increase fibre production, entrepreneurial opportunities to the surrounding community. Most of the non-quantifiable impacts are directly benefits to the project receptors.

Indirect Benefits: Indirect benefits from a proposed project mainly include increase in government revenue through different sectors like; TANESCO, TRA etc. cultural interactions, infrastructural development, and economic growth. But since the construction project requires inputs from other sectors to produce this output, and the other sectors subsequently require inputs themselves, there will be multiple rounds of interaction among the sectors resulting in additional output from each sector of the economy.

11.2.1 Benefits to METL

The proposed project has positive impacts to METL since its benefit is a lifetime process throughout the project life span. The completion of these projects will be one of the pooling factor for increased sisal fibres production thus in monetary cost its value has potential to increase annually. METL financial capacity and sustainability are going to improve by far. The project will also have several intangible benefits to METL which include improving the estate image.

11.2.2 Benefit to the Neighbourhood

The proposed project meant to increase the capacity of infrastructures and production capacities. This improvement may lead to the increase in staff requirement that is technical, staff employed for land clearance, cultivation, and planting, security man etc., During and after construction phase the project is going to provide additional employment opportunities for people surrounding Husseni estate related to operation and maintenance. However, non-skilled labourers will benefit from the daily wages. The estate will also create business opportunities in vicinity of the area. Business opportunities will be supporting government initiatives to create employment opportunities for Tanzanians as advocated by the current Government. Notwithstanding that now salaries are yet to be specified, it is envisaged that from employment, workers will get incomes, which will improve quality of their lives and perhaps improve their lifestyles. However, employment opportunities and income from salaries provided will extend beyond the workers and benefits many other people including dependants.

Moreover, employment opportunities and the benefits therein will depend on whether suitably qualified local personnel that can take up positions are available. Capacity building therefore is a prerequisite for these benefits to be realized. Alongside capacity building, there shall be a need for putting in place deliberate policies that would compel developers in the real estate economic sector to employ local labour with the requisite skills and experience. In addition, the project will also have following economic and social benefits:

a. Utilization of locally available resources;
b. Revenue to the Government will increase through payment of the various taxes (indirect and direct).
c. Contribute to the development of housing and settlements as well as commercial real estate industry in Kilimanjaro region.

d. Boosting the infrastructure and economy of the country and Mwanga district in particular Lembeni ward in which the project is located.

11.2.3 Benefit to the Government

The government will benefit through the increase in revenue to the National and District Government. The local government, Tanzania Revenue Authority (TRA), Sisal Board etc. through payment of relevant taxes, rates and fees to respective institutions.

11.2.4 Costs Related to the Project

The estimated costs for implementing enhancement measures, impact management as well as monitoring process as outlined in Chapters 10. The estimated costs for mitigation do not include the environmental costs, which could not be accurately calculated. Since some of the impacts will only to be realized during construction phase, the costs for these will also be short term, especially if mitigation measures are fully implemented. The construction costs for all the projects are detailed in Bills of Quantities.

11.2.5 Costs to Community

The resulting negative environmental and social impacts and risks such as noise, impairment of air quality, and Safety and health risks due to project activities will be absorbed by the surrounding communities. However, the introduction of mitigation measures will reduce the anticipated impacts. Apart from the above, no any community activities will be disrupted. METL management is committed to mitigate the negative social and environmental impacts.

11.2.6 Costs to Government

METL has secured fund from African Development Bank to increase sisal fibre production through improvement of HUSSENI Sisal Estate by increasing the area for planting sisals, undertake crop rotation, improving sisal processing machineries and other support facilities. Also as already mentioned the Government will directly and indirectly benefit from taxes generated during both phases of the project. Apart from tax generation, the investment will also enhance the economic growth, enhancement of industrialization and businesses.

11.2.7 Environmental Cost

Environmental cost benefit analysis is assessed in terms of the negative and positive impacts. Furthermore, the analysis is considering whether the impacts are mitigatable and the costs of mitigating the impacts are reasonable.

11.4 Project Cost Benefit Analysis

As it has been mentioned in Chapters 6,8,9 and 10 the potential benefits of the project, in terms of financial and social benefit are substantial. The environmental impacts are reasonably mitigatable and the financial resources needed to mitigate negative impacts, when compared to the required investment are relatively small. However, the benefit cost ratio concluded the project to have more benefits compared to the total cost of the project, this implies that the project is viable and the proponent is encouraged to develop it.

CHAPTER TWELVE

12.0 Decommissioning Plan of the Project

12.1 Overview

The minimum lifespan of the proposed project might be more than fifty years though the actual time of decommissioning is uncertain. However, when it comes to decommissioning of the factory, major activities will be carried out to remove unused construction materials including demolition of temporary structures. The developer will have to close the facility and rehabilitate the site back to its original environmental status; the main challenge will be how to deal with the solid waste generated from the demolition of the structure for safe disposal.

Proper handling methods including disposal of solid waste must be followed as outlined in this EIA. Solid waste might be land filled in pits and covered with soil; preferably top soils stored to encourage indigenous trees and grass to regenerate or otherwise indigenous plants must then be planted to ensure the area returns to its original condition. The other challenge is how to deal with laid off labor force and the loss of income that was coming from the estate to the local communities and the national economy. Various mitigation measures are proposed in the previous chapter that will reduce the effect of decommissioning.

A detailed decommissioning plan that takes environmental issues into consideration shall be prepared by the developer prior to the decommissioning works. Should it be done, decommissioning may entail change of use (functional changes) or demolition triggered by change of land use. Therefore, what is presented here is just a Preliminary Decommissioning Plan which gives light to what shall be done if the need for decommissioning arises.

12.2 Preliminary Decommissioning Plan

This section provides a brief outline of the works required to demolish the proposed building on the site in case it happens. This Plan will be used as a reference document that provides the framework to ensure that demolition activities on the site do not adversely affect the health, safety, habitat, diversity or the environment at large.

The Contractor will be required to prepare a detailed Demolition Plan and Construction Management Plan to the satisfaction of the Proponent and relevant Authorities (NEMC) prior to the commencement of works on site.

12.3 Demolition Methods

It is anticipated that the Contractor will prepare a detailed Demolition Plan prior to the commencement of work on site; however, the indicative demolition methodology will be as follows:

- The strip out and removal of non-structural elements will be undertaken utilizing manual labour including excavators and loaders.
- The materials will be removed from site using small to medium sized trucks.
- The structures will be demolished using larger equipment including hydraulic excavators.
- During the demolition process erosion control measures will be established. These will include treatment of dust and potential discharge into catchment area.
- Rehabilitation of the site by planting indigenous vegetation.

12.3.1 Materials Handling

All the debris from the site will be used to backfill the excavated area and the remains taken offsite to the approved dumpsite. The contractor shall submit a Demolition Waste Management Plan to NEMC which outlines the objectives of:

- maximization, reuse and recycling of demolition material
- minimization of waste disposal
- evidence of implementation for specified arrangements of waste management

On-site storage of reusable materials will occur at Site. Recycling and disposal containers will also be accommodated at this location for collection vehicles. A hazardous materials inspection will be undertaken by an accredited consultant and a report issued. Hazardous materials will be removed in accordance with EMA 2004.

12.3.2 Proposed Sequence

The Contractor will be required to prepare the following documentation prior to the commencement of demolition and/or excavation works:

- Destruction Survey
- Construction Waste Management Plan
- Demolition Management Plan

Table 12.1: Decommissioning activities plan

S/N	Decommissioning Activities	Impacts	Mitigation Measures	Institution Responsible	Time	Cost (Tshs)
1.	Support maintenance of the inactive facilities of the factory buildings and provides feedback for evaluating and revising, if necessary, the facility's hazard baseline Documentation.	Potential risk to the people due to contaminations	Support maintenance of the inactive facility's safety envelope, and To provide feedback for evaluating and revising, if necessary, the facility's hazard baseline documentation.	Mohammed Enterprises Tanzania Limited (METL)	Depend on decision	4,000,000
2.	All structures will be removed. All machines will be removed and sold to the third user or to recycling industries for iron manufacturing Industries. Soils that will be discovered to be contaminated will be remediated accordingly.	Environmental pollution such as air, soil and noise pollution. Safety risks to people.	The decommissioned area will be fenced. Public notification will be provided. Demolition permit will be provided	Mohammed Enterprises Tanzania Limited (METL)		20,000,000
3.	Filling and plant trees to restore nature condition of the area and at the Industrial premises place, if the area is	Potential risk to human	none	Mohammed Enterprises Tanzania Limited (METL)	After decommissioning	15,000,000

	to be for other uses then it must be designed well to meet the requirement for the new use.					
4.	Loss of employment	Jobless and psychological problems to the workers	Prepare workers for forced retirement by providing skills for self-employment and wise investment of the retirement benefits. Ensure employees are members of security funds such as NSSF Consider redeploying employees in other business	Mohammed Enterprises Tanzania Limited (METL)	After decommissioning	17,000,000

CHAPTER THIRTEEN

13.0 Conclusion and Recommendations

13.1 Conclusion

From the environmental assessment conducted for the project, it is clear that the project potentially has some impacts which relate to the surrounding environment. The impacts relate to issues pertaining to risk of pollution of the environment in case of improper solid and liquid waste disposal; and general nuisance during construction. Sanitation is also a challenge that has to be appropriately considered with adequate safety measures in case of bursting of sewage pipes which may pollute the immediate environment. It should be noted, however, that despite the above potential impacts, it is possible with adequate design and implementation measures advanced in this report to mitigate the environmental effects and reduce them to acceptable levels. It is recommended that strict monitoring measures will be instituted both from an engineering and environmental point considering the sensitivity of the site. This will ensure that the project adheres to acceptable practices and standards. The project will increase sisal fibre production through improvement of Husseni Sisal Estate by increasing the area for planting sisals, undertake crop rotation, improving sisal processing machineries and other support facilities.

13.2 Summary of Positive and Negative Impacts

13.2.1 Summary of key positive impacts

A summary of the key positive impacts identified in the ESIA study are indicated below:

i. Creation of employment
ii. Creation of a market for local construction materials
iii. Increase in business
iv. Increase in Sisal fibre production
v. Increase in revenue to the National and District Government
vi. Income generation to local communities/ villagers
vii. Corporate Social responsibility benefits from the Estate

13.2.1 Summary of key negative impacts

The following is a summary of the main negative impacts and recommended measures to minimize or eliminated the impacts:

i. Impact from exhaust emission
ii. Noise Pollution
iii. Impact from Vibration
iv. Soil erosion
v. Vegetation disturbance
vi. Impact from solid waste generation

vii. Soil contamination
viii. Increase in accident incidences
ix. HIV/AIDS and other sexually transmitted diseases
x. Potential of criminal activities
xi. Inadequate waste management
xii. Inadequate sanitation
xiii. Gender based violence (GBV)
xiv. Risks of fire hazards

13.3 Overall Recommendation

It is the consultant's view that the project be allowed to proceed on condition that the measures proposed in this ESIA Report and in particular in the ESMP are fully implemented. Recommendations for the prevention and mitigation of adverse impacts are as follows:

i. Promote recycling and reuse of general refuse
ii. Ensure that disposal of hazardous and non-hazardous waste is carried out in line with relevant national legislative and regulatory requirements; any hazardous waste generated on construction sites must be collected, transported and further management by competent and licensed contractors
iii. Fitting construction vehicles with silencers to reduce the noise;
iv. Servicing machinery so that they can be in good condition at all times; and
v. Providing ear protection materials for the workers in noisy areas.
vi. Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only;
vii. Equipment should be regularly inspected and maintained to ensure it is in good working order by manufacturers
viii. Conduct regular vibration monitoring tests to assess the frequency and scale of the vibrations on site, and make more informed decisions about the preventive or corrective actions they can take to better protect their people, other stakeholder and the environment
ix. All drain pipes passing under building, driveway or parking should be of heavy-duty PVC pipe tube encased in concrete surround.
x. Contractor should prohibit the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health and safety of other employees, community members or the environment
xi. Appoint senior focal points in both clients and contractors with responsibility for ensuring that commitments and policies to prevent GBVH are implemented.

xii. All assets on a construction site should be identified (marked), inventoried (records), and tracked as closely as practical. A company identification numbering system should be developed.

xiii. Alternative measures such as the use of modern technology equipment that saves energy.

xiv. Also, the proponent should try to reduce amount of waste generation at the source so as to ease the solid waste collection facility.

xv. Sisal manufacturers may also invest in technologies that can reduce water usage, such as treatment plant

xvi. Proper sanitary facility should be available at all time throughout the phases.

xvii. Advice to people on the importance of using sanitary facility at all-time throughout the phases.